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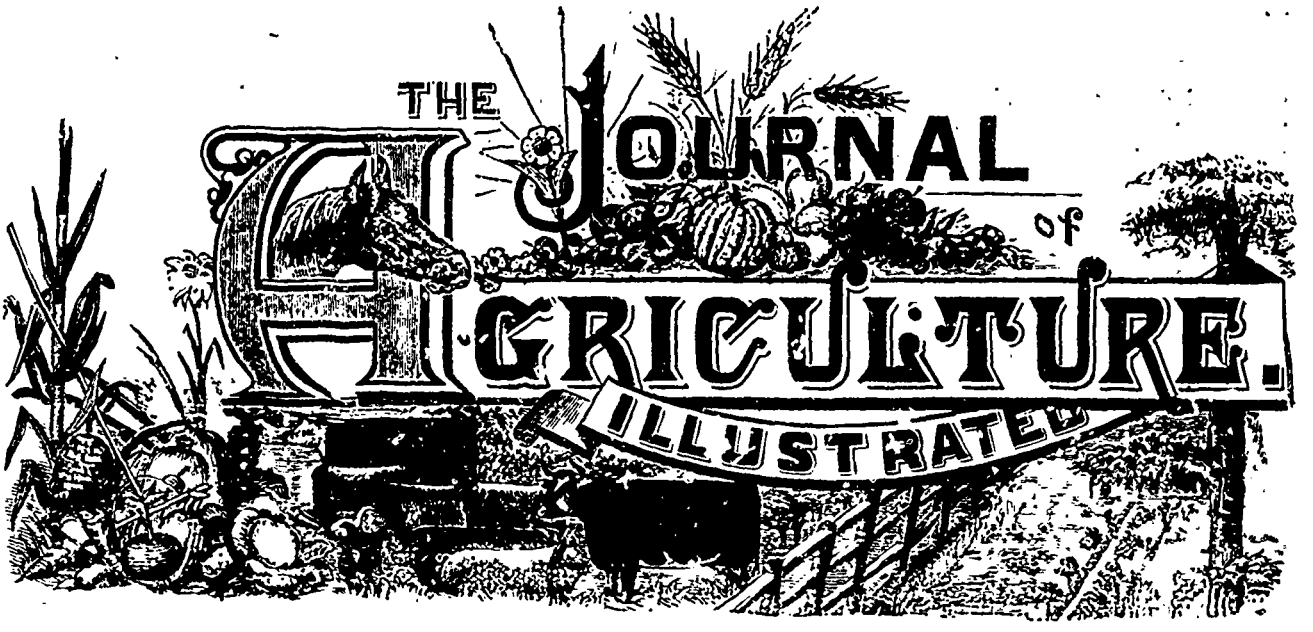

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NOTICE.—The subscription to the *Illustrated Journal of Agriculture*, for members of Agricultural and Horticultural Societies, as well as of Farmers Clubs, in the province of Quebec, is 30c annually, provided such subscription be forwarded through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

OFFICIAL PART.

Table of Contents.

FOODS FOR THE DAIRY.

Mr. Powell was followed by Alvan Devendorf of Herkimer county, on "Foods for the Dairy." Judicious feeding, he said, starts all improvements, and these improvements, thus begun, are perpetuated by breeding. But feeding is the basis, and there is little doubt that the success of some of the great breeders was owing as much to their knowledge of the combinations of food as to anything else. To produce what we want in any certain line, it is necessary to begin with the calf, by developing with proper foods, tendencies or characteristics that already exist. With grown cattle, good meadow hay forms a well-balanced ration for dry stock, but for stock in milk it has the same objectionable feature as straw, but not to the same extent, that it is too bulky, and too much labor is required for digestion and assimilation. Many dairymen make the mistake of feeding corn meal with straw, but this only increases the carbonaceous matter. There is but little vigor in corn, but plenty of fire and fat, and for butter it is one of the best of foods. But 15 lbs. of straw and 5 lbs. of clover hay is a better ration than 18 lbs. straw and 2 qts. corn meal. Clover is rich in albuminoids, and is one of the finest foods to balance up the coarse fodders like cornstalks, straw, or very poor hay. Knowing the feeding value of the different foods, there is no difficulty in using up everything grown on the farm, to good advantage. Insolvent dairies are like insolvent persons—they pay only a percentage of what is due, and the sooner they are got rid of the better. No amount of food will develop a naturally poor milker into a paying animal for the dairy. Good cows are born, not made.

The common ration among dairymen is about all the hay a cow will eat, with a certain amount of grain, usually consisting of corn, oats and wheat bran. This ration may contain a sufficient amount of the nutrients necessary for a full flow of milk, but the great objection to it is that it is too expensive, and limits the number of cows to a given number of acres.

Mr Devendorf went into the chemical analysis of foods in an extended way. The point he wished to illustrate was that a certain amount of food is required for maintenance, while beyond this the food goes to beef or milk. What foods then are most economical and profitable for use in winter dairying? Barns filled with dry fodder, large cribs of corn, and granaries filled with oats, are not the only requisities for success in winter dairying. They are too expensive and limited in amount. We must have a cheaper food, and one that, in condition, is more like the green grasses that carpet our hillsides and valleys in the summer. The system of ensilage, to a very great extent, makes the summer foods continuous through the year. Corn ensilage is a laxative, and a stimulant to the appetite, and in point of economy it exceeds all other foods. It is not a complete food, on account of its deficiency in protein, but I regard it as the best and cheapest foundation to be had, for a milk or beef ration. The corn crop is the

surest and cheapest of anything we raise. It has been definitely determined that thin seeding is the best, not to exceed ½ bushel per acre, while with the large southern varieties 12 qts. is sufficient. For harvesting, any time between silking and the milk stage will do, although the latter period is best. If we want ripe ears, it will do to plant State corn, but if we want quantity we must plant the southern varieties. I adopt the practice of filling my silo very rapidly, and find by experience that I get a sweeter ensilage than by the slow method. (1). This season I put in 200 tons in a little less than two days, with four teams and eighteen men the first day, and seventeen men the second day. These were Friday and Saturday, and on Monday I examined the ensilage and found the temperature about right for covering. So I put on about 18 inches in depth of straw, covered with boards, and weighted with stone not exceeding 30 lbs. to the square foot. The essential point, after the mass is heated to about 130°, is to stop the fermenting process as quickly as possible, and I know of no better way than by applying pressure. My expenses for harvesting were $67.50, or 33c. per ton. The crop was grown on 16 acres of land, including one-quarter southern white, one-quarter Kansas red cob, one-quarter State corn, and one-quarter gold drop. From the State corn I gathered 125 bushels of ears, besides 200 bushels that went into the silo. This would make about 14 lbs. of corn in every 400 lbs. of ensilage, or a little better than 1½ lbs. to a ration of 50 lbs.

In concluding, Mr. Devendorf said that with the silo came a new era in dairying. It has made practical the production of milk during the winter season by reducing the cost to a minimum; and the time is near at hand when the silo system will become universal among dairymen, and be regarded as absolutely necessary to the success of their industry.

Prof. J. W. Sanborn continued the discussion of this subject. He compared the past of dairy products with the prices of the present. In the first quarter of this century it took two pounds of butter to purchase one yard of calico, while to-day a pound of butter will buy four yards of calico. One trouble is that in this country we do not produce one-half the butter per acre that we ought, or that they do in Scotland.

We should use the cow, our machine, to the extent of its power. The maintenance ration of food is about 18 lbs. of hay per day for the average cow, and generally the cow that is producing 125 lbs. of butter will use 6 lbs. more. Now, if she is fed another 6 lbs. this will add another 125 lbs. of butter to her product. But how shall we induce her to eat this extra amount? Palatableness is the key to this question, and this alone will induce the cow to consume and digest an extra amount of food. This is the great value that especially attaches to ensilage. But I do assert that there is very little if any more digestibility in green food, than in the same food dry. Its value lies, however, in its palatableness. Instead of feeding 10 lbs. of hay at a meal, I would feed 5 lbs. first, then 3 lbs., then 2 lbs., because the cow will eat it up cleaner, and will give a better flow of milk from it. The professor positively asserted that there was no advantage, but a considerable loss, in husking or shelling corn for feeding. He denied that there was any advantage derived from cooking food for cattle. The nutritive ratio should comprise 1 lb. of protein to 5 4-10 lbs. of carbo-hydrates, according to the German theory, and this is pratically accepted in America, *although I do not accept it myself.* That is, I do not believe that there is a fixed and inflexible ratio for the very best development of an animal. We should study the nutritive ratio only for the purpose of producing that which we desire to produce. Professor Ladd says that his experiments show that he can increase the ratio of fat to casein in milk by his method of feeding, although most scientists assert that it cannot be done. The speaker offered as a substitute for the German ratio the statement that the value of food depends largely upon the purpose for which it is used or fed.

(1). It is surely time that this question were settled. A. R. J, F.

LIVE-STOCK.

FOODS FOR COWS. — Leaving the cowyard to-night, I amused myself by reading last number of your *Agricultural Gazette* The articles about the "Dairy" and "Seasonable Notes" are always first looked for. In the latter I found recommended a pocket book published by Messrs. Bailliere, Tindal, and Cox. How, you would oblige me by letting me know the address of that firm, and, if known to you, the price of the book! Then I should like very much Professor Wrightson to be kind enough to tell me his opinion about root pulpers and root slicers. I have a root pulper that is used up. Now, I intended to buy a slicer, because it wants less power for the same quantity of work, and because less juice leaves the roots by slicing than by pulping. As next to long hay, cakes, bran and mangels, cut straw is fed to my milch-cows, a pulper was used, because the cattle were supposed to be more greedy for the cut straw when mixed with pulped than with sliced mangels. Which advantages now weigh more, those of the slicer or of the pulper?—HOLLAND. [My opinion is in favour of a pulper, and when a fair quantity of roots are pulped the loss of juice is inappreciable, as it all goes into the pulp just as in grinding apples for cider-making I think it is a real advantage to have the pulp brought into contact with the cut straw chaff. The labour is of course a consideration, but if you cut your straw I think you ought to pulp your roots. There, is, however, an alternative, namely, to mix the chaff with water and meal, or cake, and give the roots separately as a feed immediately after milking. As to which is the best system, you might find an equal number of men ranged on either side. My own practice is to pulp the roots and mix up the pulp with the chaff. I have, however, wintered milking cows without any roots.—JOHN WRIGHTSON]

How to Train Fruit Trees.

