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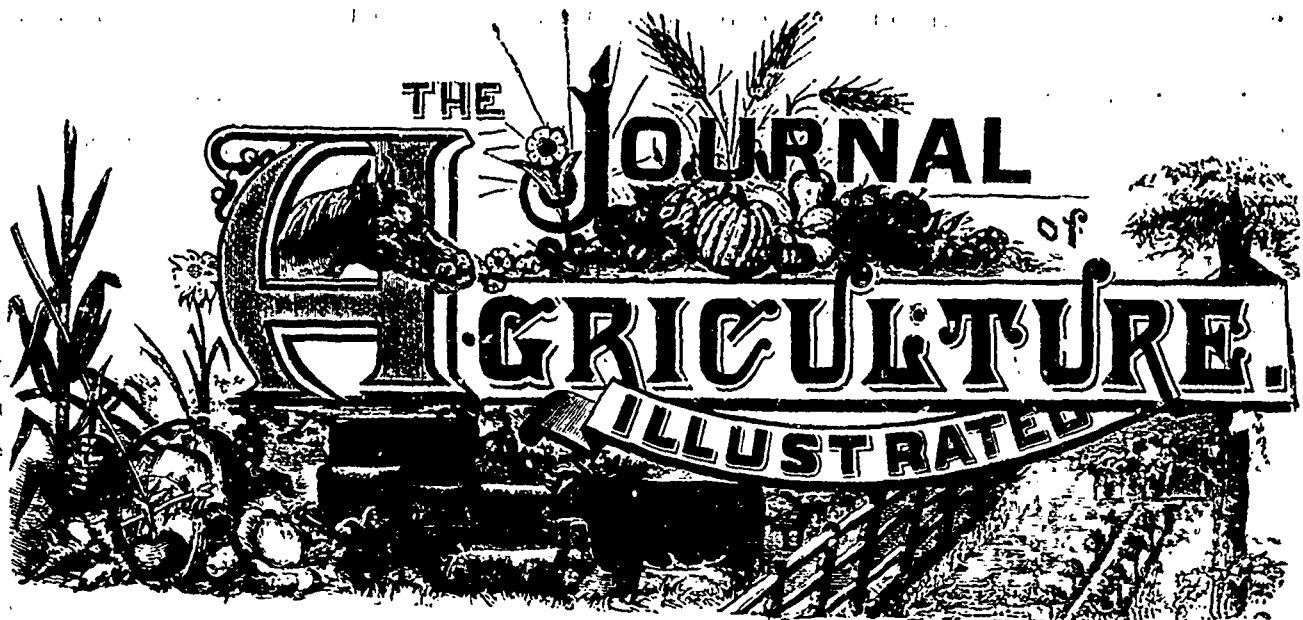
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NOTICE.—The subscription to the *Illustrated Journal of Agriculture*, for members of Agricultural and Horticultural Societies, as well as of Farmers Clubs, in the province of Quebec, is 30c annually, provided such subscription be forwarded through the secretaries of such societies.—**EDITORIAL MATTER.** All editorial matter should be addressed to A. R. Jenner Fust, Box 109, Laohine, Que.—or to Ed. A. Barnard, Director of the *Journals of Agriculture, &c.*, Quebec.

OFFICIAL PART.

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Deliberations of the Council of Agriculture.

Copy of the Report of a Committee of the Honorable Executive Council dated December 6th 1889.

Approved by the Lieutenant Governor, December 7th, 1889.

No 610. Concerning the approval of certain resolutions of the Council of Agriculture.

The Honorable Commissioner of Agriculture and Colonisation, in a memorandum dated December 6th (1889) recommends the approval of the resolutions adopted by the Council of Agriculture on the twentieth and twenty-first of November last (1889).

Certified.

(Signed) **GUSTAVE GRENIER,**
Clerk of the Executive Council.

The Council of Agriculture met on November 20th, 1889, at 9 P. M., in the room 119, Parliament Buildings, Quebec. There were present: Col. the Hon. W. Rhodes, Commissioner of Agriculture and Colonization, the Hon. G. Ouimet, Superintendent of Public Instruction, Joly de Lotbinière, Archambault and Dionne, Messrs. Pilon, Blackwood E. Casgrain, J. I. Tarte, J. I. A. Marsan, Sylvestre, Guilbault, Valois, Ness, Décarie, Péloquin, Rocheleau, A. Casgrain, N. Ritchie. Also present: Mgr. Labelle, Assistant Commissioner of Agriculture and Colonisation, and M. J. C. Chapais, Editor of the *Journal d'Agriculture*.

Proposed by M. Tarte, that Col. Rhodes be elected President: Carried unanimously.

Proposed by M. Sylvestre, seconded by M. Décarie, that M. Pilon be elected Vice President: Carried unanimously.

A letter from M. Jos. Ricard, apologising for his absence, was read.

The minutes of the last meetings were read and adopted. An invitation from Dr. Couture to visit the Quebec Veterinary College at 2 P. M. was accepted.

Proposed by M. Pilon, seconded by M. Rocheleau, and carried: That \$150 be this year retained from the grant to those agricultural societies that have not conformed to the rules of the Council in not holding a competition of the best cultivated farms, and that this sum be paid to them next year; provided they conform to the said rules and hold a farm competition.

Proposed by M. Pilon, seconded by M. Rocheleau, and carried: that the agricultural societies be required, as prescribed by law, to transmit to the Council a complete report of the proceedings at their annual meetings, with a list of the members present thereat.

Resolved, unanimously, that the Commissioner be requested to appoint veterinary surgeons to replace Messrs. Mc-

Eachran and Couture, in the examination of stallions at the exhibitions, when the above named gentlemen cannot be present.

Resolved, unanimously, that the necessity of obtaining a certificate from one of the veterinarians of the Council, showing that the stallion is perfectly sound and fit for the service, shall apply to the letting for hire as well as to the purchase of the stallion.

Resolved, unanimously, that as regards the stallions, the certificates of the veterinarians of the Council shall be renewed every year.

Resolved, unanimously, that the attention of the Government be drawn to the fact that the diplomas granted, up to the present time, by the veterinary schools do not bear an official character, and that it is desirable that this be remedied as soon as possible.

Resolved, unanimously, that the pupils of the agricultural schools shall, on their entrance, undergo a trial of two months before they are recognised as bursars (*élèves boursiers*), and that the allowance be not paid except to those who have given proofs of fitness and earnestness.

The Council then adjourned (at 5.25 p. m.) to 9.30 a. m. of the 21st.

SESSION OF NOVEMBER 21ST.

The same members being present, Col. Rhodes, the President, took the chair, and laid his resignation before the Council, giving his reasons for that step.

Proposed by M. Archambault, seconded by Messrs. Ness and Pilon, that M. Joly be elected President. Carried unanimously.

Resolved, unanimously, that the President, Vice-President, and Mr. Blackwood form the Committee on agricultural schools.

Proposed by M. Archambault, seconded by M. Rocheleau and resolved:

That the President, M. Ouimet, and M. Tarte, form the committee on the *Journal d'Agriculture*.

Proposed by M. Tarte, seconded by M. Pilon, and resolved:

That that part of the minutes of the last meeting, relating to the establishment of a branch of the *Institut Beauvais*, be withdrawn, and cancelled from the book of deliberations of the Council, seeing that the Council is of opinion that it is not advisable at present to establish in this country a branch of any foreign school.

Proposed by Mr. Blackwood, seconded by M. G. Ouimet, and resolved:

That the Council values highly the efforts now being made to establish at Richmond a thoroughly well appointed school of agriculture as a "High School" for the teaching of practical and theoretical agriculture. And the Council hopes that the promoters will receive all the patronage necessary to conduct their enterprise to a successful issue.

Proposed by Mr. P. T. N. Ritchie, seconded by M. A. Casavant:

That the Council, after having visited the veterinary school of Dr. J. A. Couture, recommends the Government to pay to him the grant which up to the present has been paid to the veterinary school attached to Laval University.

Proposed by M. Rocheleau, seconded by M. Sylvestre, and resolved:

That Mr. McEachran's school, as regards the grant to be paid in future to it, be placed on the same footing as the school at Quebec.

Proposed by M. Ouimet, seconded by M. Archambault, and resolved:

That it is desirable that there should only be one French veterinary school at Montreal assisted by Government.

Proposed by M. E. Casgrain, seconded by M. Tarte, and resolved:

That the request of M. L. N. Côté, the Rev. M. Charbonneau and others, asking leave to establish a second agricultural association in the county of Rimouski, be granted; the said association to comprise the parishes of N. D. du Sacré-Cœur, St. Valérien, Ste. Cécile du Bio, St. Fabien, St. Cimon and St. Mathieu.

Proposed by M. Rocheleau, seconded by M. Sylvestre and resolved:

That the *Journal d'Agriculture* be adopted as the official organ of the Council, and that the agricultural and horticultural societies be obliged to accept the rules and notices therein published, without any other notification.

Proposed by M. Ouimet, seconded by M. Archambault, and resolved:

That the postage be at the cost of the agricultural societies, and not at that of the secretary-treasurers.

Proposed by M. Rocheleau, seconded by Mr. Blackwood, and resolved:

That it is not convenient that the Directors of the agricultural societies be repaid the expenses incurred by them on account of their attendance at the meetings of their respective societies.

Proposed by M. Pélouquin, seconded by M. Pilon, and resolved:

That a commission on the stud-book for Canadian horses, and the herd-book of Canadian cattle, be appointed, to consist of MM. Tarte, A. Casgrain, members of the Council, and of MM. Lesage, Casavant, McEachran, Couture, and the Secretary of the Council, as specialists.

Proposed by M. Ouimet, seconded by Mr. Ness, and resolved:

That the request of the farmers of the county of St. Maurice be sent to the agricultural society of that county, to be considered by the society, which is to report upon it to the Council.

Proposed by M. Pilon, seconded by M. A. Casgrain, and resolved:

That, seeing that a considerable number of models, plaster-casts, and plants, imported from France at a great expense by the Council of Agriculture, together with maps and other articles of great value, are at present temporarily deposited in Dr. McEachran's veterinary school, at Montreal; the Government be earnestly prayed to cause these articles to be taken to Quebec, there to be placed in one of the rooms of the Parliament Buildings, to serve as a nucleus for an agricultural museum, the care of which might be entrusted to M. St. Cyr, in connection with the botanical museum of which he is the guardian.

The Council then adjourned (at 4.30 P. M.) until the first Wednesday in March.

Certified true copy,

(Signed) ED. A. BARNARD,

Secretary of the Council of Agriculture.

(From the French.)

Meeting of the Dairymen's Association of the Dominion of Canada.

This Association will hold its first annual meeting, in the city of Ottawa, during the month of February, 1890.

The executive-committee of the above association sends the present circular, with the programme it has prepared for this meeting, to all the officers and members of the directorate of the association, as well as to all the Senators and members of

the Canadian House of Commons who are, *ex officio*, members of the association, in virtue of a resolution adopted last year, which reads as follows :

" In order to become a member of this association, it will be necessary to be a member of one of the regular district or provincial associations, except in the case of Senators or members of the House of Commons, who shall be *ex officio* members of the association.

