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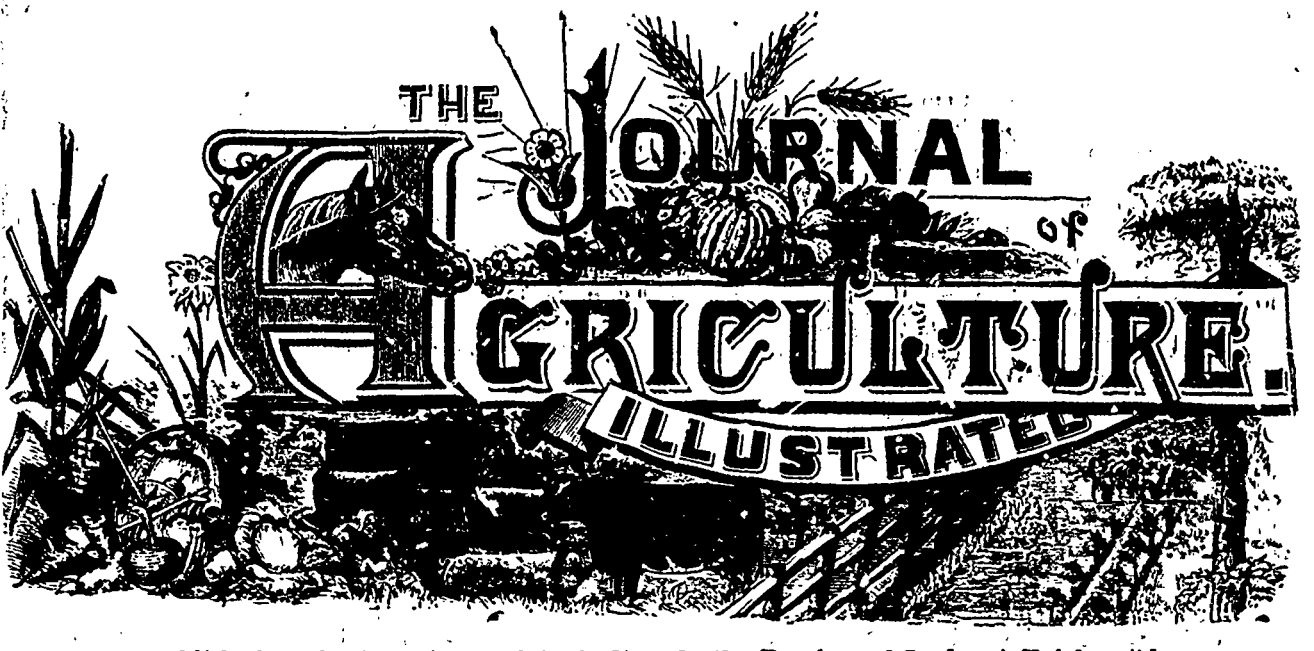

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OFFICIAL PART.

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Department of Agriculture and Colonization.

Quebec October 2nd 1890.

SIR,

With a view to encourage agriculture and in order to spread, as much as possible, agricultural knowledge throughout the whole of the province, it is desirable that each agricultural society should send one student to one of our schools.

To obtain this object the Government caused to be voted, at the last session, the necessary sums to pay the board and the labour of the students who will be thus sent.

At the next meeting of the directors of your society, you will please call their attention upon this subject and send, to the Honorable the Commissioner of Agriculture and Colonization, the name of the student recommended by your society, with the necessary information relative to the parents, their residence and occupation, the age of the young man, the extent of his instruction, &c,, &c, the whole in accordance with the enclosed blank forms.

I have the honor to be, your obedient servant,

GEORGE LECLERC, *Secretary*,
Department of Agriculture, &c.

FORMULA.

.....189

SIR,

The Agricultural Society of the county of.....
.....
recommends M. (name).....
age.....degree of education.....
son of M. (name).....
occupation.....
residence.....as a pupil in one of the Agricultural Schools, of the Province of Quebec.

I have the honor to be,
Sir,
Your obedient servant,
.....
Secretary-Treasurer.

The Honourable The Commissioner of Agriculture and Colonisation, of the Province of Quebec.

Rational feeding of Milch Cows.

Some time ago we sent our article, published in the March number, on the *Rational feeding of Milch cows*, to Sir J. B. Lawes, of Rothamstead, England, the world renowned experi-

mentator, who has made a life study of similar questions. In answer, Sir John Bennett Lawes very kindy sent us the following letter and a most valuable synopsis of experiments on (196) one hundred and ninety-six cows, for six years—which we publish below.