MR. A. DUTHOIT, in a letter to the *Times* on the question of fruit growing, gives the following instructions how to treat fruit trees from the time of planting:—"Trees should be purchased from the nursery one year old, and those will be found, according to my experience, the healthiest which consist only of one upright stem, having no shoots whatever. Holes, say 2 ft. square, should be dug a rod apart, care being taken not to disturb the clay subsoil (which should always be present in an orchard) and the roots. Each tree, when firmly planted, should then be subjected to its first pruning, this being effected by cutting off the greater part of the upright stem, leaving only about 12 in. above the soil. The portion remaining must possess at least five, or perhaps six, live bulbs or eyes. This treatment may appear to be somewhat ruthless, but given protection from blows from the cultivating instruments and from animals, it will ultimately bring success. The result of this first year's growth of a healthy tree will be that each eye left upon the short trunk referred to will throw out a shoot or branch from 4 to 6 ft. in height. These in the following autumn should be cut off to within, say, five buds of the trunk, which buds during the second year of the existence of the tree in the orchard become branches to be pruned in their turn. If the branches be always cut immediately above an eye pointing outwards the tree during the third year will already resemble an inverted half-opened umbrella, or, as it is usually termed, an inverted cone, being also kept quite free at this time from shoots growing inwards. From that period onwards the pruning must be left entirely

to the judgment of the skilled workman, and at the end of about ten years the tree will be probably fully developed, and grown to the height of about 12 feet. Marketable crops will be obtained in five, and practically full crops in seven years. The advantages of growing trees in the manner I have attempted to describe will be self-evident. The time saved in pruning the trees and picking the fruit alone is an important item, these being effected without ladders, with their attendant damage. The natural vigour of the tree, which would otherwise make unnecessary wood, is thrown into the fruit, the latter gaining in size, flavour and appearance. The tree can also be examined and treated for moth and other diseases with greater ease."

SALE OF CATTLE BY LIVE-WEIGHT.—A valuable demonstration of the superiority of selling cattle by live weight to the usual guessing system has just been given by Mr. M'Jannet, of Over-Inzievar, Fifeshire. He invited a number of farmers to estimate the live and dead weight of some bullocks, and to see what the actual weight proved to be. The first experiment was with a calf of eight months old, the live-weight value of which was put at 3½d. per lb. Its value was estimated, before it was weighed, by five farmers chosen as expert judges of cattle, two of whom gave £7 as the value, two £7. 10s. and one £8. The weight of the calf was found to be 537 lbs. and its value therefore was taken at £7. 16s. 8d. Three cross-bred steers, eighteen to nineteen months old, were next shown, and the value was estimated by the farmers at £33 to £38 the three, whereas, reckoned at 31s, per cwt. live-weight, they were found to be worth £37. 10s. The last and most important test was with a Canadian bullock, fattened by Mr. M'Jannet, a shorthorn cross, nearly four years old. In this case ten farmers estimated the dead-weight, and their estimates were sealed up to await results. The live weight of the beast, after having been fasted for 24 hours was 11cwt. 20lb., 35 lb. having been lost by fasting. While the animal was being slaughtered the company inspected the farm stock and premises and had luncheon. On the carcase being put on the scales, when hot, its weight was found to be 6cwt. 3qr 15lb. Subsequently, after cooling, the carcase weighed only 3lb. less than when hot, though this was not determined until after the lapse of 45 hours. After the hot carcase had been weighed the estimates were opened, and were found to range from 5cwt. 3qrs. to 7cwt. Two were 5cwt. 3qr. two 5cwt. 3qr. 14lb., one 6cwt. one 6cwt., and 20lb., two 6cwt. 1qr., and two 7cwt. Thus all but two farmers considerably underestimated the weight of the beast. Valuing the carcase at 61s. 6d. per cwt., the eight underestimates made it out to be from 36s. to 66s. less than the actual value. As few people have any idea of the value of the offal of a bullock, the details of the weights and total value of the several parts, as determined in the case under notice, are worth giving as follows. —Hide 83lb.; tallow, 73lb.; head, 27lb.; feet, 17lb.; intestines, 129lb.; paunch, 19½lb.; liver, 15lb.; heart, 5½lb; tongue, 6lb.; blood, 40lb.; lungs, 9½.; total value, 58s. 6d. (*Gloster Chronicle*).

FOOD RATIONS.

BY PROFESSOR WRIGHTSON.

Much attention is at the present time being given to the subject of scientific food rations, and no one can object to a rational system of feeding animals. If, by the aid of chemistry, a scientific system of feeding could be devised, stock farmers would be truly thankful. This is no doubt the object of those who prescribe these formulated allowances of various kinds of food. There are, however, certain aspects of the question which must present themselves to practical men as tending strongly against the adoption of a prescribed ration. First, they may readily ask, is not the correct albuminoid ratio already pretty well embodied in the ordinary practice of farmers? If so, what particular advantage can there be in converting a simple question of diet into an intricate scientific problem? This question we have no hesitation in ourselves asking, because we have a lurking suspicion that in this talk about albuminoid ratios there is "much cry and little wool." We could wish it were otherwise. If these authorities could tell us how to apportion our meal, cake, hay, straw, and turnips so as to obtain the best results, well and good. If, on the other hand, they meddle in a matter upon which they have insufficient practical knowledge, they may not only be found guilty of meddling, but also of muddling. We wish it to be clearly understood that we regard the proper mingling of foods as an art, based on science. Excellent food rations are in constant use among graziers and dairymen, and it is probably little that we can do to better them. On the other hand, there are many farmers who do not act up to the traditions of good practice. It is not so much that they want to be enlightened scientifically as that they fail to follow the rational, common-sense systems which are practised in their neighbourhoods.

The farming world is not ignorant of the art of feeding cattle, but it includes a large number of persons who, from want of capital, or of personal interest, are far behind the middle and foremost ranks of their business. They are precisely the men whom scientific advice will not reach. There is yet another class, namely, the amateur farmers, who have money, but are ignorant of practice, and of such persons we say that they should first master the methods already in use, and then look into the question as to whether any improvement can be made. If their feeding is to be based upon scientific research into albuminoid ratios, we pity them. If, after mastering the methods of successful graziers, they patiently look into the chemistry of the subjet we congratulate them.

The Rational Feeding and care of Milch Cows.

An intelligent dairyman feeds with a view to the largest net returns from his cows. How to obtain the greatest quantity of rich milk, per annum, from each cow, at the lowest cost for food and care, is the subject of this paper.

It is admitted by the best practical men that a cow which gives ten times its weight of normal milk in the year is an superior cow. Exceptionally, however, cows are known to have given thirteen times their weight of normal milk, and even more, per annum. It is also admitted that such large returns are not to be expected from a whole herd, even from the best of cows: some will be farrow; some may be in worse health, at times, through the year &c.

It is also a well known fact that some breeders aim at obtaining the greatest quantity of milk, or the greatest yield of butter, no matter at what cost of production.

This sort of speculation, however, has but little real interest for the practical dairyman.

The following table, computed from high dairy authorities, shows the averages to be expected from the best herds of milch cows, of various breeds, according to their respective average live weights: (1)

TABLE 1ST. ANNUAL RETURN FROM HERDS OF SUPERIOR MILCH COWS.

Average weight of cows. lbs.	Total lbs. of milk given in the year	Number of times their live weight.
440	3564 lbs	8 times.
660	4664 "	7 "
880	5676 "	6.5 "
1100	6600 "	6 "
1320	7436 "	5.6 "
1540	8228 "	5.3 "
1760	9020 "	5.1 "

It will here be observed that, although the yield of milk increases with the size of equally good milch cows, yet the percentage of increase is not the same: small cows, as a rule, give an average of about 40% more milk,—weight for weight, the cows being equally good,—than the largest cows will give. On the other hand, it is well proved that the smaller the cow the larger the ration it will absorb, for maintenance, per 100 lbs live weight, whilst the ration for production remains the same, whatever be the weight of the animal, and, I may add, should be composed from the very same chemical elements which form the produce. This will be more fully exemplified further on.

Table No 2 is a very important one to farmers and to feeders of stock generally. It gives the full *average* quantity of hay, or equivalents, which animals of various weights can absorb for a full productive ration. Of course, such figures can only be approximate, the ration, which animals do absorb depending on many contingencies, viz: appetite, activity of temperament, nature of work produced, proper selection and preparation of food, size of animals, etc., etc. Farmers knowing the average weight of their stock, and the elements of produce required, can thus make up an approximate ration in hay equivalents, by means of tables 2, 3 and 4.

This table, shows that one animal of 3,000 lbs. live weight;—or 90 animals of 10 lbs. each,—900 lbs. in the aggregate—; or 50 small animals, weighing 8 lbs. each, or 400 lbs. in all, &c. &c., consume exactly the same productive ration per day. Thus 50 young turkeys, of 8 lb. each may be made to gain half a lb. each per day, or 25lb. of flesh, with the same ration exactly in equivalents, as would fat the immense ripe ox of 3000 lbs., gaining perhaps 3 lbs. a day. Again, in a large granary, 500 young mice would consume, per day, as much food as would fatten the above mentioned ox.

I have shown in connection with *table* 1, what superior cows may be expected to do, either separately or in herds, per annum. It may be added that the worst milch cows give about double their own weight, or less, in twelve months. Thus the extreme figures, for the yield of milk per annum, are from twice to thirteen times their live weight, from the worst to the best milch cows. With these facts in mind, a farmer can easily find out, by weighing his milk at regular intervals during the year, how each individual animal in his herd ranks, and whether it is profitable or unprofitable to his owner.