It was arranged last year that this meeting should take place on the second Tuesday after the assembling of the Federal Parliament. But, in order to cause this meeting to coincide with that which is to be held, in February next, by the Dominion Convention of Fruit-Growers for the discussion with the delegates of these associations, in a session comprising the members of both conventions, of certain questions which are common to both, such as Refrigeration and the Packing and Transportation of perishable goods, the executive committee has thought it better to change the date formerly fixed.

Special rates of fares, on the railroads, and of board at the hotels, will be obtained for those who wish to attend the meeting. Due notice will be given of them, as well as of the precise date of the meeting, and of the names of the lecturers, at a future time.

Specialists from the States and from the different provinces of the Dominion will be invited, and the executive committee, desiring to render the meeting as important and interesting as possible, trusts that the public, as well as the members of the press, will attend in great numbers the sessions to which they are heartily invited.

The following is the *provisional* programme, subject to such alterations as circumstances may render necessary.

FIRST DAY.

MORNING SESSION, 9.30 A. M.

Opening address.
Reading and adoption of the minutes.
Identification of the Delegates.

AFTERNOON SESSION, 2 P. M.

Milking breeds.—Discussion.
Feeding of milch-cows.—Discussion.

EVENING SESSION.

Manuring of land for the supply of food to plants.—Discussion. Artificial manures.—Discussion.

SECOND DAY.

MORNING SESSION, 10 A. M.

Routine business, elections, &c.
Permanent organisation of the association.

AFTERNOON SESSION, 2 P. M.

Cheese-making.—Discussion.
Butter-making.—Discussion.

EVENING SESSION, 8 P. M.

Preservation and carriage of fruit and of dairy-products.—Discussion of these two questions by the members of the Dairymen's and of the Horticultural Associations.

Three other subjects will be discussed if time and circumstances permit :

Farm buildings.

The prevention of fraud.

The production of meat *vs.* the production of milk.

Meetings of the executive committee will be held during the afternoon of the day preceding the meeting, as well as every morning before the general session of the convention.

The lectures must not exceed half an hour each and the delegates shall only speak once on each subject, and that only for five minutes, unless the manifest desire of the meeting shall cause an exception to be made to this rule.

By order of the executive committee of the Dairymen's Association of the Dominion of Canada.

J. C. CHAPUIS

Sec. D. A. D. C.

(From the French.)

DAIRY WORK.

We publish the following from the *Prix Courant* on the subject of the dairy-interest, as an introduction to certain reflections we wish to submit to our readers :

" In spite of the efforts of the Dairymen's Association, the manufacture of butter and cheese, we regret to say, is growing less in Quebec, though in Ontario it is on the increase. Strange ; for there is no country to which the dairy industry is better suited than our province. Grain and roots may fail ; potatoes rot and wheat freeze ; but the pastures always yield well. Growing hay for sale is sure to impoverish the farm ; feeding off the grass, on the contrary, improves the land. No system of farming is so certain to yield a profit at so small an expenditure of labour as dairy-farming ; the only absolutely necessary part of it, a part too much neglected by our people, is the proper feeding of the cow in winter. A cow well kept during the winter will give a considerable profit ; neglect her six months out of the twelve, and she will hardly pay for her keep.

" A word on cheese-making. We observe that many of our factories got the same price for their cheese this season as the best factories of Ontario. The quality of our cheese, then, depends on the makers, and we cannot too earnestly impress on the minds of the directors and patrons the necessity of securing the services of competent cheese-men. Were we to send some of our makers to Ontario, and import others from that province for our factories, it would not be lost labour.

" Let directors, patrons, and makers remember, especially to attend the lectures and practical lessons given by the Dairymen's Association, and be present without fail at the annual meeting of the Association on the 11th and 12th of December, at Arthabaskaville, where we hope to meet our readers."

We, in common with our contemporary, regret that the manufacture of cheese and butter is falling off in our province.

We endorse, too, all that he says about the resources offered by our province as regards the development of the dairy-industry and the management of cows in winter, which if properly carried out is always rendered profitable by the ample yield of milk it insures.

And we also take pleasure in stating that, if the quantity of cheese made is on the decrease, its quality is improving.

Lastly, when our readers see these words, the Convention of the Dairymen's Association, at Arthabaska, to which the *Prix Courant* invites all those interested in the products of the dairy, will have taken place, and will have been attended, we trust, by a numerous assemblage.

And having said this, we wish to inquire shortly into the best means to be taken to ensure a regular, normal, and rational development of the dairy industry, not only in our own province but throughout the Dominion, an inquiry, which others have instituted before us, and to them it appeared good, and we agree with them, that a Federal Association of the Dairymen's Associations of the whole Dominion would be one of the best means of assisting the development of the Dairy-industry.

It is to Mr. Lynch that we owe the first germ of this idea. He it is who has done the most for the advancement of agriculture as connected with the manufacture of butter and cheese. He has done all in his power to cause this germ to take root, and, last April, he succeeded in getting together at Ottawa a number of delegates from the associations, who then and there laid the foundations of a Federal Dairymen's Association.

At once, the new society set to work. Interviews were had with the Committee of the House on Agriculture; then with the Premier and his colleagues, who were compelled to admit that, to promote effectually the advancement of the dairy-industry of the Dominion, the appointment of a dairy-commissioner, charged with the special duty of looking after the wants of that business, was absolutely necessary. And more; at the request of the new association, a grant of \$3,000 was voted for the promotion of the interest of the dairy business.

Here, indeed, was a good starting post. Unfortunately, the principle accepted and the vote carried, the affair ended. In fact, an interview of the committee of organisation of the association with the federal authorities ended in nothing being done, and nobody knows how to begin the work to carry out which the new association was instituted, and for which it prayed for the appointment of a dairy-commissioner.

Our local dairymen's associations are about to hold their annual meetings. Last year, they agreed to what Mr. Lynch proposed, and, at his request, sent their delegates to Ottawa. Well, they should now continue the work they then began. The new association holds its meeting on the second Tuesday after the opening of the federal parliament. Let delegates be sent there again, charged to come to an understanding about the appointment of the dairy-commissioner whose existence has been already acknowledged to be necessary, and about the employment to be made of the \$3,000 voted for the dairy-industry.

We wish to suggest certain considerations as to the nomination of the dairy-commissioner, and the expenditure of the grant.

To begin with, the first point to be established as regards the commissioner is, that he shall be a perfect master of English and French. We must not forget that this high officer will have to discuss questions of the greatest interests with, not only the English people of the whole Dominion, but also with the entire population of the province of Quebec, with the important groups of French-Canadians inhabiting Manitoba and Ontario, and with the French-Acadians of New-Brunswick and Prince Edward's Island. When we consider the proportion of French-speaking people engaged in dairy-work, especially, Quebec after Ontario having of all the provinces the greatest interests, we shall not be considered too exigent if we insist that the commissioner shall be master of both languages.

In the second place, if there is some hesitation as to where the improvement of the dairy-business should begin, we will point out a work of pressing importance, that might be begun this very year, and which will give the federal government an opportunity of expending a part of the \$3,000 voted for this year, between the present time and the 1st July, in a most beneficial manner.

In the past summer, we visited the Eastern part of Quebec and the maritime provinces. Passing by the Baie-des-Chaleurs, we traversed the Northern district of New-Brunswick, inhabited by Acadians, and Prince Edward's Island, returning by the Madawaska country. In all these districts we found as many central places marvellously well adapted to the development of the dairy-trade. What is wanting is a spirit of enterprise and a knowledge of the advantages offered to farmers by this industry. Let specialists, under the control of the commissioner, who will, we trust, be appointed by that time, be sent during this winter into these districts. Let them get together, in small groups, meetings of the farmers. Let them show the advantages to be derived from farming conducted in connexion with dairy-work, and lead them to second the enterprise of those manufacturers who, the moment they find farmers willing to supply them with milk, will always be ready to establish cheese- and butter-factories on the co-operative plan. And more; let them do on a large scale what our government has done; i. e., let them offer a grant of money to the first factory that shall be started in a place where there is not one already, provided it be a model one, and marvellous practical results will be obtained from the very beginning.

Our local Dairymen's Associations have not the means of starting these creative undertakings. All that they can do is to guide those who have already entered on this road, and who want information to help them on their journey towards perfection. The work of these associations, to be effective, must as far as possible, be de-centralised. To that end, the federal association ought to labour for de-centralisation, by favouring the creation of numerous local societies wherever the dairy-business has an opportunity of establishing itself.

And, with all this, we must not forget that the idea which dominates the development of the dairy-trade is not that of increasing unreasonably the production of butter and cheese, so much as that of favouring an entire system of rural economy and of well studied cultivation which will enable us to preserve the fertility of our land. This system will lead to the development of the dairy-industry, because it is a recognised fact that this industry is the best suited to the northern countries, which excel in the production of succulent grass and nutritious fodder-crops.

J. C. CHAPUIS.

(From the French.)

Whether the cheese exported from Canada to England comes chiefly from Quebec or from Ontario, I know not, but this I know: Canadian cheese is fetching now—in November—a halfpenny a pound more than the best whole cream thick Gloucesters made on the richest alluvial meadows on the banks of the Severn. My brother wrote me word yesterday that his people cannot get sixpence a pound for theirs, and I see the Liverpool quotation for best Canadians is 56s. a cwt. It was a long time before I could believe that such pasture as I see every day could make good cheese; but I was mistaken. It is the maker's skill and not the quality of the land that determines the value of the cheese.

Shorthorns.—I am sorry to see by the papers that M. Couture, the veterinary-surgeon, has so bad an opinion of shorthorns for the dairy. I am not surprised, however; as most if not all of the shorthorns imported from Britain are of the show kind, no real dairy shorthorns having been introduced into this country. Nine-tenths of the butter and cheese made in England comes from these cows, and, except locally, no dairy-farmer there keeps any other stock, so they cannot be very bad after all.

Potatoes.—Surely the *Montreal Witness* must have been mistaken the other day when it stated that the statistics published at Washington gave the average crop of the United States as 76 bushels to the acre. My friend, Dr Hoskins, published the other day the following account of the yield of that crop in Northeastern Maine. The greatest yield, 730 bushels, is equal to about 20 tons (112 lbs. to the owt.), and even on our best English *warp* lands 15 tons are rarely grown. In fact, I never knew any one but Mr. Shirley Hibburd who grew 20 tons to the acre, and he only did it once, as far as I know.