Sir J. B. Lawes has often shown in his writings how impossible it is to follow out in practice what is known amongst theorists as the *nutritive ratio*. But, for all that, Sir J. B. Lawes has been feeding exactly according to the principles of true science, and as will be seen by the correspondance, the results agree most exactly with the system so well described in Jules Crevat's Book : "*L'alimentation rationnelle du bétail*," (The rational feeding of stock).

Here, we must again repeat that the true theory seems to us as follows : Give your animal such digestible food as will produce what you aim at, be it lean or fat meat, wool, milk, butter, or cheese, eggs, &c.—or animal labor of various kinds—fast or slow, heavy or light, &c.

Purchase such food in the cheapest market; that is from such material as will give you *the digestible elements of food needed*, at the lowest cost. Then prepare your rations so as to give your animal what it needs fully, in the proportion required to obtain the result aimed at, and no more. That is to us perfect doctrine. Only let us say respecting what is called *the nutritive ratio*, that its fallacy appears to us in the fact that too many theorists mix up the carbo-hydrates proper with the fat, making no distinction, as if carbo-hydrates could form fat, and then advise so much of the mixture to so much of albuminoids, say, 1 of the later to 5 of the former. In opposition to this fallacy Jules Crevat has demonstrated that carbo-hydrates proper, or what he denominates under the general term of *sugar*, must not be fed in view of producing any thing else but heat, or vital power—and never in considerable excess;—and that vegetable fatty matter must either be fed direct, or obtained from digestible nitrogenous food—which alone can be transformed by the animal, either into heat, or flesh, or fat. Of course, all agree that fat produces heat, and therefore the only point at issue is in the false supposition that pure carbo-hydrates (outside of fat) can be transformed into fat.

It will be seen by Sir J. B. Lawes' second letter that his cows are fed as highly as possible. There is however an important lesson to gather from the information therein given, to the effect that even the best milking strains of Durham, for their weight (1290 lbs) consume more food to produce the same quantity of poorer milk than that given by our Canadian-Jersey stock, which only weigh about 750 lbs.

Now, respecting the question raised by Sir J. B. Lawes, as to the economy of his milk ration, we have figured out the cost of such rations in England which appears to be 24c per cow per day. Hay we estimated at $20 a ton of 2000 lbs. in England, and beets at $4 a ton (of 2000 lbs.) delivered at the byres. At such prices such milk as is obtained would cost about 1 cent a lb. It appears to be worth, on an average, 6d stg. a gallon or about 1 cent and $\frac{2}{6}$ a lb. for the production of either butter or cheese, leaving a profit of 20 % on the cost of food consumed.

Were we in England, we should be disposed to replace such expensive hay and roots by clover ensilage, which should come to perfection on the Rothamsted wheat farms, and taking the average of 5 tons of clover-hay per acre, should in our estimation give an economy on ensilage over hay and roots of about 6 cents per day per cow. This, of course, is a mere opinion, given without much knowledge of the exact circumstances, and merely as a hint to further experiments, which Sir J. B. Lawes is always so generous in making, for the general interest of farmers.

It will be observed that Sir J. B. Lawes has honored the *Illustrated Journal of Agriculture* by giving us the great privilege of publishing an important document of which he has sent us the very original, for which we tender him our most sincere thanks.

ED. A. BARNARD.

DEAR SIR,

I send you a few general results of my dairy experiments. They are taken from some lectures recently delivered by Dr. Gilbert at Oxford and they will be very soon published. For the last two or three years I have been regulating the quantity of cake to each cow weekly according to the yield of milk, but I do not know at the present time how far there is evidence of economy of food in the process, as we have no actual standard by which to measure the food. Compared with fattening a bullock, the production of milk removes much larger quantities of the substance of the food. A cow giving 10 quarts of milk per day carries off in it about 22½ lbs. of solid matter; while, a fattening ox will not carry off more than 10 to 11 lbs. Of nitrogenous substance, the milk will carry off more than 6½ lbs., the bullock not more than 1 lb. The manure from milking cows is of much less value than it is from fattening cattle. While admitting that cows require a higher nitrogenous diet than fattening animals, I have very little opinion in regard to the importance of what is called the nutritive ratio, and I should select my food according to its cost rather than to its composition. However carefully we may feed by a nutritive ratio, this ratio is overturned by the animals voiding more or less of the food in an undigested state, and unless we give more food to a fattening animal than he can properly digest, he does not lay on flesh sufficiently fast. It is in fact cheaper to waste food than to fatten slower. Yours truly,

April 25th 1890. (Signed) J. B. LAWES.