Of course, the yield of milk does not depend exclusively on the milking qualities of the herd; the proper care of stock, the quality, quantity and intelligent preparation of the needed food will make all the difference in the world in the milk yield. In fact, the better the herd, the more knowledge and care is required to keep it up to its highest possible achievements, especially where perfect economy is aimed at.

As to care, I would rank perfect, frequent milkings as the first of indispensible needs; then, cleanliness, pure air and water. Next comes a moderately warm temperature, where economy of food is aimed at. *Table* 3 shows the quantity of food consumed, for a simple maintenance ration, at various temperatures, ranging from 32° to 66° Fahr. It is there shown that 50 o/o of the maintenance ration can either be saved or lost where animals are in a constantly changing temperature, and exposed to sudden cold, and even more than 50 o/o, where frost enters the stable.

TABLE 2. FULL AVERAGE RATION OF ANIMALS OF VARIOUS WEIGHTS.

Live weight of animals in lbs.	Hay (equivalents)		Equivalents in number of animals and rations. Animals.	
	Per day * lbs.	Per 100lbs. live weight	Number.	Weight. lbs.
		lbs.		
10.000	146.2	1.46	Large	Elephant.
3.000	65.4	2.18	1 00	3000
2.000	50.0	2.50	1.30	.....
1.000	31.5	3 15	2.08	2080
900	29 5	3 27	.....	.....
800	27 1	3 39	.....	.....
700	25 0	3.56	2 60	1820
600	22.4	3 73	.....	.....
500	20.0	4 00	3 25	1625
400	17 1	4.27	.....	.....
300	14 5	4 83	4 50	1350
200	10.7	5.35	.....	.....
100	6.8	6 80	.....	.....
90	6.4	7.05	10 00	900
80	5.9	7 30	11.00	880
70	5.4	7 65	12 00	840
60	4.8	8 00	.....	.....
50	4 3	8 60	15.20	760
40	3.7	9.20	.....	.....
30	3 1	10.18	21.00	630
20	2.3	11.16	.....	.....
10	1.5	14.60	43.33	433
9	1.4	15 30	.....	.....
8	1.3	15 80	50	400
7	1 2	16 05	.....	.....
6	1.1	17 30	60.	360
5	0.93	18.60	70.	350
4	0.79	19.90	82.	328
3	0.67	22.50	98.	294
2	0 50	25 —	130.	260
1	0 32	31.50	205.	205
0 5	9.27	54.	242.	121
0.1	0 15	146.	436.	43.6
0 05	0.13	260.	500.	25.—

* The grass ration is computed at four times its weight in hay.

(1) For most of the tables which follow, and for the general principles which may appear novel in this paper, I am indebted to Jules Crevat's book: "NOUVELLE MÉTHODE DE RATIONNEMENT," OUVRAGE COURONNÉ PAR "LA SOCIÉTÉ DES AGRICULTEURS DE FRANCE, 1885." Jules Crevat, in his work, refers to the following authorities, which he has consulted: Boussingault, Payen, Isidore Pierre, Reiset, Allibert, A. Sanson, Barral, Magne, Grandeau, Parsez, Dumas, in France. Frankland, Lawes and Gilbert, A. Voelcker, in England; Liebig, Hanneberg, Stohmann, Crusius, Stoeckhardt, Mayer, Weckerlin, Haubner, Grouven, Voit, Pettenkofer, J. Kühn, E. Wolff, in Germany, &c., &c.

It should be added, however, that in a state of nature animals change their coat according to the season, and then the need of food to maintain life is not affected at all in the proportions given above. But this natural protection does not affect our milch cows, which, if left to nature, would shrink at once in their milk as soon as the cold winds of the fall affected them.

Table 3.—MAINTENANCE RATION AT VARYING TEMPERATURES.

(Calculated for animals of 1000 lbs live weight.)

TEMPERATURE		Sugar	DIGESTIBLE Protein	
Centi-grade	Fahren-heit			
		lbs.	lbs.	The quantity of food saved or lost is about 4 % per degree centigrade, or about 2 2 per degree Fahrenheit.
0°	32°	13.2	0.836	
5°	41°	11.4	0.720	
10°	50°	9.6	0.608	
15°	59°	8.0	0.506	
20°	68°	6.6	0.418	

As to food and its preparation, all dairymen admit that an abundance of sweet June grass, from the side hills if possible, is the best of food for the production of abundant milk. How to secure, during eleven months out of twelve, a ration equal to the June grass becomes an important objective to all practical dairymen. We should have here to deal with some of the most abstruse scientific principles, for a full elucidation of the subject. But this is not the author's object. However, agricultural readers are now too far advanced and wide awake to doubt the usefulness of scientific principles, as applied to the feeding of stock. For the last fifty years, the proper selection and preparation of food have been made the constant study of learned practitioners. A set of rules of the highest usefulness have been thus secured. June grass have been scientifically analysed, after exact returns in milk solids had, by numerous observations, been obtained. After careful analysis of such grass, giving the contents of digestible and undigestible foods, most of the fodders, grains, cakes and varieties of food to be found on the farms, or in the food markets of the world, were compared, both in their digestible and undigestible forms, and very valuable tables prepared. But the last link seems now obtained,—through Jules Crevat's remarkable book,—giving us the exact proportions of solids, of sugar, or purely heat producing food, of digestible protein and fats required by animals, for the various animal products. We are also told in what proportion to feed and how to best prepare such foods, in order to obtain from them the largest amount of digestibility. From general tables lately published under the highest authorities in Europe, table 4 has been drawn up, showing the amount of normally digestible foods in most of the fodders, grains, grasses, etc., in use in Canada. The analyses of such foods, however, are of those from Europe, and may differ, even considerably, from the analyses of such as are grown here. Later on, our various experimental stations in North America will no doubt give us exact information as to the amount of digestible food contained in our own fodders etc., in their various conditions of growth, soil, climate, etc which will make the usefulness of such tables complete.

Table 4.—CHEMICAL ANALYSIS AND CONTENTS OF VARIOUS FOODS.

Proportion per 1000 lbs.

	NAME OF FODDER CROPS.	Dry substances.	Sugar.	Digestible protein	Digestible fat.	Nutritive equivalent. (1)	Fertilising value per 2200 pounds consumed.
Dry fodder.	Good mixed hay	857	400	57	16	100	$ 7 40
	Aftermath "	850	423	86	16	82	8 80
	Red-clover	850	381	77	15	91	9 40
	Alsike "	840	327	102	22	81	9 60
	White "	835	339	100	24	80	10 40
	Vetches and oats	833	332	84	16	92	11 20
	Timothy 1st bloom	857	458	71	22	83	9 00
Green fodder.	Young pasture-grass	200	92	27	6	304	
	" ready to bloom	250	131	23	6	277	
	Timothy	300	163	24	8	236	
	Rye in bloom	240	104	22	5	320	
	Oats " "	190	83	16	3	432	
	Vetches in bloom	180	66	24	4	372	
	Pease " "	185	76	22	4	372	
	Buckwheat in bloom	150	64	17	4	451	
	Horse-beans " "	127	61	20	2	479	
	Red-clover " "	220	95	22	5	332	
	White " " "	195	72	24	5	352	
	Alsike " " "	180	63	22	4	397	
	Indian corn "	180	106	10	3	444	
	" " ensilage	187	110	9	4	430	
	Sorghum	227	117	18	5	330	
	Artichoke leaves	200	98	27	7	284	
	Cabbages hearted	99	53	22	8	390	
Roots	Potatoes	250	206	20	3	241	2 40
	Jerusalem artichokes	200	154	19	3	290	2 20
	Mangels	134	100	11	1	184	1 40
	Sugar-beets	185	154	9	1	381	
	Carrots	150	108	12	2	434	1 60
	Swedes	130	95	12	1	485	1 40
	Parsnips	200	130	20	4	397	2 20
	Leaves do do	200	95	26	8	286	
Grain, etc.	Wheat	860	618	165	18	50	
	Rye	857	674	106	19	59	8 40
	Barley	857	639	92	23	66	7 60
	Oats	857	557	107	53	57	8 20
	Maize	856	621	93	60	50	7 20
	Buckwheat	860	590	95	17	67	6 80
	Pease	857	525	208	19	46	13 40
	Horse beans	855	459	227	14	46	15 20
	French beans	852	495	252	21	42	15 60
	White-beans	850	488	261	29	40	16 80
	Vetches	857	458	253	28	41	15 20
	Lentils	855	492	219	24	45	13 20
	Linseed	817	198	187	337	25	13 60
	do cak	885	373	249	88	36	17 60
	Cottonseed decorticated do	899	274	305	98	33	27 00
	Wheat-bran	869	459	112	30	65	13 40
	Pollard	887	509	179	40	48	
	Brewer's grains	234	106	36	4	252	3 20
	Cummins	920	422	207	20	49	16 60
	Wheat-germs free of flour	885	222	348	111	30	
	Ground meat	885		728	120	18	
	Cow's milk	127	40	40	40	163	
	" " skimmed	100	42	41	8	260	
	Butter-milk	100	44	1	10	251	
	Whey	61	44	8	3	770	

(1) The figures in this column must be understood to mean that *in a well balanced ration*, containing the right proportion of solids, of heat producers, flesh formers and fat,—or in other words, of sugar, protein and fat,—100 lbs. of meadow hay may be replaced by 82 lbs. of aftermath, or 91 lbs. of red clover &c: &c. What is meant by a *well* balanced ration will be found explained at page 18.

Table 4 —Proportion per 1000 lbs.—*Continued.*

	NAME OF FODDER CROPS.	Dry substances.	Sugar.	Digestible protein.	Digestible fat.	Nutritive equivalent.	Fertilising value per 2200 pounds consumed.
Straw.	Fall wheat straw	857	326	15	7	176	4 00
	Rye "	857	298	11	6	201	4 00
	Spring barley "	857	362	21	7	155	4 80
	Oat "	857	342	17	10	160	4 80
	Vetches	840	290	38	5	153	6 60
	Pease	840	340	36	5	142	6 40
	Bean	840	342	61	6	114	8 60
	Maize	850	367	16	6	162	
	Clover-haulm	840	250	47	10	143	9 00

Having elucidated the subject so far, from general principles, let us see what has been obtained from milch cows, in the colder regions of the province of Quebec; on what food rich milk is thus obtained, in each of the twelve months in the year, and how such rations are prepared, in accordance with the above given principles. We can thus better compare and appreciate the value of scientific European teachings, as applied to America, in its most northerly regions.