The potato in Aroostook.—The remarkable yield of the potato crop in Northeastern Maine, even in this unfavorable year, is more than surprising—it is astounding. Who would want to emigrate from a section where such results as the following, reported in the *Maine Farmer*, are got from the land in a bad year: "Several parties planted fields in competition for the prize offered by the *American Agriculturist* for best acre grown from the application of commercial fertilizers alone. At our recent visit to northern Aroostook we picked up some statements of these prize acres and also other remarkable yields. C. B. Coy, Presque Isles, claims to have raised 738 bushels of the Dakota Red on a single acre. F. S. Wiggin of the same town raised 537 bushels on an acre, sixty-seven of which were small ones, leaving 470 bushels of market potatoes to the acre. The details of growing these almost fabulous crops are not yet given to the public. Mr. Wiggin, however, states that his acre was one of a field of five, and received no different treatment from the rest, only in the commercial manure used. C. B. Lovejoy, of Perham, from a field of eleven acres put 2,000 bushels into the factory and had a few bushels over 2,000 more of market potatoes. A single selected acre gave 470 bushels. John Eddy, of Woodland averaged over 400 bushels to the acre with his whole crop. A son of Columbus Hayford, Maysville, still a boy, harvested and sold what brought \$131 from a single acre, and this was only a sample acre of a field of fourteen. We could go on with similar statements of crops to an unlimited extent, but these are enough to show the bounty of the crop. It can not appear strange that the farmers of that county are cheerful over the situation. Within reach of the railroad, the cellars are still full of market potatoes. We have always thought Orleans county about as good as any place for potatoes; and we did once grow 410 bushels of merchantable potatoes on one acre, but this year we are obliged to confess that Mr. Hayford's son got as much money out of one acre as we got out of three.

Pea-straw.—In another part of this number of the Journal will be found an appreciation of the value of pea-straw which will, I fear, astonish many of my readers. However, I am not alone in my respect for that generally derided fodder, as the subjoined article, taken from the "answers to correspondents" of the *English Agricultural Gazette*, will show:

Rations.—1. What are the feeding constituents of "pea chaff"? 2. Is the following ration for big dairy cows giving sixteen to twenty quarts of milk correct as to feeding constituents to produce good milk for sale, and to keep the cows in good condition: 40 lbs. mangels; 16 lbs. red carrots; 22 lbs. ale-grains (wet); 7 lbs. decorticated cotton-meal and rice meal; 16 lbs. fair meadow hay—total 101 lbs.? Would half the above (but with 10 lbs. hay) do for Jersey cows in full milk, and dairy cows giving seven to ten quarts a day? S. H. [1. By pea-chaff we presume you mean pea-straw cut up into chaff. If so, it contains 65 per cent. of albuminoids, 0.5 of fat, and 33.5 of carbo-hydrates; with the addition of a little oilcake it would make a good food itself. 2. The ration you give has too much of total dry matter and excess of nitrogen-

ous ingredients. Try the following quantities:—30 lbs. mangels; 12 lbs. carrots; 20 lbs. grains; 7 lbs. pea-chaff; 12 lbs. hay—Total 81 lbs. Leave out the cake and rice altogether, or substitute the pea-chaff for them. If the cows show symptoms of falling off in milk then give some cake; in any case you might communicate the result to us. A little over half the quantity you give (say a total of 60 lbs.) should be enough for Jerseys. 3. We cannot lay our hands on the comparative analysis of ale and porter grains, but the former are quite worth all the difference in price more than the latter.]

Price of beef.—The following is not bad, and hardly exaggerates the difference between the live-weight price and the retail price of a bullock in the place. Butchers are paying the farmers about 3 to 3½ cents a pound for their beasts alive, and they charge me 4 cents for shins, &c., and 12½ cents for roasting pieces! And very inferior roasting pieces, too.

Brought Him in Debt.—The following queer story of a transaction between a farmer and a butcher in one of the counties bordering on San Francisco Bay is told by the *Butchers' and Live Stock Gazette*: Mr. Jones sold a bullock to Mr. Lazarus for \$16, to be taken and paid for when fat. When Mr. Lazarus came for the animal, Jones said he would like to have a forequarter for his own use. Mr. Lazarus willingly accepted the order and, after the bullock was slaughtered, delivered the meat. A few days later Jones went to town, called on Lazarus, and as a preliminary to a settlement, asked for his bill. "Dot's all right, Mr. Jones. I haf the bill already made out. Here you are." Mr. Jones read:

Mr. Jones, Dr., to Jacob Lazarus.

To one quarter of beef, 185 lbs., at 10c.....	\$18.50
By credit, one bullock.	16.00
	\$2.50

"Good heavens, Lazarus, you get three quarters of the beef, the hide, tallow, and offal, and bring me in debt \$2.50. How's that, old man?" "Ah, Mr. Jones, that beef was cheap at ten cents a pound." "But, Lazarus, you only gave me \$16 for the whole bullock." "Ah, but, Jones, dot's pizness, pizness, do you see?" "Well, Lazarus, next time I have a fat bullock I'll kill it myself, use one quarter and throw away the rest, and then I will save \$2.50. You see?" "Ah! ah! but dot's not pizness; farmers should not be butchers—dot's bad." A. R. J. F.

How to prepare Straw for Cows in Winter.

In considering this question, I shall endeavour to keep, as far as possible, within the limits of practical management. I am well aware that a good deal of attention has been directed, chiefly in Germany and the U. S., to the question of the preparation of food for the live-stock of the farm. There have arisen chemists who pretend to give the exact food fitted to produce a milk for a given purpose, the only factor taken into account being the weight of the cow.

This phase of the feeding question is so purely ideal and so thoroughly unpractical that it is not likely to have any very long life. Feeding—like all other farming operations—depends so much on the available resources of the farm, supplemented perhaps by judicious purchases of extraneous matters, that this ideal system can hardly be carried out except by those to whom expense is no object.

But this by way of introduction. My real subject sums itself up in this: is the practice of feeding milch cows in winter on straw—a practice almost universal throughout the province—capable of any modification by which the value of that aliment can be increased without great additional outlay either in labour or in the purchase of other materials.

And first, a few words on the different sorts of straw usually found on our farms: they are oat-, wheat-, barley-, and pease-straw.

Of these, pease-straw and oat-straw are the most valuable; next comes barley-straw, and wheat-straw is, both theoretically and practically, the least valuable of all.

I need hardly pause here to remind you that the value of straw, like the value of hay, is very much modified by the state of ripeness in which the crop finds itself when it is cut, and by the weather that obtains during the time the crop lies in the field. Pease-straw, for instance, left to stand till the grain is dead-ripe, drenched with rain, and turned over and over to dry until the leaves are all fallen from the stalk, is very poor stuff. And so of the other straw-crops. Cut as early as possible, and carried after fine drying weather, pease-straw will be found to be, for any stock, one of the most valuable adjuncts to their food of any fodder-crop grown.

Barley-straw, when the grain is intended for the use of the brewer, and has therefore been, very properly, allowed to ripen thoroughly, is of no great value, unless, as happened this year, the constant moisture has encouraged the growth of the young clover; in which case we must of course attribute its good qualities to the latter.

Wheat-straw is very much used in the south of England for horses. It is cut into chaff with clover-hay, in the proportion of one of straw to two of hay, but more to prevent the clover-chaff from balling in the animal's stomach than from any idea of its imparting much nourishment to its frame.

In Scotland, where, owing to the dull moist climate, grain-crops rarely over-ripen, horses and cattle seldom taste anything but straw, as fodder, and very little hay is made, which little is kept untouched till the heavy-work of the spring begins, and is then given in by no means a lavish manner to the horses. Forty years ago, $\frac{1}{10}$ of the noble beasts that were sent from Scotland to the London market were fattened on roots and straw alone. The straw used was almost entirely oat-straw, and the crop was, as I hinted above, generally cut on the green side.

The nutritive constituents per acre of the four kinds of straw, in a homely way of putting it, are:

	Fibre lbs.	Starch, sugar &c. lbs.	Nitrogenous matters. lbs.	Fat. lbs.
Wheat, say, 3,000 lbs.....	1,500	900	40	75
Barley, say, 2,100 lbs.....	1,050	630	28	30
Oats, say, 2,700 lbs.....	1,210	956	36	54
Pease, say, 2,700 lbs.....	675	1,200	330	40

The above figures are from "Johnston's lectures," and have no doubt been revised over and over again since the publication of that excellent work. Here are Wolff's figures, for the same weights of straw per acre:

Wheat	1,200	900	90	36
Barley.....	840	760	73	29
Oats	1,080	977	108	54
Pease	1,016	978	175	27

It must be remembered in these tables that a good deal of the fibre is digestible, and part of the other elements indigestible.

A great difference indeed is visible in many places between the two sets of analyses; so great, indeed, that I am inclined to think that Johnston's figures for the nitrogenous matters of pease-straw must be a misprint. If we take the digestible nutrients contained in the different straws, we shall get very much nearer the proper idea of their respective values:

	Nitrogenous matters.	Starch, sugar, &c., and fibre.	Fat.
3,000 lbs.—Wheat.....	24.00	1068.00	12.00
2,100 " —Barley.....	27.00	1852.00	10.50
2,700 " —Oats.....	37.80	1081.70	16.20
2,700 " —Pease.....	78.30	901.80	12.50

I need not say that the nitrogenous matters—*albuminoids* or *protein compounds*—are the most valuable elements of food. Taking the American valuation of the two, albuminoids, and fat together as being worth 4.33 cents, and starch, sugar, digestible fibre, &c.—carbohydrates—at .9, we find that the ratio of value between wheat- and pease-straw is 37.41. Speaking as a man who in England never grew less than 12 acres of pease and horse-beans, a year, I must say that the harvesting of the pease-straw, samples of which were furnished to Mr. Stewart for the above analyses, must have been very badly managed. There is only one thing that suffers more than pease-straw from rain, and that is tare-hay. The straight upright stems of the horse-bean endure washing after being cut without much damage; I wish heavy land farmers grew more of them; there is nothing equal to this bean for horses in hard work in cold weather, and they eat the straw voraciously. What says our old English proverb of a man who is too cheeky? "We must dook his beans." The cultivation of them is simple: 2½ to 3 bushels an acre, drilled 2 feet apart and kept clean, like corn, by harrow, horse hoe, and hand-hoe. M.M. Irving and Drummond, of Logan's farm and Petite-Côte, grow them every year. They must be sown *very* early, and, if the land is properly worked, they are one of the best preparations for wheat or other grain.

And, now, having carried our straw, in what manner shall we prepare it for our cows in winter?

And here a question naturally arises: are the cows intended to be kept in warm quarters all the winter and soiled in summer, or to be turned out to grass as soon as the snow is off, and exposed to the cold blasts of early May? Again: are the cows kept for the purpose of supplying milk to be sold *en nature*, or to make butter? Upon the answer you make to these questions depends the point whether you shall or shall not cook their food.

In 1887, Mr. Moore, of Frome, Somersetshire, England, addressed a set of inquiries—19 in number—to 200 well known English farmers, asking them to give him their experience and practice as to (1) chaffing, (2) mixing, (3) cooking, (4) steaming food for cattle. Of course, the English practice, universally including roots among the cattle-foods, can hardly be a guide to us, as the immense majority of our farmers, I grieve to say, grow none. Still, as in years of bad seasons, roots have to be very economically expended, straw is there largely used as a supplementary provision, and it can hardly be superfluous to mention here some of the means used to modify it in that country.

Of course all of you have chaff-cutters, of some form or another. If not, I should advise the immediate purchase of

one. They are not expensive : a good hand-machine, large enough to cut up—one man to turn and a boy to feed—the day's consumption of straw for a dozen head of cow-stock in an hour, can be had for \$10 or \$12. Almost all the farmers addressed by Mr. Moore cut their straw—there is hardly an exception.

The celebrated Sir John Lawes uses all his oat-straw and some of his wheat-straw as food ; he chaffs it all. His herd consists of 60 milch cows, which have from 4 lbs. to 7 lbs. of cotton-seed cake a day with 4 lbs. of bran, 50 lbs. of mangels, and chaff—half hay, half straw. Is not in the habit of cooking food for his stock ; the Woburn experiments, which were conducted under his supervision, were against it.

Mr. Martin Sutton, the well known seedsman, uses straw largely for feeding purposes ; finds great saving in chaffing it.

Mr. J. P. Sheldon, professor of dairy-teaching, at Sheen, Derbyshire, used largely oat-straw for cattle-food when on his father's farm. This gentleman, so well known from his visit to Canada, some years ago, and from his description of that country, is the only one of the 200 farmers who uses no litter for his cattle, horses, or pigs ! He farms on the beautiful hills of " the Peak," over which I have followed the hounds many a time ; the fields are large, divided by stone-walls, and hardly the mark of a plough to be seen during the day. So straw must be very scarce indeed—far too scarce to be used for litter. I may say here, *par parenthèse*, that our own tenants in Gloucestershire, whose land is almost entirely in old pasture—about 4 $\frac{1}{2}$ arable—never litter their cows. I am sorry to add, that the yards, in consequence, are (or were) generally in a filthy state.

Mr. Sheldon "generally uses about 4 quarts of meal to each bushel of chaff. Never measures out the food, but gives all the cows will eat up cleanly." His mixture seems to be, nearly, my own favorite one—I have often mentioned it in the *Journal of Agriculture*—pease-meal, boiled linseed, and maize, with chaff. Does not use brewers' grains, though would, were he a seller of milk. Never cooks food, as damping the chaff and mixing it with the meals is quite as good, and less costly.

Mr. Richard Stratton, the well-known shorthorn breeder, only chaffs his straw *during years of scarcity*—I am afraid our years, in this province, are too generally, as regards cattle food, years of scarcity—. As to purchased foods, he has no rule, buying always what is cheapest. Finds no saving in cooking food, but, when keep is short, sometimes steams food in order to get it all consumed, and litters his cattle with moss.

Mr. Brockie, Caermarthenshire, tried cooking for two winters. Will not continue it, *stock did not do so well when turned out in spring*.

Mr. Duckham, the celebrated breeder of Herofords, uses all his barley and oat-straw for food, and litters with his wheat-straw. His cows live exclusively on two feeds of "cavings" mixed with the pomace from cider-making, and afterwards with pulped swedes or turnips, and are supped up with barley or oat-straw. When short of roots, he applies linseed, crushed and steeped in boiling water—one peck to 20 gallons—to the cavings, letting the moisture lie and imbibe the moisture for some hours.

Next, I may mention Mr. John Speirs, a large cow-feeder of Glasgow, Scotland, who gives his *milch-cows* 8 lbs. to 10 lbs. of fresh-threshed oat-straw a day, but chaffs none. His cows get a great variety of food : "Silage (grass), oat-straw, hay, cabbages, clover, vetches, all *en nature*. Brewers and distillers grains and wash, *muttah-pease* (the *dall* of India), in meal, decorticated cotton-seed meal, refuse maize-meal from the starch-factories, linseed-cake, bean-meal, malt-cummius (rootlets of dried malt), &c. As an example of the daily food of the cow I add the following :

Oat-straw	8 lbs.
Silage (grass).....	10 "
Potatoes	14 "
Grains	10 "
Linseed-cake.....	$\frac{1}{2}$ "
Muttah-pease	4 "
Refuse maize-meal.....	2 $\frac{1}{2}$ "

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Feeds as follows : cake during milking time, 4 A. M. ; grains and meals 6 A. M., 12, Noon ; and 6 P. M. ; silage, mid-forenoon ; potatoes, mid-afternoon ; straw at 10 A. M., 4 P. M. and 6.15 P. M. The cows are Ayrshires, weighing about 900 lbs., so each cow eats daily about $\frac{1}{8}$ of her own weight, and in the course of the year upwards of 200 times as much as her own weight. Mr. Speirs should know his own business best, but I do not know what my friend Mr. Deming will say, if he sees this ! He contends that no stock should be fed more than twice a day ! Mr. Speirs feeds 9 times in the 24 hours and I am sure a Glasgow cow-feeder consults his own interest in the management of his stock. For the information of my "scientific ration" friends I may say that the cow-food above detailed has a nutritive ratio of 1:5.7.

Mr. Speirs cooks for cows only, and he is quite convinced that the greatest profit cannot be made out of a milk-business unless the cows are kept warm, and their food and drink given warm. His cows go to pasture in June and have 7 lbs. brewers' grains, 4 lbs. decorticated cotton-seed meal, 3 lbs. of oat-straw, and cut grass *ad lib.*, a day. They are *always* kept in at night, so the objection to cooked food for cows, as making them delicate when turned out in the spring, is obviated.

Mr. Hunter Pringle has a very strong feeling in favour of using straw as food for stock. He farms largely in Norfolk, and is a regular correspondent of that excellent paper, the *Agriculture Gazette*. Seven shillings the arable acre he calculates to be the loss entailed throughout England by waste of valuable feeding straw. He uses, in the form of chaff, $\frac{2}{3}$ of the straw produced on his farm, but as the Norfolk light-land farmers keep no cows, we must pass them by. Norfolk is a sheep-country, and very good mutton they make, very good beef too, but all the bullocks are bred elsewhere.

Mr. Gilbert Murray, Derbyshire, the McPherson of the English cheese-factories, chaffs all his straw. Uses moss-litter instead of wheat-straw. Finds great economy in chaffing. Feeds with oats, wheat-tailings, pease, and linseed on ground. Steams chaff and mixes meal with it. Finds cooked food capital for dairy cows.

Now, taking a glance over the opinions of these gentlemen we find that, as regards *chaffing*, 70 per cent. adopt it entirely, 20 per cent. adopt it partially, and only 10 per cent. repudiate the practice.

As to the use of straw for litter, only Professor Sheldon and Mr. Wright use no litter at all. But then, as I observed before, the former lives in a district where very little straw is grown, and Mr. Wright is evidently in a like predicament, as he says : "I endeavour to cut a little fern for cows to calve on ; at other times they have no bedding at all." Shepton Mallet, where his farm lies, is one of the richest dairy districts in England. I know it well, and can remember its extensive pastures without an acre of arable land to be seen, except on the slopes bordering on the fen.

Mr. Woods, Lord Walsingham's agent for his Norfolk property, speaks in favour of *mixed-food* ; as, in fact every one of the writers does. "It prevents the food from being wasted, promotes digestion, helps the use of unpalatable food by the flavour imparted to it by the better sorts of meals, and converts poor sour edibles into wholesome nutriment."

Cooked or steamed food is evidently unpopular in England, except in the case of town-supplying dairies. One of the main reasons brought forward by the advocates of cooked food is that the process increases the digestibility of the substance treated. This, I believe to be an erroneous idea. It was shown long ago, in the case of the soldier who fortunately—fortunately for science, I mean—was wounded in such a delightfully convenient manner that the whole process of digestion could be observed through an aperture in his chest, that boiled cabbage took $2\frac{1}{2}$ hours longer to digest than uncooked cabbage. And of late years, such practical chemists as Hellriegel and Luocanus have shown that rye-straw was not increased in digestibility by fermenting or by cooking it. Experiments by Funke gave the same results regarding the digestibility of the total dry matter and the cellulose of a mixed ration, given to milch-cows.

Another set of experiments, at Poppelsdorf, showed that the digestibility of hay was actually decreased by steaming. Coarse hay, given to oxen, first dry, then steamed, showed a reduced digestibility of all the constituents, but especially of the nitrogenous or protein compounds, which were reduced from 46% to 30%. Boiled bran was proved to be less digestible than uncooked bran. The deduction to be made is: the digestibility of concentrated fodder is not increased by cooking, and it is clear from what has gone before, that the general opinion of our best English farmers is not favourable to cooking food for animals where hardness is desired; several of the correspondents giving a very decided opinion that animals that have been fed on cooked or steamed food do badly when turned out to grass in the spring.

I may as well mention, before I take my leave of this part of my subject, that the men whose opinions I have quoted above are all regular tenant farmers who, with the exception of Professor Sheldon, live entirely by farming.

And, now, having briefly considered the various modes in which straw is utilised in England for cattle-food, let us see how we, in a country far more difficult to supply with winter nutriment, can prepare this food so as to be more valuable for the production of milk than it is in its crude state.

Many of us grow pease, and all of us ought to grow flax, unless our farms consist of land too heavy for it culture. Indian corn, too, is produced on most of our farms. Here, we have three most valuable grains, capable of highly useful and, at the same time, economical application to our winter-dairy. For, I suppose, few farmers who are desirous of improving their methods of management will in future dry off their cows, as a rule, in November, as has been too much the practice heretofore. Scarce as good butter is at all times of the year, it is very scarce indeed in winter, and a few cows well kept would at that season add no trifling amount to the farmer's income.

For the preparation of the food, let us take, first, the case of the farm on which there is neither silage nor root crop, and no great means of purchasing extraneous food. Some thing must be added to the straw, that is positive: let us take linseed, and proceed as follows:

Cut the straw into inch-lengths—cattle masticate long chaff better than short—spread it on a stone-floor, or on a tight wooden floor if the other is not convenient. Steep 7 lbs. of linseed in as much hot water as you can manage to prepare, and pour it over the straw, turning the stuff over and over till thoroughly mixed; leave it to soak for ten or twelve hours, and then give it to your cows. Simple enough, but very effective, I assure you. Seven pounds of linseed will be of more use than you would believe to 10 cows. The moisture will soften the straw, the linseed will flavour it, and the two together will induce your animals to eat up their food with appetite and without waste. In a fortnight after beginning this

made of feeding the difference in the appearance of your cows will astonish you. There is nothing like linseed for giving a satin skin to cow or horse.

But this first mode of preparing food is but a makeshift and very imperfect. The cows will not by any means digest the whole of the linseed if used uncrushed. Bite a grain of it and see how it slips from between the teeth. In England, we have small (large ones too) crushers that crack linseed at a great rate, but here we must be content with the mill-stones, and as the oil exuding from the seed clogs the stones we must mix some grain or pulse—or, which is better, both grain and pulse—with the linseed. You make take either

No. 2—1 bushel of linseed;	} 4 bushels.
2 “ “ oats;	
1 “ “ pease;	

or

No. 3—1 bushel of linseed;	} $4\frac{1}{2}$ bushels.
2 “ “ oats;	
$1\frac{1}{2}$ “ “ corn.	

Of the two, I prefer the former, though the pure theorist would say that the *albuminoids* were very much in excess. So they are, but they are very much in defect in the straw, and therefore it is all right. One advantage of these mixtures is, that as the linseed is cracked, cold water may be used in place of hot, as more handy.