Table 5 —MILK RETURNS ETC., FROM CANADIAN-JERSEY COWS (registered)

FROM DECEMBER 1888 TO NOVEMBER 1889.

Register No.	DATE. Birth. Day	Birth. Mth.	Birth. Year	Last calving. Day	Last calving. Mth.	Last calving. Year	AGE. Years	AGE. Mths.	lbs. of milk per day per cow 1889. Nov.	May.	Live weight of animal. lbs.	Proportion of Jersey blood.	Total lbs. of milk obtained from the whole herd. Month.	Number of cows milked.	Total lbs.
16	16	3	1887	9	4	1889	2	1	13	22	594		Decemb 1888.	3½	1567
19	22	3	1885	22	12	1888	3	8	.....	38	713		January 1889	4	2493
15	15	1	1886	16	1	1889	3	.....	14	41	815		February.....	4	3358
17	4	5	1885	31	3	1889	3	10	19	37	693		March.....	6½	4696
21	27	3	1885	15	3	1889	4	.....	17	41	623		April.....	11	7964
13	27	3	1885	11	3	1889	4	.....	22	36	713		May.....	12	8686
18	2	4	1884	20	4	1889	5	.....	18	45	722		June.....	12	8752
14	2	6	1883	3	2	1889	6	.....	18	41	645		July.....	12	8819
22	2	5	1883	10	3	1889	6	.....	21	40	693		August.....	11	8645
12	12	5	1882	15	3	1889	7	.....	.....	42	776		September....	11	8338
11	6	6	1882	14	7	1888	7	.....	18	22	887		October.....	11	7145
10			1879	24	6	1888	10	.....	25	18	688		November....	10	5425
				9	10	1889					8467				76,788 lbs.
											*705				

(*) This average may be a little low, the cows having been weighed but once and under special circumstances.

From the above given principles, let us see what has been obtained from milch cows, in the colder regions of the province of Quebec; on what food rich milk is thus obtained, in each of the twelve months in the year, and how such rations are prepared, in accordance with the above given principles. We can thus better compare and appreciate the value of scientific European teachings, as applied to America, in its most northerly regions.

We have, in *Table* 5, the exact yield of a herd of twelve head, six of which are too young to count as matured animals. In fact, this herd hardly represents 10 adult cows, although I allow that number, making the average 7578 lbs of milk per annum, per matured cow.

Table 6 shows what was the average ration per day, and what its cost would be with most farmers. It also shows the profit and loss account, taking milk at the low average price of 1 cent per lb through the year, and allowing the manure—liquid and solid which, with us, is all saved—to go as a fair compensation against the labor account.

TABLE 6.—PROFIT AND LOSS ACCOUNT FOR HERD, 1888-1889.

The exact cost to us of our winter ration for 210 days averaged per cow (see details below, foot note 2).... $ 18 38

The cost of green food for 155 days in summer, we estimate at $10 per cow, being the full crop value of our meadows, etc.....$10 00

to which we add the cost of 3 lbs of bran per day, actually paid..... 3 26

13 26

Total cost of food.....$ 31 64

The account therefore stands thus:

7500 lbs milk at 1 cent.....$75 00

Food consumed..... 31 64

Net profit per cow(1)...$43 36

(1) It should be stated here that this herd had been poorly cared for until it was placed, in October 1888, under the special care of the Reverend Sisters of the Sacred Heart Hospital, at Quebec. Here, arrangements were made by which the cows are thoroughly milked, even three times a day when needed, and the food and milk weighed very carefully, the latter at each milking throughout the year, and an official return made monthly to the Department of Agriculture, at Quebec. The improvement still going on can best be judged from the milk returns obtained in the months of November, December, January and even to the 15th of February, in the years 1888-1889 and 1889-1890, showing a large increase in the milk production of the same months, in 1889 and 1890 respectively.

Table 6a.—COMPARATIVE YIELD OF MILK FOR 1888-89 AND 1889-90.

1888	Total milk	1889-9	Total milk	Increase
November.....	1443 lbs.	Nov. 1889.....	5425 lbs.	3982 lbs.
December.....	1567 "	December.....	3858 "	2291 "
January 1889.	2493 "	January 1890.	5074 "	2581 "
Febry. 1st to 15th.....	1661 "	Febry 1st to 15th.....	2790 "	1129 "
Total.	7164 lbs.		17147 lbs.	9883 lbs.

(2) The rations have varied, at different times, from uncontrollable circumstances. They were, from November 1888, to 20th of March 1889 composed as follows, per day per cow.

10 lbs Common meadow hay finely chaffed (450 lbs per day for 46 heads.

13½ " Ensilage.....(612 lbs do do

36 lbs straw finely chaffed, 50 " Cotton seed meal, 50 " Bran — made into a warm mash and given to 30 milking cows.

After the 20th of March, the ensilage having given out was replaced by 50 lbs Cotton seed meal and 30 lbs of bran to be 46 animals.

This winter (1890) the Canadian Jerseys receive:

25 lbs Ensilage at $2.50 a ton = 3c.12.

5 " Hay at 8.00 a ton = 2c.

36 " Straw at 4.00 a ton =

75 lbs Cotton seed meal 25.00 a ton =

50 " Bran 14.00 a ton = 6c,18

fed to 22 milch cows of various breeds, size etc.

Average cost of ration per day, for cows in milk 11c.30

At the following prices: hay, $8 a ton, straw, $4, ensilage, $2-50, cotton seed meal, $25 and bran at $14.00, our winter rations for the

On a further examination of *table* 5, it may be observed that from April to October no fresh cows came in, although the yield was remarkably uniform and large. This is the more striking since the herd has not had the advantage of fresh pastures, having been stall-fed the whole summer. The full herd numbered 26 heads, and the number of acres under cultivation—inside the city limits of Quebec—does not exceed 12 in all, which supplied us with about 100 tons of ensilage for winter feed, besides the summer food, as above.

This herd is stall-fed the year round. For seven months out of twelve our cows are tied to a stanchion all the time, except at calving, when the cow is allowed the range of a comfortable box, for from one to three weeks, this being the average time these cows go dry. As soon as the after birth has come away, the cow goes back to her stanchion (1).

When the warm weather comes, our cows are allowed an airing in the sun of about two hours in all per day. In the heat of summer they are turned out early in the morning. When colder weather sets in, about September, they go out at noon, and early in October—generally, with us—they take to their winter quarters entirely, until late in May.

Last summer and fall, we had to provide temporarily for our stock and used a shed roofed in and entirely opened on both sides. This answered very well until the September winds and rains prevailed, when the cows suddenly shrank greatly in milk, and thus continued until late in October, when their winter quarters were made ready; proving that in such climate as Quebec, heavy milking cows need full protection from the weather, as soon as the wet fall-weather sets in.

We have since adopted a very thorough system of ventilation in our stables, which is shown in the following drawings. (2) We expect that in future the herd will do very well in those stables, both winter and summer, continuing of course the two hours of exercise outside during the warm season. In fact, from very thorough experiments we made last summer, we have every hope of securing, in the heat of summer, a cooler temperature in our stables, than what generally obtains outside.

Crops for soiling—How situated. (3).

Crops for soiling, being watery, are heavy to carry, containing as they do about three times as much water as those grown to maturity, or for hay, &c. It is therefore indispensable to grow such crops in a special rotation, and in such fields as immediately surround the stables. Here, the bull and milking cows are kept, perhaps for 22 hours out of 24, and, to be profitable, every comfort, such as thorough cleanliness, ventilation, pure water, and every convenience for feeding, milking and stable cleaning— besides proper husbanding of all droppings—must have been provided for, in order to reduce to a minimum the amount of manual and other labor required, and of possible loss.

After mature consideration, and several years of experimental work in this direction, I have adopted a special rotation for soiling crops, as follows :

First year: Maize— of a variety *sure to mature* in our climate, and sown—according to its natural size, very much as if grown for seed, and only when the ground is thoroughly warmed up, viz: when the white oak is coming well into leaf;—if possible, on a rich meadow lea, well manured, early in the previous fall and to which about 300 lbs. of plain superphosphate per acre is added, to hasten and enrich the crop in solids. If the season has been favourable, a light crop of grass, from 10 to 12 inches high, is cut and fed, or ensiled, the plough started, followed immediately by the *acme* or *similar* breaking harrow, and, if possible again, the corn sowed in rows, but on the flat—*the same day as ploughed.* (1).

This maize is neither fed nor ensiled until the ears are fairly well glazed. The cultivation in the mean time—done entirely with horses—is thoroughly carried on, in order to keep the soil perfectly clean and aerated, until the crop allows no more interference with it.

As soon as the crop is removed, the land is carefully fall-ploughed and treated to from 8 to 10 bushels of quick lime per acre, put into small heaps covered with earth, and finally when entirely pulverised, shovelled over the whole field. (2).

2nd Year.—As soon as the soil is fit, in the spring, four to five bushels of a mixture,—of oats and rye (half and half), and tares and peas (half and half)—is sown, thoroughly harrowed in and over this, 15 lbs. of mixed red clovers are *bushed* in and rolled,—if light land and *pressed* down with the *acme harrow and leveller*,—if heavy soil, likely to cake. This crop is used for food, or ensiled, as soon as necessary, and *always* carried away entirely before the crop can possibly get laid and rot at the bottom; this, in order to have better food, and save clover killing. In good time a second crop, mainly clover, is carried away to the stock, or the silo, the same season. As soon as this second crop is carried away, a half dose of manure—or more, if the soil be not sufficiently rich—is given, with the Kemp manure distributor.

3rd Year.—Three cuttings of clover, in order to obtain rich, palatable food, by no means woody and over fibrous. A more or less heavy coat of manure is given in the fall, with 200 lbs. of plain superphosphate to the acre, after the last cutting is removed.