Of these meals, 3 lbs. or 4 lbs. per head stirred up in lots of water and intimately mixed with straw-chaff will be sufficient. The process is the same as the one previously described.

Where ensilage is made, I should trust to the moisture of that conserve to moisten the straw, still allowing the mixture to lie for some hours in a well raised heap. Of course meal of some sort must be given separately to the cows: I would not mix it with the ensilage. (1) Of the two, I should use the pease-mixture with ensilage.

Where roots are grown for milch-cows, and batter made from the milk, it is a matter of great importance to obviate the slightest risk of the taste of the roots affecting the product. To this end, give the roots either during milking or immediately after—digestion will in most cases carry off the flavour—. Either of the mixtures Nos. 2, 3, may be used with roots.

Of straw, prepared in either of the above ways, a fair-sized cow—say 1,000 lbs.—will consume about $3\frac{1}{2}$ bushels. Any quantity may be out at a time, provided it is tramped down tightly in a close bin and kept covered from dust and damp.

As for the cost of these mixtures, it is rather difficult to fix a price upon them, as all the ingredients are supposed to be produced on your own farms. But (No. 1) taking linseed at $1\frac{1}{2}$ cent a pound, and allowing a cow to be 200 days at stall-feeding, she would consume 150 lbs. during the winter months, costing, nearly, \$1.90.

No. 2 would cost an additional sum of \$6.00, and No. 3 about the same, or altogether for full feed of $3\frac{1}{2}$ lbs. of linseed, oats, and pease or corn—\$7.90, for the winter season: only $3\frac{1}{2}$ cents a day—not a very expensive food.

Those of you who live near the great centres can, I am told, buy cotton-seed meal for \$23.00 a ton of 2,000 lbs.; about a cent and a tenth per lb. This, diluted with plenty of water, and scattered over the chaff, as before, must be a cheap food. When I was farming, it was not to be had at less than \$30.00 a ton, and freight from Montreal, cartage,

(1) I do not mean that the meal should be given alone, but mixed with straw-chop, wet or dry.

&c, brought up to \$33.00. The other mixtures I have used largely myself, both here and in England, and can recommend them.

Lastly, every milch-cow should have, if she is giving a fair lot of milk, 8 lbs. or 10 lbs. of long hay the last thing at night. Some how or other it seems to help the digestion of the other foods, and as hay is so very plentiful, it cannot be an expensive mode of doing justice to the animals from whom you will, I hope, in future derive a profit which was non-existent during the past, when there were very few cows in milk during the winter months throughout the province.

(Read, in French, at Arthabaska.)

ARTHUR R. JENNER FUST.

Manure Adulteration on the Continent.

During the last meeting of the Society of German Agriculturo, which took place at Magdeburg, M. Schultz, of Lupitz and several of his confrères raised the question of how best to assure the probity of transactions in the chemical manure trade. For large farmers this question is perhaps less important. Large farmers, by their personal instructions, by the importance of their purchases, which place them in communication with great manufacturers, find themselves much better protected, as they know how to invoke in case of need the vigilance of the control stations, and as, from another point of view, large manufacturers, in order to retain



RED POLLED CATTLE.—THE PROPERTY OF MR. J. J. COLMAN, M. P., CARROW HOUSE, NORWICH.

Distribution of seeds to the Agricultural Societies.

The following letter may prove interesting to members of agricultural societies generally. It is addressed to one of the English societies in this province.

Dear Sir,—In answer to your letter of the the 18th instant, I may say that all agricultural societies are allowed to give their members half of the subscription in grass and other seeds. However it would be far better, to encourage them by direct prizes in the production of their own seeds.

Clover does not require to be hulled; being threshed thoroughly, the seed in its hull, is then in the best shape for seeding purposes, finding in its shell the necessary food at its start and being fully three or four times more powerful than when hulled. Yours very truly,

ED. A. BARNARD, Sec. Coun. Agr. &c. &c.

Quebec, 20th December 1889.

their customers, have every interest to deal fairly. With the same farmer it is not the same. Scientific notions are generally wanting; he does not do a large business; and he is rarely in a position to buy first-hand; he is more often forced to do business with small intermediary dealers, who do not hesitate to take advantage of his credulity and good faith.

In America, France, and Belgium, says the *Deutschelands-wirtschaftliche Presse*, from which these particulars are taken, these abuses have provoked rigorous legislative dispositions against the delinquents. In Germany, where there is also room for complaint, the necessity begins to be felt of protecting those who are the victims. But it is desired to bring this about without the intervention of the State. It would be seemly, worthy of German genius, says Herr Schultz, to attain the object by a common effort, emanating from the free initiative of agriculturists, manufacturers, dealers, and representatives of science, who should associate together with

the view of rendering the small manure trade of Germany safe and effective. To succeed in such an enterprise, and by means independent of the public powers, would be an inestimable honour for the manure trade, German *savants*, and especially for the Society of German Agriculture.

The enthusiastic appeal of Herr Schultz has not remained without an echo. The manure section at the Magdeburg meeting considered the question, and nominated a special commission composed of nine delegates, three of whom represent agriculture, three the manure trade, and three the agricultural stations. This commission met at Berlin, under the presidency of Dr. Maercker, the eminent professor at the University of Halle, and drew up the following conclusions:—

It is necessary that all bags holding commercial manures offered for sale should bear in printed characters the exact signature of the manufacturer, the name of the manure, and the contents in nutritive substances of the matters enclosed. It is also to be desired that the bags should always be of a uniform weight, this weight might be fixed at 50, 75, or 100 kilogrammes; the bags should be sealed. Relative to the denomination of the manure and its composition, the sub-commission was of the following opinion: For *superphosphate only the amount in soluble phosphoric acid would be indicated*. For *superphosphates* which contain phosphoric acid partly soluble in water and partly insoluble, the value of which in consequence must be printed, the quantity of each of these two forms of phosphoric acid must be indicated. For precipitated the bag must bear the indication of the total phosphoric acid; for the scoria of finely pulverised dephosphorisation, that of the amount of phosphoric acid and fine flour. The bags of bone flour, fish guano, meat powder, Peruvian guano, dried night soil, &c., must bear the indication of phosphoric acid and azote. Ammoniacal superphosphate obtained with pure superphosphate and sulphate of ammonia, must indicate the amount of azote and soluble phosphoric acid. For mixtures of azote and superphosphate from superphosphates associated in organic azoted substances (except leather in powder and wool), it is necessary to indicate, as well for the latter as for the sulphate of ammonia mixed with them, the content in total azote, and approximately, the relation of the organic matter to the ammoniacal azote. For saltpetre-superphosphates, mixtures of Chilean nitrate of soda, the amount of soluble phosphoric acid and azote must be shown. For saltpetre-ammoniac-superphosphates, mixtures of Chilean nitrate of soda, of sulphate of ammonia, and superphosphate, the amount must be given of phosphoric acid soluble in water, of nitrate, and of ammoniacal azote. Blood and horn powders and other azoted powders will be indicated by their names and contents in azote. In mixtures of potassic substances, the amount in potash accompanied by the proportion of other substances capable of giving value to manure must be noted. It would be advisable to negotiate with manufacturers with a view to obtain in kainit and other potassic salts an account of the amount of potash instead of that of sulphate of potash. Taking samples must be done by the consignee or his representative immediately after the reception of the merchandise and in the presence of an agent of the consignor or with the co-operation of an impartial and competent person. The sub-commission decided to put the above measures into practice from the autumn of 1890. It also expressed the desire to see an agreement arrived at as to the methods to be adopted for the examination of the manures, and wished it to be understood that the meeting of the delegates of the trial stations with representatives of the manure manufacturers would contribute not only to obtaining that result, but also to render quite clear the different questions raised on this subject. *Azote = nitrogen.*

Such are the commercial usages which the Society of German Agriculture are endeavouring to get adopted, in the hope of ensuring the honesty of dealing in small manure transactions.

To Destroy Noxious Weeds.

Most all farmers of the Northwest have noticed that if they break up a new clean piece of prairie and raise wheat on it for four or five years in the usual way of fall plowing stubble ground, that the land has become very foul with weeds of different kinds—wild buckwheat being the worst of all that try to take full possession—to the great detriment of the wheat crop. I say it is the *worst of all*, because I have seen farmers hauling their wheat to the elevator from the thresher and stand a dockage of fifteen pounds per bushel without much kicking against the wheat-buyer, because they were satisfied that there was at least one-fourth rubbish in the load of wheat.

I have heard those farmers and others express wonder that so much foul seed got on their land in so short time of farming it, but when they learn that these foul weeds increase each year, at first, while the soil is new and rich, at a thousand-fold, it should not take them long to figure out what that increase amounts to in five years. To be safe and conservative I will say that they increase a hundred-fold, and that in five crops gives us ten million seeds, and taking three million seeds in a bushel, as a fair estimate, it gives 3,333 bushels from one seed sowed the first year. I do not pretend to say that all of these seeds get back on to the land each year, or that all of them make the hundred-fold increase, but you have only to take a very small per cent of these 3,333 bushels and mix them with the soil each year in your fall plowing and you will soon have your field "chuck full" of weed seeds that will grow, whenever brought near the surface, in your crops each year, and so the increase of weeds goes on, the grain crops diminish in proportion, and at the end of five years you get ten bushels per acre where at first and second crop you got thirty or thirty-five bushels.

Taking the fields and farms in this new Northwest that are not giving an average of over ten bushels of wheat per acre when farmed from eight to twelve years; they are not worn out as indicated by the small yield, but it is the weeds and rubbish that are growing with, and at the roots of the grain, that reduces the crop so materially, for there are more weeds trying to grow than can grow to perfection, and is it not foolish to expect to grow a good crop of grain with the weeds? The lands are rich and all right yet, and would give sure yield of an average of thirty bushels of wheat per acre, and all other crops in proportion, if the weed seeds could all be destroyed at once, so that nothing grew except the grain that is sown.

If the weed crop is as disastrous to our crops of grain as I have tried to show in our limited time and space, then any plan of farming that has the most "kill weeds" in it is the best plan to be considered by all those that do not like the ten bushels per acre and would like to raise 100 bushels of wheat on three acres of their wheat fields.

From what experience and observation I have had, I am satisfied that the summer-fallow plan, strictly followed and thoroughly done, is the only way that you can boss the weed business. It can be done to perfection on fields of corn and potatoes on a small scale, but when you come to raising those crops in hundred acres or section fields, then there would be a great liability that crops of corn or potatoes would suffer from the great amount of weeds that would grow and go to seed on them. It is only small fields of corn and potatoes that I grow, and it is a standing offer of one dollar per pound

for all the weeds or rubbish of any kind that can be gathered on my patches at the time of harvesting the corn and potatoes. The same offer is good on the field of white beans. I have been experimenting with white beans for a number of years and find that to grow and ripen them to perfection you must plant *thick* and shallow on solid and compact soil.—*Ex.*

Why Thresh Oats ?