4th Year.—A light crop of grass being removed—maize follows,—exactly as above (see 1st year).

5st Year.—A mixture of seeds,—oats, rye, tares and peas—exactly as in the 2nd year, the clover seed being here replaced by 25 lbs. of the best hay seed mixture, according to the nature of the soil; but without any red clovers, this, to avoid clover *sickness* in the future.

6th, 7th and 8th Year.—Mixed grasses—cut *thrice* each season, and manured, more or less heavily, every second year at the latest.

I count that good land so treated should feed two cows and produce from 14,000 to 15,000 lbs. of milk, per acre, provided from 4 to 5 lbs. of good straw, finely chaffed and mixed with the green food every day, and about 1250 lbs. of cotton seed meal and 350 lbs. of bran be added per annum, per

herd of milking cows averaged about 9c. a day last winter, and now, with *increased feed*, as above, the ration costs 11c.3 per day.

The estimate of 1c per lb for milk, the year round, takes in the value of butter and cheese of the best quality, and also the value of skimmed milk or whey for feeding purposes. Most, if not all farmers in Canada are in a position to average at least that much with their milk, no matter how distant they may be from a good market. But for all who reside in the proximity of a town or city, milk will sell for fully double that price, winter milk selling generally from 5 to 8 cents per quart of 2¼ lbs, according to locality &c.

(1) The calf is removed immediately after birth, before the cow has seen or perhaps even heard it, and thenceforth is entirely hand-fed.

(2) See appendix.

(3) The following article, by the same author, is here reproduced from his previous writings, but with some considerable additions. It explains more fully the exact system followed out in summer, in the feeding and care of the above mentioned herd.

(1). With our frequent droughts, we think it advisable to sow the superphosphate *on growing grass* in the fall, in order to secure its more perfect solubility for the coming corn crop.

(2). In most parts of the province of Quebec, lime is found wanting, and therefore should be added, as above, once in six years or so. Lime, moreover, acts as a disaggregator of solubility in the soil and, as such, is most beneficial.

cow. (1). I must say here that I *want* cows to gi.e the largest possible percentage of rich milk, with a minimum expenditure of the necessary food, and therefore, I act accordingly.

ONOBRYCHIS SATIVA, Sainfoin, Esparsette.

(1). With us, the food elements in bran cost more than in cotton-seed meal, and hence the latter is used, mainly, in preference. However, a mixture of both is highly recommended, as more appetizing and thus better digested. In all cases, farmers should study out the comparative food constituents to be found in table 4. Observing, however, that sugar, or purely heat producers, is abundant in nature and generally much cheaper than the proteins and fats. As a rule, sugar is counted as representing 1. Whilst protein counts as 5, and fat at 6.

Applying this principle to some of the cattle foods and manurial values found in table 4, pages 8 and 9, the following table has been prepared, *see page* 17 :

But let me say, here again, that to make soiling profitable, (1st) proximity to the stables, (2nd) thorough cultivation, (3rd) heavy manuring, (4th) systematized, intelligent, persevering labour are indispensable. Under these conditions, soiling means heavy cash returns, provided the produce—be it calves, pork, poultry, and milk, butter or cheese – be properly managed as well. Successful soiling, also, means the production and proper husbanding of an abundance of farm manure, which will grow—besides soiling crops—heavy crops of grain, roots, hay, &c., provided too much grain cultivation and too scanty manuring be not attempted on that portion of the farm.

LOLIUM PERENNE, Perennial rye grass.

Farmers may ask where all the farm manure mention above will come from. The answer is plain: From your cow

provided all the droppings, solid and liquid, be saved and properly utilized.

Table 6b.—Showing how food and manurial values are compared and estimated :

Variety of food	Digestible	Per 1000 lbs.	Per ton	Price in cents	Value per ton	For food	Left in manure	Total value.
Hay	Sugar.....	400 lbs	800 lbs	0.5	$4.00		(1).	
	Protein.....	57 "	114 "	2.5	2.85			
	Fat.....	16 "	32 "	3.0	0.96	$ 7.81	7.40	15.20
Cotton seed meal	Sugar.....	274 "	548 "	0.5	2.74			
	Protein.....	305 "	610 "	2.5	15.25			
	Fat.....	98 "	196 "	3.0	11.74	29.73	27.00	56.73
Bran	Sugar.....	459 "	918 "	0.5	4.59			
	Protein.....	112 "	224 "	2.5	5.60			
	Fat.....	30 "	60 "	3.0	1.80	11.99	13.40	25.39
Pollard or *Shorts*	Sugar.....	509 "	1018 "	0.5	5.00			
	Protein.....	179 "	858 "	2.5	8.97			
	Fat.....	40 "	80 "	3.0	2.40	16.46	.....	.....

(1). The values put in this column are based on the quantities of undigested food which the animal drops as manure, and estimated as equal to the same fertilizing elements in commercial fertilizers, the price of which, however, are constantly varying, whilst their solubility is higher than in the same elements in stable manure. Such values must therefore be considered more as a guide to the farmer than a true valuation.

Knowing now how this herd was cared for, from Dec. 1888 to Nov. 1889, how much milk it gave and on what rations, let us compare such rations with what cows are supposed to obtain on the best June pastures. Taking an average herd of good cows, calved some time during the winter months, the average quantity of milk yielded on such pastures is from 20 to 30 lbs per day.

Table 7.—Basis for a milk producing ration.

	Dry matter.	Sugar	Digestible.	
			Protein.	Fat.
	lbs.	lbs.	lbs.	lbs.
31.5 Hay contain.	26.9	12.60	1.79	0.496
126 lbs. June grass contain	25.2	11.59	3.40	0.756
On the other hand, it has been proved, by the highest authorities on such matters, that an average cow weighing 1000 lbs. live weight requires for a full maintenance ration from 2 °/₀ to 4 °/₀ dry matter, and		10.00	0.70	0.20
That to the maintenance ration must be added the elements of milk, which for 10 lbs, amount to	.....	0.40	0.40	0.40
And for 20 lbs more, or 30 lbs in all, amount to (see table 4)		0.80	0 80	0.80
		11.20	1.90	1.40

Referring now to *table* 2, it is there shown that an animal of 1000 lbs live weight can absorb, on an average, about 31.5lbs of hay equivalents for a full ration, or 126 lbs of grass, computing grass at one-fourth its weight in hay. By referring to *table* 4, the details contained in the following table will be found exact.

Now, if we compare the June grass ration as above with the scientific ration, we find that the proportion of dry matter and sugar fully agree. But apparently, the protein of the grass ration is in excess by 1.50 lbs, whilst the fat seems short by 0.644. However, science teaches us also that protein can be changed into fat, and is actually so changed—according to the requirements of the animal, in the proportion of 1 of protein to 0.485 of fat. Therefore, by transforming the excess of 1.50 of protein into 0.727 of fat, and adding this to the .756 already mentioned, we have for the June grass ration :

Dry matter : 2.5 °/₀ of live weight.
Protein used as such : 1.90
Total fat : 1.48

showing that the full June grass ration should produce about 30 lbs of milk, without any loss of flesh.

Here it is necessary to note down a few simple rules, of great importance however in the rational feeding of milch cows :

1o Sugar or purely heat producing food should never be fed in excess of the requirements of the animals, as it is then more than useless—having to be *burnt out* and washed out of the animal system by the absorption and evaporation of 6.13 lbs of water for every lb of sugar thus uselessly absorbed. (1)

2o The protein of the ration can replace heat producers in the proportion of 100 to 139; that is 1 lb of protein can be counted in the ration as equal to 1.39 of heat producers.

3o As stated above, protein can replace fat in the proportion of 1 of protein to .485 of fat.

4o Fat also can be made to replace heat producers, in the proportion of 1 fat to 2.76 of sugar; but fat can, in no ways, replace protein.

5o Sugar can neither replace protein nor fat, and therefore as emphasized before, all excess given in the food is more than a waste : it is positively injurious.

6o Phosphates are indispensable to milch cows and must be fed, either by means of fodder rich in phosphates, such as bran, cotton seed meal, etc., or directly, in the form of *bone meal.* A cow giving 35 lbs of milk requires in its food 60 grammes, or about 2 oz. of phosphate of lime, and about $\frac{3}{10}$ of an oz. of soda salt, per day, besides other salts, such as potash, etc., which are generally found in all fodders.

It may be observed, in table 7, how deficient in digestible elements the hay ration is when compared with four times its weight of rich June grasses. This fully explains why cows may on grass give large returns in milk, and even gain in weight, whilst it is next to impossible to produce much milk on dry hay alone.

We have seen what a full ration of June grass should produce in milk, and the theory on which such returns are based. Let us now show how the winter rations of the Quebec herd compare with the June grass rations.

(1) This has been demonstrated by the well known experiments by Allibert, in France. Dogs, in similar conditions, were put into separate kenels. One lot was fed on sugar and water, whilst the other lot was kept without food or water. Yet the latter lived several days longer than those having all the sugar and water they would absorb.

Table 8 — Special ration of Canadian-Jersey Herd (1889) Weighing about 725 lbs average.

Daily ration.	Solids		Sugar.		Dig estible protein.		Digestible fat
		lbs.		lbs.			
10 lbs hay	867 × 10	= 8.67	400 × 10	= 4	57 × 10	= 0.57	16 × 10 = 0.16
13.1 Ensilage	1000 / 187 × 13.3	= 2.48	1000 / 110 × 13.3	1.46	1000 / 9 × 13.3	= 0.12	1000 / 4 × 13.3 0.04
1.2 Straw	1000 / 867 × 1.2	= 1.02	1000 / 342 × 1.2	0.41	1000 / 17 × 1.2	= 0.02	1000 / 10 × 1.2 0.01
1.66 Cotton Seed Meal	1000 / 899 × 1.66	= 1.49	1000 / 274 × 1.66	0.45	1000 / 305 × 1.66	0.50	1000 / 93 × 1.66 0.16
1.66 Bran	1000 / 869 × 1.66	= 1.44	1000 / 459 × 1.66	0.76	1000 / 112 × 1.66	0.18	1000 / 30 × 1.66 0.05
		15.00	1000	7.08	1000	1.39	1000 3.42
Normal ration for 1000 lbs. " " for 725 " (1) and giving 20 lbs. of milk a day, on an average.	2 % = 15.00		10.80 less 20 %	= 8.64	1.50 less 20 %	= 1.20	1.00 less 20 % = 0.80

(1) Table 2, page 5, shows that the ration for animals weighing 725 is about 20 % less than for 1000 lbs. animals.

Referring again to table 2, it is there shown that animals weighing 725 lbs require 20o/o less,for their full productive ration, than animals of 1000 lbs. At the foot of table 8 it will be seen what a normal ration for our stock should have been. According to these figures, however, our rations appear short; but in looking back to *table* 3, it is there seen that fully 3 lbs of sugar and 0.190 lbs of protein are saved by having the stables at 63° instead of 45°. We aim to have 60° on an average all the winter. Adding therefore this saving on heat and flesh producers to our rations, it will be shown that they fully agree with the theory given above.

Something is also gained, most decidedly, by the preparation given to our food, which is cut up fine, mixed up appetisingly, and warmed; whilst a *normal* food is merely the average of naturally prepared food such as hay, without chaffing, softening it with hot water, &c.

My aim, has been all through this paper to be concise, and yet practical, and sufficiently plain to be useful to all intelligent, progressive farmers. By following the rules given, cows can be fed more economically than was general, thus far, and they may be made to produce an abundance of rich milk the year round. Table 8 even shows how the necessary calculations for the preparation of any required ration may be made in connection with table 4. The author therefore hopes that this paper will be found to contain, a concise account of the principles on which the care and feeding of milch cows depend, which, if closely followed, may cause very considerable economy in food, and increase of production in milk, in most of the cow stables of Canada and America.

The Capelton Fertilisers.

I promised last month to say a few words on the list of fertilisers published by Messrs. G. H. Nichols & Co., Capelton, near Sherbrooke. I have carefully studied the analyses as presented therein and I find them, with here and there a trifling exception, very satisfactory.

I proceed to compare the prices of the different compounds, and, in order to do so fairly, I shall take the valuation of the two constituents: phosphoric acid and potash, as established by the common consent of the United-States' Experimental Stations; you who have seen the circular issued by Messrs. Nichols & Co. will have observed that the firm especially mentions that "they use no animal matter to supply the ammonia, but only high-grade chemical salts": i. e., I presume, sulphate of ammonia and nitrate of soda. The ammonia, therefore, in the fertilisers in question, I shall estimate at the prices charged by Mr. Vasey of Hochelaga, at his chemical works, and the complete valuation, then, will stand thus:

Reliance Brand.

Ammonia 2 per cent	$2 \times 13 \times 20 = \$5.20$
Available phosphoric acid $6\frac{1}{2}$ per cent.	$6\frac{1}{2} \times 7 \times 20 = 9.10$
Potash $2\frac{1}{2}$ per cent	$2\frac{1}{2} \times 4\frac{1}{2} \times 20 = 2.25$
	$16 55

Victor Brand.

Ammonia $2\frac{1}{2}$ per cent	$2\frac{1}{2} \times 13 \times 20 = \$ 6.50$
Available phosphoric acid 8 per cent	$8 \times 7 \times 20 = 11.20$
Potash $3\frac{1}{2}$ per cent	$3\frac{1}{2} \times 4\frac{1}{2} \times 20 = 3 15$
	$20.85

Royal Canadian Brand.

Ammonia $4\frac{1}{2}$ per cent	$4\frac{1}{2} \times 13 \times 20 = \$11.70$
Available phosphoric acid 10 per cent.	$10 \times 7 \times 20 = 14.00$
Potash $5\frac{1}{2}$ per cent	$5\frac{1}{2} \times 4\frac{1}{2} \times 20 = 4.95$
	$30.65

Of course, in all these samples the expense of manufacturing, freight, bags and bagging, commission, &c., amount to a considerable sum, but these charges are alike in all cases. It can hardly escape the eye of the intelligent purchaser that as one hundred pounds of the Royal Canadian brand will go as far as about 180 lbs. of the others he should select that sample rather than the latter, as both freight and labour in sowing will be thereby saved.

Canadian rock-phosphate, *apatite*, has certainly risen in price lately, but even two dollars a ton of increase should not make much difference in the price per pound of available phosphoric acid; one cent a pound would cover it. At all events as this constituent is sold in the "Capelton" brand of superphosphate at exactly the same price as I have calculated it at in the previous analyses, I cannot be far wrong in my valuation.

The Superphosphate brands run thus:

The "Capelton."

	cwts.
Available phosphoric acid	$9\ \% \times 7 = 63 \times 20 = \$12.60$

No. 1.

SUPERPHOSPHATE.

	cwts.
Available phosphoric acid.....14 %	× 7 = 98 × 20 = $19.60

SPECIAL HIGH-GRADE SUPERPHOSPHATE.

Available phosphoric acid..18.50 % × 7 = 1.29 x 20 = $25.90

The selling prices of these fertilisers are, per ton :

Reliance brand.....	$27.00
Victor do	30.00
Royal Canadian brand.....	38.00
Capelton superphosphate.....	12.00
No. 1 do	17.00
Special High-grade superphosphate.....	25.00

All "cash, f. o. b., at Capelton."

I need not repeat my advice about mixed fertilisers. Potash is rarely needed here, and at all events, considering how very late our springs usually are, can hardly benefit the year's crop. Less than 40 lbs. of ammonia does but little good on an acre of land unless used as an assistance to half a dressing of dung. Still, as people will employ ready mixed manures for the sake of convenience, I do not think they will find anything better or cheaper than those offered for sale by Messrs. Nichols & Co.

One discrepancy I must point out: the price of phosphoric acid in the different samples of superphosphate is not constant! In the "Capelton" brand it costs 7 cents a pound : 9 % x20 = 180, which, multiplied by 7 = $12.60 a ton, the selling price being $12 50. Again, in the No. 1, superphosphate, 14 x 20 = 280, which, multiplied by 7 = $19.60, the selling price being $17.00; this would make the price of the phosphoric acid only 6 cents a pound, as nearly as possible : 280 x 6 = 16.80! In the special high-grade, again, 18.50 % x 20 = 370. which, multiplied by 7 = $25.90, the selling price being $25.00, and that is near enough.

I must earnestly hope that, now fertilisers are to be had at a fair price and of good quality, our farmers will at least try their effects on their crops, and that the Messrs. Nichols & Co. will reap the benefit of their spirited outlay. I never had the pleasure of meeting Mr. Nichols, but, if I can possibly manage it, I intend paying a visit to the Capelton factory and mines this summer, when I hope to make his acquaintance.

By the bye, speaking of superphosphate, it is curious to note how very carelessly some of the reports of the United-States Stations are edited. In the Alabama Station report we read as follows: "There was little apparent difference in effect between raw phosphate and superphosphate." No mention is made of what kind of raw phosphate was used, and it is very probable that an uninformed farmer reading this would be led to believe that any kind of raw phosphate would answer as well as superphosphate; whereas, the Carolina-rock is, of course, the sort alluded to. I hope the Seminary-station at St. Hyacinthe will make this season an exhaustive trial of our own *apatite* against superphosphate on thoroughly worn out land. The trial crop should be *swedes*.

Barley.—The following were the prices of barley—English and Foreign—on the Mark Lane market—London—on the 13th January :

ENGLISH.

Grinding.....	20 to 24	shillings per 8 bushels.
Distilling	26 to 30	" " "
Malting.....	32 to 50	" " "

FOREIGN.

Saale	38 to 50	per 448 lbs.
Moravian.....	38 to 50	" " "
French.....	27 to 35	per 416 lbs.

Thus, we see, that between the best samples of French and Saale barley there is a difference of nearly two shillings a bushel. I hear that the Minister of Agriculture of the Dominion has given orders for the purchase of $25,000 worth of 2-rowed barley from England for distribution among the farmers! (at $2.00 a bushel.) This, with a view to encourage the exportation of this grain to England, but I fear the English maltster will not find our Canadian grown barleys suited to his purpose. The Messrs. Dawes have, long ago, given up trying the 2-rowed kind, as they find the 6-rowed yields more to the acre and makes better beer. The Americans will have nothing to do with 2-rowed, and their purchases of Canadian barley are very large. The 2-rowed kind will, no doubt, answer here in spots, and where it does answer, it is a most superior grain; but it is so dependent upon the *soil* for its malting qualities that I do not think the very finest Chevalier barley will do much good to the general run of farmers in this country. In 1862, I imported Chevalier barley for seed thinking to benefit my neighbours at Chambly, thereby, as well as my own brewery. In three years time it had all run out. The soil did not suit it.

States' Malt.—Five min'tes after I had written the above, I accidentally picked up a scrap of paper containing the following report of the Boston Malt-market, dated Boston, January 29th, 1890 :

Malt.—trade dull.—6 *rowed State*, 70 *c.* ; 2-*rowed State*, 60 *c. to* 65 *c.*; 6-*rowed Canada*, 75 *c. to* 78 *c.*

As we have a hold on the United States' market, would it not be wise to try and retain it ?

Wheat- & maize-crops.—Mr. H. F. Barton, of Salt Lake City, Utah, grew this last season 80 bushels of wheat to the acre! I suppose the bushels were of 60 lbs. weight each, equal to about 75½ bushels English. A great crop indeed, and one rarely equalled in any country. Of maize, Mr. Drake, South Carolina, grew 225 bushels, but whether of corn on the cob or threshed out, I know not.

Melon fly.—I am told that rags dipped in petroleum and laid near plants of cucumbers, melons, squash, &c., will keep off the troublesome yellow-fly. Unnecessary to say that the rags need refreshing with the oil from time to time.