The inquiry is made. "Why do the farmers thresh oats?" Let us look at it from a practical business standpoint. The average crop of oats raised in Minnesota is 30 bushels per acre and the average price 20 cents per bushel, which yields \$6 per acre gross. The farmer in this section raises oats primarily for feeding his stock; he don't raise them for shipment to a distant market, as that course wouldn't pay. Why not then, feed the oats in the straw, and save the expense of threshing? Should the farmer have oats to sell, why not bring them to the market in the straw? An acre of oats produces unthreshed three tons of straw on an average. We are told that oats in that form this year would readily sell at \$8 per ton. If this is so the average crop will produce \$24 instead of \$6, and the cost of threshing will be saved beside. We repeat the inquiry. "Why thresh oats?" — *News, Moorhead, Minn.*

Mr. Crozier's Dairy Management.

EDS. COUNTRY GENTLEMAN—Referring to page 793, where the mill feed per day per cow is quoted as 3 lbs. shorts and 1½ lbs. corn meal, with pasture and green cornstalks, may I inquire of Mr. Crozier what the winter feeding consists of, and if he feeds ensilage; also what he would recommend in amount of shorts and meal per day per cow on chopped up corn tops, fodder or millet?

This letter from Mr. Curtis is exceedingly valuable throughout, and the simple ration of mixed corn meal and shorts, founded on experiment and long experience, I regard as of the greatest value to us butter men, who find our days, pockets and feed boxes all too short for the highly complicated mixed feeding so much in vogue, or at least so much argued in favor of at the present time

P. H. F.

Western Highlands, N. C.

[Answer by Mr. WILLIAM CROZIER.]

I do not feed ensilage; my feed consists of cut corn fodder, pulped mangold wurzel, bran and ground oats. This is cut, pulped, and the coarse bran and ground oats, with some fine salt, all thoroughly mixed together. I cut mostly on Saturday enough to last to next Saturday, or one week. It is put in one heap on the barn floor, and covered over with a piece of old sail cloth. The mass soon warms up, not hot. Each cow gets a bushel basketful of this, morning and night, and when a cow is in full milk, or fresh, she gets one pailful of warm water, with three quarts of bran and one quart of ground oats mixed in the water, twice each day. My cows never get out of the stable in winter, nor do they get cold water—the chill is always taken off before they get it to drink. A bushel basketful of the mixture weighs about 20 pounds. In the midday, after they are watered, they get a bunch of hay. This hay is made from my grass mixture, as my mowing land is sowed down with several mixtures, and one of the mixtures is alfalfa, which is very important to give flavor and texture to butter. To have dairy cows in good condition, and to give rich, pure cream, they must have change of feed, and not feed

alone, but must be kept clean. The stables are cleaned every day, and the cows are curried and brushed once each day. This gives contentment and comfort to them, and if I find a cow that does not give me an equal return, she goes to the butcher.

Weight of Hampshire-Down Ewe-Lambs.

EXAMPLES have often been given of the weights attained by Hampshire Down wethers and wether lambs. No better case could indeed be cited than that of Mr. Parsons's pen of lambs at the Smithfield Club Show, 1883, which averaged 207 lb. each. The weights of ewe lambs are less often taken, and having had the opportunity very recently of weighing ten lambs born last January, probably about the 20th of the month, I thought the weights might be of interest to readers. The weights were taken in the presence of several gentlemen on the 20th of November, and were as follows:—

No. 1	...	...	193 lb.	No. 6	...	...	179 lb.
" 2	...	...	187 "	" 7	...	...	187 "
" 3	...	...	182 "	" 8	...	...	172 "
" 4	...	...	179 "	" 9	...	...	173 "
" 5	...	...	205 "	" 10	...	...	171 "
Total, 1,808 lb. = 180½ lb. each.							

These ewe lambs might be fairly taken to be 304 days old, and must therefore, supposing them to have scaled 11 lb. when dropped, have increased from birth 1½ lb. per day, or slightly over ½ lb.

It was estimated that No. 5, if killed, would weigh 30 lb. per quarter, and that the ten lambs would average 27 lb. per quarter, and were worth to the butcher £4 each.

The extraordinary weight of these lambs when contrasted with their apparent size was very striking. They are compact and beautifully proportioned, with great width of shoulder and back, but very deceiving as to their actual weights on the bridge.

I enclose my name and address.

J. W.

THE DAIRY.

COMPOSITION OF MILK OF DIFFERENT BREEDS.

The general composition of milk is a thing which we all have pretty well at our fingers' ends, and it is generally known that within certain limits no two samples of it agree exactly together, but vary in some respect. It is also known that there are a great many factors which influence the composition, such as breed of the animal, age, period of lactation, food, and so on. It is the influence due to the first of these—breed—that we propose to discuss in the present article, and show wherein this variation consists. For the last ten years the British Dairy Farmers' Association has carried out milking trials at the annual show, one feature of which is that the milk of each competing animal is analysed on a morning and an evening. These analyses have annually been published in the Journal of the Association, and have been accumulating, so that now there are several hundreds of them, representing all the dairy breeds of the country, and forming a mass of information quite unique—at least in Britain. It is further thoroughly reliable information, in the procuring of which no time, trouble, or expense has been spared, while the results represent all possible influences bearing on the secretion of milk. Thus the animals that have been tried were in all

stages of lactation, of every age, fed with all possible kinds of rations, and with endless kinds of men to attend to them. We have thus a body of figures as a basis from which we can derive a very large amount of information. The following table gives the average daily yield of milk in pounds, with the fat and total solids in the milk calculated out for each breed from the results of these trials, including the last one this year:—

Breed.	Lbs of Milk.	Total solids.	Fats.
119 Shorthorns.....	{ 43.13	12.87	3.73
31 ".....	{ 44.80	12.89	3.81
118 Jerseys.....	{ 27.87	14.36	4.56
43 ".....	{ 28.41	14.94	5.47
49 Guernseys.....	{ 28.30	14.00	4.77
14 ".....	{ 31.15	14.46	5.03
26 Crosses.....	{ 39.12	12.91	3.69
3 ".....	{ 51.86	12.28	3.23
7 Dutch.....	43.31	12.11	3.26
13 Ayrshires.....	34.26	13.43	4.15
2 Devons.....	30.12	14.34	4.90
3 Red Polls.....	43.10	12.72	3.60
1 Welsh.....	46.00	12.74	4.16
3 Keries.....	23.50	14.22	4.40

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With the six last mentioned breeds the number of animals tried is too small to be conclusive, and the statement given is put out for what it is worth. In these trials there have only been four classes—Shorthorns, Jerseys, Guernseys, and Mixed Breeds—the last comprising all other pure breeds or crosses which their owners care to enter for competition, and consequently with some (as the Welsh and Keries) there have only been one or two experiments. While thus in the Association's Journal there has annually been published the averages for four classes ready to hand; those coming under the fourth group refer to "Crosses" only, and the pure breeds have had to be worked out for the purposes of this paper, and are not included in the former. A comparison of the figures does not reveal anything very startling, and, in fact, only corroborates many points with which we are already familiar. Thus Shorthorn milk is not very rich in total solids or fat; Jerseys and Guernseys are very high in fat and total solids; Dutch very poor in fat and solids; and others medium. If the solids other than fat are worked out, it will be found that they vary only within a half per cent, not only within the limits of the breed, but between the averages of all; that is, they exist in the proportion of from 9 to 9½ per cent, no matter how much the "total" solids may differ, though, of course, the highest in one is also highest in the other. The exceptions to this only occur with the Dutch and Welsh in the above table, which fall below 9 per cent, where, however, the total solids are fair. The table further shows the average daily yield of milk of each breed. It does not mean that any animal will yield an average of these figures during her period of milking, but that animals in all stages, from ten to 200 days calved, selected by their owners as good milkers for competition, and "forced" as much as possible without risking after bad effects, gave these yields. As all were competing under the same circumstances and conditions, however, it is a perfect guide for comparing one breed with another.

Under the headings of Shorthorns, Jerseys, Guernseys, and Crosses, are given a second set of figures; these are the averages of the last two years by themselves, and they show that the general quality of all kinds as dairy animals is improving. There is an increase in every item right through, with the exception of the quality alone of the "Cross" milk—apparently due to an extra number of Dutch half-breeds. Not only is this true for the present time, but a gradual improvement

has been taking place all through the years, as may be seen by a study of the successive tables issued each year by the judges of the milking trials. With the smaller groups of pure bred animals enumerated above, there are not a sufficient number of figures to work out a comparison in this direction, but it cannot be doubted that they also participate in the general improvement. As the number of animals entered keeps up to about the same figure, this increase cannot be due to more careful selection of the competing animals, but must be owing to a general and decided rise in the dairy qualities of all. The unusual results obtained from some individual animal at the last show prove that there is no definite limit to the productive power of a cow's udder, and we may hope that the future will see this line of evolution developed very much further.

P. M' C.

The Food of Vegetables.

The following are the principal portions of a paper read by Mr. J. Wright, at the Vegetable Conference, on Thursday:—

The mere size of vegetables does not, in my opinion, represent superior culture, because in the first place I suspect abnormal bulk is obtained at the expense of something of inherently greater value—for instance, gold. We may see cabbages, cauliflowers, celery, turnips, and other vegetables of titanic proportions or three or four times the size of the best produce for table, but if the cost of production exceed the value of the articles produced where is the credit attaching to cultivation? Observe, I do not object to a person spending money in the preparation of a horse for winning the Derby, or a bullock for securing the blue ribbon at the Smithfield Show, because there is a special object in view, the attainment of which may justify the outlay, and it is the same with gigantic vegetables. They may be grown for a special purpose, because invested with an extra food value; but if every body were to invest the same amount as represented by time and materials in attempts to produce similar examples, not only would the great majority fail in their object, but the practice, if generally indulged in, would lead to bankruptcy. I do not believe in the utility of bloated vegetables, animals, or men, but suspect that ninety-nine out of a hundred of either of them have cost more than they are worth in the producing.

The vegetables must be fed with ingredients which impart to them their distinctive qualities before they can in turn serve as food of the most enjoyable and wholesome kind for consumers. Some so-called manure is lamentably deficient in those ingredients, and the crops that are grown by it must of necessity be deficient too. They must have all they need to render them perfect. What has Liebig said on this important subject? Here are two of his "laws" which should be learned by heart by every gardener:—

1. "A soil can be termed fertile only when it contains all the materials requisite for the nutrition of plants in the required quantity and the proper form." We must note that some of the ingredients do not suffice, but "all" must be there, and in the required quantity (be it large or small), also in the proper form—a condition of vital importance. They must be soluble, ready for use when needed, or they may as well not be there so far as regards the immediate crop.