Insoluble phosphate.—I see some dealers still are inclined to put a certain value on the insoluble phosphoric acid in their superphosphates. A little consideration will show any one that after the rock has been subjected to such a powerful agent as sulphuric acid, if any phosphate remains unacted upon it must be of an extraordinarily refractory nature, and therefore not likely to be acted upon by any organic acid in the ground. Mr. Nichols, as I observed in the last number of the Journal, makes no mention of insoluble phosphoric acid, and therein acts very wisely and honestly.

Pulse crops.—Will any one tell me why dung from the farmyard increases largely the yield of horse- and haricot-beans, while artificial manures—barring land-plaster—according to my experience, have no effect upon them? *Ville* gives a mixture which he says improves the crop greatly, but as it embraces, among other things, 352 lbs. of plaster, I think we are at liberty to doubt the efficacy of the other constituents of the compound. The whole stands thus:

Manure for Beans, Clover, Sainfoin, Tares, Lucerne.

	lbs. per acre.
Superphosphate of lime.....	352
Chloride of potash.....	176
Sulphate of lime (burnt plaster)	352
	880

Sir John Lawes avows his inability to find any artificial manures for these pulse crops.

Fallow- and fodder-crops.—Messrs. Chapman and Hall, publishers, London, have just sent out a small work, by John Wrightson, Principal of the Downton Agricultural College at Downton, on "Fallow- and fodder-crops." Mr. Wrightson is a thoroughly practical farmer and has fought through the last 15 years of low-prices and bad crops more successfully than most men; his writings are invariably full of good sound sense, and I can recommend the present publication as a very useful one to my younger readers.

Fall-wheat.—Will any one try an experiment this ensuing autumn on fall-wheat? As thus:

Select a piece of land of the same quality all through; previous crop early potatoes, fodder-corn, &c.; break it up, clean it, and get it moderately fine. Divide the piece into two equal parts; on one half, sow the seed as usual—6 pecks to the acre—and harrow in, leaving the land pretty rough, and on the other part, sow 2 bushels an acre, ploughing it in not less than 3½ or more than 4½ inches deep, leaving the land untouched till spring. The work should be finished by the 10th September, and cattle, &c., should be kept out of the piece during the soft weather. I need not say that the water-furrowing should be carefully attended to.

In the spring, both pieces should be harrowed with moderately short-tined harrows, and rolled down tight with the heaviest roller procurable.

Live-weight.— The shorthorn belonging to Mr. Utting and exhibited at the late Smithfield Club show must have been a marvellously profitable animal to the butcher who bought him. He turned out 76½ per cent of carcase to live-weight. The kyloes and the Kerries only gave about 56 per cent! A Polled-Angus, one year and nine months old, weighed when slaughtered 1,170 lbs.=146 stone London weight. Talk of the early maturity of the Sussex cattle! Why, all the improved breeds mature early now-a-days. Even the Cotswold lambs are treading closely at the heels of the Hampshire-downs.

Mutton.—Mr. Barnard asked, in a note at p. 23 of the last number of the Journal, what difference there was per pound between the Southdown and the Hampshire-down muttons; to which I replied very briefly, as the publisher was in a hurry. I may say, more fully, that two well bred downs, the one Sussex and the other Hampshire, each weighing from 66 lbs. to 72 lbs. would fetch the same price per pound in any other market but London. There, the run after neat, *small* joints is so great, that the butchers find it answer their purpose to pay a trifle more per pound at Smithfield for a Southdown of 64 to 68 pounds than for a larger Hampshire-down. I have bred both, and I must say that, though our house was celebrated for saddles of mutton, none of us could ever distinguish between the two breeds except as regards size. As we killed, on an average, from 85 to 90 wethers a year for the use of the family, our experience cannot have been small. Observe what Mr. Ellis says about the Lincolns and Cotswolds at p.——. (*Crowded out.*)

Ashes.—How are we to employ our ashes on the light lands for potatoes? If we mix them with the dung they promote the expulsion of the ammonia; if we sow them on the manure in the drills, it is generally the second week in May before it can be done and the year's crop is not benefited by them. I think, after all, the best place would be to store them in a dry place, and broadcast them over the autumn-furrow. Where potatoes follow grass—a rotation I do not like—the ashes might be spread over the land at any convenient time during the summer previous to breaking up. I do not think, except in the case of land subject to *washing* when the snow goes, that the waste from leaching would be very great.

Pease.—I see one of the best gardeners in England, Mr. Smith, who works for Baron Rothschild, of Mentmore, recommends pease to be planted 4 inches deep Mr. Lavallée, of Sorel, always ploughs his in about that depth, but what would answer well on the Sorel sand would fail on a heavy clay. Of one thing I am very sure: pease should never be sown on the surface and have no more cover than the usual couple of strokes of the harrows give them. The common seed-machine, with grubber-teeth, puts them in at a fair depth, if care is taken to harrow well before sowing; but the worst of it is, the farmers in too many places *will* sow on the unbroken furrow, and in that case the machine cannot possibly deposit the seed at a regular depth. Nobody would use *the drill* without previous preparation of the land; why, then, should the seed machine be expected to do double work?

Scarlet runner beans.—Of all the beans for eating in the green state, these, in my opinion, are by far the best. So largely are they cultivated in the neighbourhood of London, that I remember one of the sources of revenue from the Kentish woods was from "Runner-bean sticks." These were slender stakes as thick as one's thumb, and about 7 feet long. The beans were sown in rows five or six feet apart. Spinach for winter use between the rows, and if the beans were kept closely picked, the plants continued in bearing for several weeks. Here, I have never seen the scarlet-runners in market, and I doubt if they are grown for that purpose, serving, as they generally do, for ornamenting a trellis-work. At Potton, Bedfordshire, the gardeners cultivate runner-beans in the following way: early potatoes are planted in rows 40 inches apart, and as soon as all danger from frost is over, the beans are set, about 4 inches apart, in rows between the potato drills. When the beans begin to run, the runners are cut or pinched off, which process continues as fast as the runners form throughout the season. This forms a bushy instead of a climbing plant, and runners are formed from every joint. Many more pods are formed by plants treated in this way than when the beans are poled, and of course the picking is much more easily conducted. The pods, to be eaten in perfection, should be gathered young, and carefully deprived of their *strings*: according to their treatment in the kitchen, French and other kidney beans are either the most delicious or the most hateful of all vegetables.

Rotations—Mr. F. Warner, of Hanford County, Maryland, describes, in the County Gentleman a singular—at least, I hope it is unique—way of laying down land to grass:

"COUNTRY GENTLEMAN.—As an experiment I tried seeding a turnip patch with timothy and clover this season. The result was so satisfactory that I give it for the benefit of your readers.

I had a piece of ground that I had been trying for several years to get into grass by seeding with wheat, without success for some cause or other. I plowed it up last spring and

made a truck patch of part of it, the rest I left until the latter part of July, and then worked it up well with cultivators, sowed some fine ground bone and phosphate, mixed the turnips with sand and sowed them. I then concluded to try seeding with timothy and clover as I had heard of its being done. After sowing the seed, I ran a light plank-drag over it to smooth it and cover the seed. As a result I had the best crop of turnips I ever raised, and never had a better catch of grass. The turnips shaded the young grass sufficiently, and also kept the weeds down very effectually. (Care must be taken to sow the turnip seed very thin or they will smother the grass out.)

When the turnips were ready to gather, I cut the tops with a mowing scythe, and whisked the turnips into piles with a potato hook, threw them in the cart and hauled them in. If all farmers would seed a portion of their ground in that way instead of sowing so much wheat, we might get better prices for what we do raise, and have a nice lot of turnips to feed during the winter. Almost any farmer could feed several hundred bushels to advantage. They certainly have a value beyond the nutritive ingredients they contain. We are now feeding them quite liberally to milch cows, by cutting them up and mixing with cut hay and meal. They do not flavor the milk or butter."

Many are the sins herein committed against good farming: (1) turnips are especially a fallow- or cleansing crop, and should always be sown in drills or rows and horse-hoed; (2) if it had not been for the very, very wet latter summer, Mr. Warner would have had neither turnips nor grass, in such a climate as that of Maryland. July is not the season for sowing grass-seed in the South; (3) "whisking the turnips into piles with a potato hook" is a rough way of treating them, as they would bleed from every hole made by the hook.

Animal nutrition.—At all events, Professor Sanborn is not afraid to speak out! There is no mistaking what he means when he makes an assertion. Many of the principal English *agronomes* have no more faith in "the German idea as enunciated by Wolff" than Dr. Sanborn has, or as one of them expresses it: "It will be long before English farmers take to the theory of Professor Wolff, which, like the Guénon proposal of judging milch-cows by their escutcheons, seems to have taken great hold in the minds of American theorists." (I quote from memory.)

"I regard the German idea as enunciated by Wolff as fundamentally wrong, the logic upon which it was founded being radically erroneous: especially is this true of the method of valuing the nutrients of foods. The present discussion of feeding for fat and for lean has grown out of experiments that I inaugurated in 1883, which reverse the doctrine laid down in the German view of the nutritive ratio. I found in the trials referred to that a change of the nutritive ratio resulted—not as the foreign view asserted, in a decrease of the digestibility of the food and a waste of a part of one of the nutrients—but in a change of the composition of the animal food. These trials have been carried on for five years, and all of their results have been confirmed by subsequent experiments of Profs. Henry, Roberts and others. Prof. Shelton's trials do not, as supposed, in any way antagonize but confirm them, so far as mature hogs with muscles already developed could confirm them.

We can make a pig with 35 per cent. of fat or with 55 per cent., according as we vary the nutritive ratio. We also vary every organ in the body, and affect even the weight of hair. The German view makes the variation of the nutritive ratio affect the food, while I affirm that the nutritive ratio may be varied most radically, and yet not affect the amount of growth but its character. It is a far more economic result for the use of foods if this be true, and more profound in its influence on animals and man, as we can mould the character of meat in its color, flavor and composition, and thus reach man himself. Indeed, we can change the composition of food, in a measure, by soil fertilization.

I go so far as to assume that the ratio of fat to casein in milk can be varied by the nutritive ratio, notwithstanding investigators in this country and Europe declare against it. Their trials have not been calculated to settle this point, and when they have approached a well-considered trial, they have got a change in the ratio of fat to casein, but have ignored its bearings.

We have but to determine in advance the type of flesh we want, and we can make it by change in the ratio and food given. Food may disguise even breed influence in flesh quality—hence the block is not a test of breed on quality of meat unless they are fed alike."

Prof. Sanborn did not believe in mixing meal with coarse food for cattle. Cooking food for cattle or hogs did not pay, unless it might be potatoes. *A smaller meal or ration, fed oftener, was better than a heavy meal only twice a day.* Carrots were the best root crop. It cost too much to grind grain for steers or pigs. Feed the steers, the corn, ears, stalks and all, and the pigs the corn on the ears. Husking and grinding were too expensive. Have all foods as palatable as possible, and induce the animal to eat more. This was the chief benefit of ensilage. It was in a palatable form, and cattle would eat it on top of other foods, and so it made extra food for production.

Prof. Sanborn, Mr. Edmonds and Secretary Woodward took issue with Prof. Wing on feeding grain, declaring that it keeps the cow in better trim to go on giving milk after the grass fails, and even that they get a much better yield during the summer than they would if it were not fed. *They looked to the practical results, and if these conflicted with science, they preferred to stick by the method that gave them such results.*"

A simple insecticide.—There is a very simple way of destroying that horrid little beast, the cabbage-fly—*haltica-striolata*—a beetle, though usually called a fly: the turnip-fly—*haltica-nemorum*—may, I suppose, be banished in the same fashion. The fact is, that a light whisk of straw drawn several times over the plants would have the same effect as drowning them with water: it is the disturbance that floors the beast, not the water. My readers have no doubt observed that the greatest damage is done by the fly in bright, sunny weather—a wind of any sort shakes the plants, dislodges the fly, and arrests its ravages. Still, the water-hose is effective I dare say, and I will try it myself this summer.

OUR AGRICULTURAL EXPERIMENT STATION.

THE FLEA BEETLE (*Haltica striolata.*)

This enemy to young cabbage plants was successfully combated the past season by means of water alone. Cabbage seed was sown where the bed could be reached with a hose. The plants were simply sprinkled several times daily from the time the seed germinated until they were transplanted. The beetle was by this means kept in check and the plants grew finely. This is a more effectual remedy than dusting the plants with ashes or lime, besides being much easier of application where water is convenient, and having no tendency to check the growth of the plants.

Carrots for food for milch-cows.—I mentioned in a note on M. Séraphin Guèvremont's letter in last month's number

of the Journal, that I considered carrots as being the best roots for milch-cows. In opposition to my views I cite the following from the Report of the Massachusett Experiment Station :

QUARTS OF MILK REQUIRED TO MAKE ONE SPACE OF CREAM.

(Average of six cows fed as given below.)

Corn-stover period	1.59
Fodder-corn period	1.68
Sugar-beet period	1.88
Corn-ensilage period	1.92
Hay period	1.98
Carrot period	2.16

This is a very remarkable test, and one that I should like to see repeated. That carrots should give a milk poorer than that produced by sugar-beets upsets some of my previously conceived ideas.

Waste of manure.— Immense is the waste of farmyard manure throughout the province. What does Mr. J. C. Chapais say he observed on his journey from Kamouraska to Montreal last November? Let him speak for himself: At the end of the fall, we saw all along the railroad, on both sides of the river, little heaps of dung, which had been left there by farmers utterly careless of what became of the fertilising elements contained in this precious product of their farms. And this abuse is unfortunately, very general. What will this manure be worth in the spring, after having been dried and pulverised by sun and frost, and then washed by the rain and melted snow? Absolutely nothing. Its wealth of fertilising materials will have been dispersed, partly into the atmosphere, partly into the ditches. Was it desired to preserve it till the spring afforded a fit opportunity of carting it on to the land, why was it not thrown up into large, well-squared up heaps?

Not only is the farmyard dung wasted, but how about the HARDWOOD ASHES? Again, I see, in the Country Gentleman, *four full advertisements* of "Canada Unleached Hardwood Ashes—Nature's greatest fertiliser; ready for direct shipment, in carload-lots of from 12 to 20 tons; strength and purity guaranteed; price, sample, *and pamphlet*, sent on application."

Now, putting the potash aside, which as I have said before, is not absolutely needed on most of our soils, hardwood ashes contain, on an average, say, 3.8 per cent. of phosphoric acid. So a carload of 20 tons contains at least 1,500 lbs. of that invaluable manure, equal to the manuring, as far as the acid goes, of, at least, 40 acres of land. Half a ton of ashes, with 150 lbs. of sulphate of ammonia, sown separately, ought to make the biggest of grass- or hay-crops: a little plaster with it would do no harm: the plaster, phosphoric acid, and potash, for the clovers, and the sulphate of ammonia for the grasses proper.

Two clippings in this number are worth reading: Mr. Ellis, on "Downs vs. Cotswolds"; and Mr. Cooke, on the "Value of the oil in linseed cake." *Crowded out.* As to the latter, the experiments carried out by the Norfolk Chamber of Agriculture under Mr. COOKE'S direction were very sensibly made with a considerable number of lambs, and this gives much greater weight to the conclusions derived from them than could have been claimed if only a few animals had been fed. Two lots of thirty lambs, the aggregate weights of which differed only 2 lb when the experiment was started, were fed for about four months on precisely the same weight of food, the only difference being that the linseed cake given to one lot contained 15.36 to 16.21 per cent. of oil, while that given to the other lot contained only 6 to 7 per cent. At the end of the experiment it was found that the lot fed on the cake rich in oil had increased by 1,148 lb. in live weight, while the other lot had increased by only 1,002 lb. Thus, there was a difference of 4¼ lb. a head in favour of the former lot. The difference in values is put at 2s. 5d. a head, and this extra return was obtained at a cost of 8d. to 1s., though the rich cake cost 20s. to 30s. a ton more than the poor cake. Unfortunately, it is extremely difficult to get linseed cake containing 15 per cent. of oil, and, therefore, to use that which will pay best; but if a demand arises for it, the supply assuredly will not long be lacking.

As I remember well Mr. Cheesman, the Agricultural Chemist, laughing at me, some seven years ago, for believing in the value of linseed oil as a fattener, I was rather pleased at the success of the richer cake. Here is another proof of the value of practice over theory.

ARTHUR R. JENNER FUST.

OUR ENGRAVINGS.

Sainfoin.—I see some of the seedsmen in the United-States have been led into the same error as myself in supposing that this plant was *Holy*-hay instead of wholesome—hay—*saint-foin* instead of *sainfoin*. In Germany it is called Esparsette. It has been grown in England for more than two hundred years, and flockmasters on the chalk-hills, where red-clover will hardly grow, would be put to it without it. There are two kinds, the ordinary sort, that rarely exceeds 2 feet in height, and the Giant-sainfoin, which, as its name indicates, is much larger. The latter is not so particular as to the land it grows on as the small kind, it having been proved to answer on clays where the ordinary sort refuses to grow.

The sainfoin I sowed last spring, on Messrs. Dawes' Cross-farm, looked very well before winter set in; and as it, by the kind aid of Mr. Tuck, received a good top-dressing of rotten dung in October, I hope to see it flourishing when the snow goes, though the frequent alternations of snow, frost, thaw and rain have been hard upon it. However, of its ultimate usefulness in this country nothing can be predicated till the summer of '91, sainfoin never gathering together till the second year after sowing.

Pacey's perennial rye grass.—I am not quite certain whether the engraving is taken from Pacey's grass or from the Italian variety. The heading, in the N. Y. Station reports is given, "*Lolium perenne*." ("Italian Rye grass.") Now the "*Italicum*" variety is by no means a perennial, under ordinary cultivation, though in the irrigated meadows of Lombardy it may be. It is much higher at maturity than the Pacey's grass, which is in full bloom when red-clover arrives at that stage of growth, and is therefore always sown with it on our Kent farms. The rye grass alongside of the sainfoin—on the Cross-farm—was looking very well indeed the last time I saw it.

A. R. J. F.

NON-OFFICIAL PART.

Conservatism vs. The Rage for Novelties.

The Seed Annual for 1890, issued by D. M. Ferry & Co., of Detroit, Michigan, has reached our table. Its cover this year is especially artistic and attractive, and its contents as usual, interesting and instructive. Ferry's seeds are thoroughly reliable, and always come true. The directions given in the Annual for the cultivation of both flowers and vegetables are so full and explicit that no one can fail of success who uses their seeds and follows the instructions.

D. M. Ferry & Co. are very conservative, both in offering new sorts and in their claims for them when offered ; but they take pains to inform themselves as to the true character of all new varieties, so if some much lauded novelties are not found in the Annual, the probability is they have tested them and found them of no value.

A request sent to the firm at Detroit, Michigan will bring you a copy of the Seed Annual for 1890 by return mail.

A letter from Dr Hans Von Bulow.

The Knabe Pianos which I did not know before, have been chosen for my present Concert tour in the United States by my impressario and accepted by me on the recommendation of my friend, Bechstein, acquainted with their merits. Had I known these pianos as now I do, I would have chosen them by myself, as their sound and touch are more sympathetic to my ears and hands than all others of the country.

DR. HANS. VON BULOW.

New York, April, 6, 1389.
To Messrs. Wm Knabe & Co.

What butter makers ought to do.

Everybody who makes butter, from the farmer's wife, whose one cow affords only enough butter for her own table, to the large creamery that produces several hundred pounds a day, ought to use every endeavor to obtain a uniform product. With a little care this can be done. There is no more need of making fresh butter from one churning, and the next time getting it too salt to eat, than there is of taking the cow into the parlor to be milked. Find out how salt your customers want their butter and then afterwards use the right amount of salt every time.

The color is even more important than the flavor, for butter of a rich golden shade always tastes well. Keep your butter of a uniform June tint the whole year, and it will give much better satisfaction and bring higher prices. Messrs. J. Kenney & Son, butter buyers of Hallerton, P. Q., advise their farmers to use Wells, Richardson & Co's Improved Butter Color. They usually pay two cents per pound more for butter in which this color has been used than they do for butter that has not been colored.