2. "With every crop a portion of these ingredients is removed. A part of this portion is again added from the inexhaustible store of the atmosphere: another part, however, is lost for ever if not replaced by man." Those are fundamental truths, and with them is incorporated the responsibility of

cultivators. The atmospheric food referred to is of enormous importance. This will be apparent when the fact is grasped by all, as it is by many, that more than ninety out of every hundred parts of vegetables are derived from the air, or, in other words, 90 per cent. of the food of crops is derived from the air under favorable conditions in the form of rain and gases that act as solvents of the matter locked up in the soil. The earth must be filled, so to say, with air, but it must be moist or it will be useless. And here we see the importance of tillage and drainage; because, if water cannot percolate through the soil air cannot enter to warm it and render the food therein available. Warmth represents life and growth; cold, death and stagnation; and it is utterly useless, indeed worse, because wasteful, placing manure in waterlogged land. Some soils are too light and porous, needing additions of heavier to increase their retentiveness, otherwise the air in them would be dry and of no service; others may be too close and need opening material for the admission of air; but no matter the texture of soil, whether sandy or clayey, if it is waterlogged it is cold, inert, even poisonous; and the sun cannot increase its temperature till the excess of water is evaporated, any more than water with a lump of ice in it can be warmed over the fire till the ice is melted. The cultivator, therefore, for making the most of the virtues of the atmosphere and manure, must have the soil in the best condition for their absorption and retention, stirring, hoeing, or mulching, as may be in turn required for its permeation by health-giving, food-supplying, moist warm air. Then, and not till then, can the mineral ingredients already in the soil, or which may be added to it in the form of manure, be appropriated by crops under cultivation.

Some persons condemn natural manure and extol the so-called artificial; others condemn the artificial and extol the natural. I think it is better to do neither, but to discriminate. Ville, the great French chemist, says land to which farmyard manure only is applied is being gradually exhausted, and that its fertility can be better maintained and crops better fed with the three ingredients—lime, potash, and phosphoric acid—in combination with nitrogenous manure. Professor Wrightson says farmyard manure has no equal. Stephens, in his "Book of the Farm" says a ton of first class well-made manure should contain between 12 lbs. and 14 lbs. of nitrogen, 11 lbs. to 15 lbs. of potash, 8 lbs. to 9 lbs. of soluble phosphoric acid (as in superphosphate), and 10 lbs. to 13 lbs. of insoluble phosphate, as in bones. As these are all the ingredients Ville asks for, and as the manure also act mechanically in opening the soil, supplying silica, and eventually humus—which is the nursery of bacteria or micro-organisms that render the nitrogen active by converting it into nitrates—such a mixture of good things must be long in exhausting the land. It will feed the land and the crops, but—and here is the point—not one ton of manure in ten thousand equals, or even approaches, the standard named. The bulk of the material that gardeners have to work with does not half equal it, and a vast quantity is but a poor apology for the genuine article—the husk without the kernel, a dead body from which the spirit has gone.

Then come the value and the need of the concentrated essences known as artificials. Every gardener should have a supply of these, and he may then not only increase the produce of the soil, but improve it—storing the vegetables with food, without which, though they may be passable, they cannot be perfect. Phosphoric acid with potash, the former preponderating, for the Brassica (1) family; potash with phosphates for the Legumes or pod-bearers, also potatoes; and nitrogen for every crop that needs a whip on to enable it the more

freely and fully to abstract the substantial ingredients. With superphosphate of lime, chloride (or nitrate) of potash, the latter the more potent and costly, also nitrate of soda or sulphate of ammonia at hand, the gardener can improve his probably poor farmyard manure considerably, and indeed, need not wait for it as so many men have to do till they lose their tempers and prejudice their crops.

When special manures are found to be good they contain the above-named ingredients, and possibly others, which may act beneficially in certain soils; thus magnesia for potatoes, soda for asparagus and carrots, and chlorine for beet (both in part by common salt), and a little iron for most crops. According to the experiments of Dr. Griffiths, principal of the Lincoln School of Science, many soils do not contain sufficient of this ingredient. His "Treatise on Manures," which is an admirable work, contains striking examples of $\frac{1}{2}$ cwt. of iron sulphate (green vitriol) per acre increasing the crop of potatoes, turnips, mangels, cereals, and beans, while it cured the stubborn root disease of cucumbers (according to the evidence of Mr. Crocker, of Ham Green Tomato fame), and gave him extraordinary crops. Passing for a moment for vegetables, Mr. Divers has recently stated in the *Gardeners' Chronicle* its efficacy in curing a fine peach tree of "yellow." I have seen the tree and can pronounce the cure complete. For vegetable crops about $\frac{1}{2}$ cwt. to the square yard will suffice for experimental purposes, either in solution or powder, this to be employed only when the soil is wet to yellowish-looking plants and crops, for producing matter or chlorophyll.

But while the soil must be fed for feeding the crops, it is possible to impair its productiveness by over-manuring, especially with matter from stables of milking cows, and decayed leaves. I once took possession of a garden that was like a mass of humus, through additions of that nature for generations, perhaps. A walking stick could be pushed down in it to the handle easily. One plot, I was told, would grow potato plants, but no tubers. (1) I found that to be a fact, and recorded it in the *Journal of Horticulture* at the time. Peas were yellow and profitless. The soil was poisoned with acids, and lime was needed to neutralise them, also to set free the dormant nitrogen. It was given freely, as also was potash and bone meal. The effect was magical and the crops of potatoes and peas, where they would not grow before, were remarkable. Why were potash and phosphates so much needed? Because there were none in the cowyard manure. The phosphates were drawn away with the milk. Manure from milch cows, especially if largely fed on grass and roots, is greatly over-estimated. There is little good in it to feed crops. It may make them grow, but the growth is worthless. Proof of this can be found in any cow pasture where the manure is not spread. The grass grows freely enough, but the animals refuse to eat it, and eventually tussocks form and pastures are spoiled. Manure from full-grown, well-fed outlocks is very different, for it is rich in phosphates and other nutritive or manurial properties. It is well then, as I said before, to discriminate.

If weak manure is supplied to the garden, and I have often had it so weak that it would not ferment when moist, mix half a peck or more of good guano in a load. The mass will soon heat then, and eventually its value for the land will be a good deal more than doubled. Instead of conflict between natural and artificial manures we have then combination, and the union is a happy one for whatever crops are fed with the preparation.

But how should we feed? By placing what is good for

(1) In 1863 I manured a piece of ground for potatoes with spent hops about 4 inches thick on the land: immense tops, no tubers.

(1) Cabbages, turnips, &c.

plants within immediate reach of the roots at the moment of their formation. Digging manure deep down and leaving the surface poor is poor practice. I do not say: have the soil poor below; on the contrary, have it as rich as the crops need; but do not, as many do, forget the surface; also remember that young plants like quick acting nitrogenous rather than slower mineral food. The advantage of a good, free start in growth cannot be over-valued, and the start is often slow and weak in strong land, and always so in poor soils. Collect decayed leaves or other vegetable matter, wood ashes, light soil of any kind with a dash of soot, and mix well. When moist, and only then, pour on liquid manure, such as drainings from heaps, or, what is very good, half an ounce of sulphate ammonia to a gallon of water. A few weeks later, when the time of sowing comes, draw deep drills, fill with this mixture, and in it sow the seed. That is food for infant plants, and they thrive on it. This little attention at the outset may make all the difference between success and failure with certain crops in naturally poor or ungenial soils.

Just another sentence or two. Quick-acting nitrogenous manures, such as nitrate of soda and sulphate of ammonia (the former for light and dry, the latter for heavy and cold soils), should be applied early in the season to growing crops, never late in the autumn; phosphatic and potassic manures earlier still, before growth commences and before dry summer weather sets in, or they cannot be appropriated, because not dissolved, by the crops they are intended to support. Chemical manures have often been condemned as worthless, when the fault rested with the users in simply applying what was really good at the wrong time for attaining the object in view. These remarks are founded on practice. I think they cannot do harm to any and may possibly be suggestive to some who may engage in the cultivation of food-producing crops. (1)

Age for Corn Fodder.

I see in your number of 10th inst. on page 772, an inquiry by T. E. E. as to the nutritive value of corn ensilage, and an answer by E. W. S., referring to a statement on page 312 of this volume. I have carefully read the two articles, and confess that I have been somewhat startled by the point brought out. From the reports of all scientific men whose writings about ensilage I have read, especially from the report of the Cornell Experiments last winter, I thought it was pretty conclusively established that corn, cut when the ear was nearly mature or at all events when the kernels were glazed, was, pound for pound, much more nutritious than the same corn cut at any former stage of growth, and consequently I and all my neighbors and those I have consulted with and whose opinions I have read, have been trying to find out what kind of corn would reach the maturer stage in this climate and also give a good bulk. If, however, this opinion or fact, if it is a fact, is to be taken, we can leave out all considerations of maturity and look simply to the different varieties, almost all of which will reach the tassel stage or even show embryo ears. This season I planted 20 different varieties in plats of one square rod, and weighed the product at cutting time, and observed the stage of maturity which each variety reached. Without going into details, I may say that there were some three or four kinds with embryo ears, and in full tassel, and which gave the heaviest growth, ranging at the rate of 20 to 24 tons to the acre, while only one of those with glazed ears gave more than from 11 to 17 tons per acre. There was, however, one kind, thoroughbred white flint, on which the ears were fully glazed, and the growth would give 24½ tons

(1) Very well worth attention.

A. R. J. F.

to the acre. I may say these plats were on fair corn land in good order, but without a light dressing of phosphate as manure. The question is whether a crop which will give 24 tons of corn in the tassel is as good or better than one which will give say 17 tons of corn with the ears glazed. This is a very important point for ensilage growers in this northern climate, and an answer will be of great value. S. A. FISHER. *Knowlton, P. Q., Can.* [Much experiment will be required to settle fully this question. The different varieties of corn do not give the same comparative amount of stalk and leaf as compared with the growth and ripening of the ears. Some of the smaller and earlier varieties, for instance, furnish twice the amount above the ears as below it, both in length and quality; while the tall growing sorts, which reach a height of 12 feet and more, have most of the stalks below the ear. This difference would effect the result, in using the ripeness of the ear as a criterion to judge from, or the same rule of ripeness would not apply alike in both cases. The same amount of fertility in the soil would give unlike results in the two varieties. The same amount of seed to the acre would also vary the results. These and other influences would need many and varied experiments to properly settle the question, and careful and accurate cultivators will find it an interesting subject for inquiry, in addition to the few experiments which have been already made. (1)—*Country Gentleman.*]

SHEEP-WASHING.

A meeting of the Perith Farmers' Club was held last week, when a paper was read by Mr. J. E. Hargreaves, J.P., of the firm of Whitwell and Hargreaves, of Kendal, on "Sheep-washing." Major Barker, of Newtonrigg, presided.

Mr. HARGREAVES said sheep-washing from a farmer's point of view was a subject he did not profess to understand, and he must leave it for practical and experienced sheep-farmers to settle for themselves. His object was to give what information he could on the subject of wool—whether it should be washed or unwashed, and to try and answer the question which had given rise to so much discussion in the country. Like most questions, there were two sides to it. Even Bradford, the great wool centre, was divided. On the one hand, Mr. John Scriven—a practical farmer and a wool merchant—had boldly come to the front in his advocacy of the folly of washing sheep; and on the other hand the Bradford Chamber of Commerce had given their verdict in favour of sheep-washing—treating the subject, no doubt, from a national point of view. In his paper he would treat it from a local standpoint, and his remarks would refer to what was commonly known as north wool—wool grown in Cumberland, Westmorland, and Northumberland, and in the whole of Scotland.

He believed a deal of good had been done in the district by the discussion upon a paper on "Wool" he read at Kendal a few years ago. Salving had been practically abolished in the better bred cheep; but there was room for improvement in this respect with regard to black-faced or fell breeds. He would here strongly recommend farmers to abolish salving or mixing the dip with oil, tar, or anything that discoloured the wool.

Of recent years a great change had taken place in regard to the washing of Colonial fleeces. In 1869 the Australian fleeces shorn unwashed were about 30 per cent. Last year the percentage was 97, only 3 per cent. of the clip being washed. In South America, all the sheep were shorn unwashed, and the same was the case with the great bulk of the sheep in the United

(1) The Provincial Experiment Station at St. Hyacinthe has already taken up the study of this question and will experiment very thoroughly on the matter.

ED. A. BARNARD.

States and in Russia. In Scotland sheep-washing was very much on the decline, and there was a larger proportion of unwashed wool put in the market every year. The question naturally arose—Were the northern farmers wise in keeping up the present system of placing their wool in the market in the washed state? With the experience of other countries before them, he was inclined to think that, if sheep were benefited by washing, it was absolutely indispensable that they should be washed. The next important question for the northern farmer to consider was—If he did not wash his sheep, could he find a ready market for his greasy wool? and if so, did it pay him better to have his wool washed or greasy? Here again the experience of other countries, where sheep were grown for the sake of the wool, pointed to the answer that it was not better to wash the wool.

He had the result of several local experiments before him, and in only one case had the result been unsatisfactory to the grower, who was the Rev. H. Fox, of St. Bees. But against that he put the experience of Mr. Mitchell, of Howgill Castle, who said he made more for his fleeces in the greasy state than in the washed; and he had divided his clip, washing one-half, and leaving the other greasy, and putting it up for sale by auction.

The next question was a most important one. Did the actual consumers of the north wool prefer to buy it or use it in the washed or in the unwashed state? He adduced the opinions of several of the largest consumers of north wool in the country on the subject. Messrs. W. and H. Foster preferred to use washed wools. Messrs. Robertshaw and Sons, of Bradford, said, in their opinions, so far as bred wool was concerned, it was better both for farmers and users to wash the wool before clipping. Messrs. Anderton and Sons said their experience favoured washing, as wool in the grease, if kept any length of time, became discoloured, and harder to the touch, than the same wool in the washed state; and in the north, where there were so many beautiful streams to tempt the farmers to wash, there ought to be no hesitation or two opinions on the matter. Messrs. Oldroyd and Sons said they used all their Cheviot wool unwashed. Mr. Thomas Lea, M. P., said that as a rule it was best to wash sheep before shearing, unless the wool was to go into consumption as soon as it was off the sheep's back. In England clips were often held for one, two, and three years—a very bad custom—and if it remained in the grease, the colour would be destroyed, and if unwashing became universal, the market would be filled with bad coloured wool. This opinion referred more to the better class of wool than to the rough, strong wools. He was convinced it would be a bad thing for the entire British clip to be an unwashed one. Messrs. John Shaw and Sons preferred north wool in its greasy state, providing it could be kept white. Kemp was a great objection in north cross-fleeces, and on this account was totally unsuitable to many woollen manufacturers. Messrs. Biggart and Co. said that they could point to no decided advantage in either mode, though each had its advantages and drawbacks. Messrs. E. Boden and Co. stated that they had always been in favour of unwashed wools; the manufactured goods always looked better, the colour was better, the material better to handle and to wear. In their opinion the method usually adopted by farmers and others at washing time was both cruel and clumsy. Mr. John Reddihough said he preferred half-bred wools unwashed, providing the sheep had not been on turnip, ploughed or clayey land, which wools he would not buy at all, if unwashed as it was impossible to judge their yield.

Here, Mr. Hargreaves said, there was divided opinion, but all were based upon long practical experience. All wool, whether clipped in the washed or greasy state, before it could be combed, spun, and manufactured, must be well scoured by

soap and hot water, and the scouring machines in all factories were a very important and expensive plant. The wool buyer for a manufacturer in valuing and purchasing wool had to estimate what the wool would cost clean scoured. Farmers must not run away with the idea that if they did not wash their wool they would get as much for it per pound as they would if it was washed. Take for example an ordinary washed half-bred hogg-fleece, which would lose in scouring 15 to 20 per cent. This would cost clean scoured about 1s. 1d. per lb. If the same wool was unwashed, as the greasy fleece, it would lose about 40 per cent. The buyer would then require to purchase it at 20 per cent. less than the washed wool, namely at 8d. per lb., and at this it would come out clean scoured at the same price, 1s. 1d. per lb. Briefly put, a farmer would be as much in pocket by selling, say, a mixed clip unwashed at 7d. per lb., as he would be by selling the same clip washed at 9d. per lb. They should also take notice that the finest-haired wools lost the most in scouring. There was no doubt wool lost colour if kept too long either in the greasy or washed state.

He went on to condemn the practice of farmers hoarding up their wool year after year. He spoke from a wool point of view, and also with the view of helping forward Lady Bective's movement. They should make a rule never to commence clipping their sheep until the previous year's clip was sold and turned into money. That was the kernel of the whole question. Think of the great good to be derived by adopting the policy of selling their wool every season! It found its way to the manufacturer and the spinner, and if not made into ladies' dress goods, it was used for carpets, tweeds, knitting yarns, and other articles which took up an enormous quantity of wool. If wool was sold at low prices, they would find the benefit of low prices in clothing. By selling the wool every year, they kept the prices more regular, and there would not be so many fluctuations, and so farms would be kept more regular in the rents.

He had been often asked by farmers for advice. He would say if he was a northern farmer, with the clean grassy lands of the district, he would never wash sheep. His experience as a salesman was that unwashed wool met with better competition than washed wool. To those who could not make up their minds on the question he would say—Wash half of their sheep, and leave the other half unwashed, and then they could judge for themselves which was the better course. In any case, whether they clipped their sheep washed or unwashed, see that the wool was well got up; in all cases, improve the breed as much as possible. In the better bred flocks, it would be advantageous, he thought, to introduce a merino cross. To the fell farmers he would say there was still room for improvement in the blackfaced breeds; let them abolish the use of salve, and do not mix their dip with bad oil or tar or anything that discoloured and stained the wool. Do not, he said, wrap locks inside your fleeces before rolling up. All ribs and dirty pieces must be taken from the fleece and kept separate, as they strain and injure the wool if rolled up with the fleece. Also, avoid large tar marks. Mark the sheep on the ear or the face. Careful attention to these details would give them a better market for their wool, and in these days of keen competition it was desirable in the interests of the British wool-grower that the production should be first-class.

Manuring on Dairy Farms.

The opinion is held by some some that dairy farming is an exhaustive system; and we have even known landlords to ob-

ject to the introduction of this mode on to their land, on the plea that it deteriorates soil more quickly than other kinds of farming. It is, of course, quite possible to conceive of a system of keeping cows which shall add nothing to the soil, but, on the contrary, take everything out of it, and it would, perhaps, not be difficult to find individual dairymen who follow this bad practice in every district. But that dairying properly carried out really enriches the soil is a fact not very difficult to prove. In a paper read by Mr. HOWMAN some years ago before the British Dairy Farmers' Association the matter was, so far as we are aware, first presented in its true bearing, and the subject came up for discussion again at the Ipswich meeting of last year's Conference. A few calculations will show us exactly how the matter stands. Ash or mineral matter exists in milk to the extent of about eight-tenths of a per cent. and if we allow that a cow yields 600 gallons per annum, she will extract some 50 lb. of manurial matter from the soil in the form of grass and fodder during that period. Out of this quantity only some 30 lb. represent the valuable substances, phosphoric acid and potash, and if we take a herd of say fifty cows, it follows that the total amount these materials removed from the farm, or such portions of it as grazes them in summer and grows fodder for the winter, is considerably under a ton, and would be replaced by about three tons of mineral superphosphate and two and a half tons of kainite. Besides these, however, there is the nitrogen which is removed in the albuminoids of the milk, and which is the most serious part. The fifty cows would remove about 2,000 pounds of it, or as much as is contained in five and a half tons of nitrate of soda. In round numbers, however, and at present market prices, these manures, to make up for all that is removed, would amount to thirty shillings per head.

These amounts of fertilising ingredients, however, never are really taken away, but, on the contrary, tend to accumulate in the soil. We have supposed the case where the animals are fed on home grown food only, but let us consider the circumstances where cake and other foods are used that are purchased-in, and the manure from such applied to the land. Suppose the animals to be receiving four pounds of cotton-cake (decorticated) daily per head, it will amount to over half a ton each per annum for the time in milk, or say, twenty five tons in all. Analysis shows this to contain about 3,000 pounds of nitrogen and 4,000 pounds of mineral matters, or, in other words, a half more nitrogen and twice as much mineral as is contained in the milk. Besides this, however, there is the residue left from the consumption of the grass, fodder, or other materials, while many people give far more than the equivalent of 4 lb. of decorticated cotton-cake per head daily—the writer, for instance, allowing 10 lb. of mixed meals.

It will thus be seen that, even after allowing a wide margin for waste, there is a large surplus of fertilising ingredients returned to the land in the manure of the animals, so that dairy farms, where there is even a very small quantity of purchased-in food allowed, must of necessity become more and more fertile, more especially as the fertility is added in the best of all forms—farmyard manure. For the sake of simplicity we have supposed the milk to be sold clean off the farm, but it is evident that where it is utilised in various ways at home there is some residue left, and therefore less to replace. Butter for instance, being a hydrocarbon, removes absolutely none of the valuable ingredients, though the skim-milk does.

It is to be regretted, however, that manuring on a dairy farm is often a very one-sided affair. The muck is generally spread on the arable fields, and the pasture lands are left to starve. This is not as it should be, and is, perhaps, the reason why a dressing of bones did so much good on the Cheshire pastures, a circumstance which no text-book on agricul-

ture must omit to notice if it is to be considered complete. It would be a better plan to give the pastures and meadows a dose each in its turn at regular intervals, and perhaps mow for hay the first year if the grass threatens to be too strong.

It is also to be regretted that cows' droppings lie all of a heap in the fields, and not nicely spread about, as is the case with sheep, this no doubt being one of the reasons why feeding with sheep improves land, and thus the summer's cow-dung is almost lost. We have heard of farmers who sent boys through the fields at interval to spread out the little heaps, and, considering the value of cake-fed manure, it almost seems worth while to do so, and could not fail to improve the grass. At present it is either killed out at the spot or grows so rank that the animals will not eat it.

It will thus be seen that a comparatively small amount of purchased in feeding stuffs or manure will replace the fertilising ingredients removed by a fairly large herd of cows, while a surplus is sure to accumulate for future crops if the business is conducted in the ordinary way. P. M'C.

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