ROTHAMSTED DAIRY (of about 40 to 50 Shorthorn cows). *Average yield of milk per head per day for 6 years.*

	lbs.
January	20.31
February	21.81
March	24.19
April	26.50
May	31.31
June	30.51
July	33.56
August	25.00
September	22.94
October	21.00
November	19.19
December	19.31
Mean	23.61

The cows are in pasture about six months, May until November, but receive cotton cake, in a shed, the remaining six months and consume the following food per head :

		Approximative cost.
Cotton cake	4 lbs.	5 cents.
Bran	3½ "	2
Hay chaff	3.6 "	3.6
Oat straw chaff	7.2 "	3.6
Mangels	51. "	10.2
		24.4 cents. (1)

Weight of cows : 1200 lbs.

The daily food calculated in the dry state amounts to 25 lbs. 70, or calculated upon an animal weighing 1000, 20 lbs. On an average 46½ weeks, gave 756 gallons of milk per cow, or 7509 lbs. or 24.2 lbs. per head per "milking" day.

Quebec, May 10th 1890.

SIR J. B. LAWES, Bart., Rothamsted, England.

Dear Sir,—Allow me to state the pleasure you so kindly conferred upon me, by your letter just received.

I myself never could make much of the so called : nutritive ratio. Your figures giving the milk returns and exact food of

(1) We here add what we suppose may be the cost of such food at Rothamsted. ED. A. BARNARD.

your Rothamsted dairy will prove particularly valuable to me, and to your numerous American readers.

I was anxious to compare your statement with the theory of Jules Crevat's book on the "Rational feeding of stock" (French) as contained in the printed notes I had the honor of sending you lately. The results of such comparison may prove interesting, bringing out, as they do, in a most favorable manner, the exactness of Crevat's theory. He recommends, for a cow of 1200 lbs. weight for a full maintenance ration :

Dry matter.	Sugar.	Digestible proteine.	Digestible fat.
from 2 to 4	11.20	0.79	0.22
To which must be added the chemical elements of about 20 lbs. of milk for your six winter months	0.80	0.80	0.80
Giving a total according to Crevat, of	12.00	1.59	1.02

Now, taking the chemical digestible contents of your rations, according to the table I sent you, we have :

	Dry matter.	Sugar.	Digestible proteine.	Digestible fat.
4 lbs. cotton cake	3.596	1.096	1.220	0 392
3½ " bran	3.041	1.606	0.392	0.105
3.6 " hay chaff	3.085	1.400	0.199	0.056
7 2 " oat straw chaff	6 170	2.462	0.122	0.072
51 " mangels	6.834	5.200	0.572	0.052
Practical ration	22.726	11 764	2.505	0.677
Theoretica. "		12.000	1.590	1.020
Difference		—0.236	+0.915	—0.343
Which is equalized by transforming 0.915 of proteine into fat (x.485) or				+0.437
Now transforming this surplus of +0.094 of fat into sugar (x2.76) gives in sugar		+0.257		+0.094
Leaving a surplus of sugar of		+0.021		

MILK PRODUCTION.

EXPERIMENTS AT ROTHAMSTEAD IN WHICH THE QUANTITY OF OILCAKE GIVEN IS REGULATED BY THE AMOUNT OF MILK YIELD 1886–1890.

	NAMES OF COWS.	Average cake per head per day.	Yield of milk per head per day.	Milk per lb. of cake.	Weeks in milk.
					w. d.
1	Stella	5.30	37.44	7.06	43.4
2	Marchioness	5.09	35.25	6.93	53 4
3	Sally	5.00	34.88	6.98	45.3
4	Stella	4.90	34 94	7.13	42.1
5	Stella	4.88	34.25	7 02	41.3
6	Rhoda	4 88	33.81	6.93	45 3
7	Dinah	4 86	34.38	7 07	49 3
8	Florie	4.75	33.25	7.00	40 6
9	Ayrshire	4 56	32 19	7.06	45.5
10	Nelly	4.50	31 69	7.04	22.6
11	Sylvia	4 50	31.19	6.93	49 3
12	Lucy	4.50	30.69	6.82	64.1
13	Joan of Arc	4.48	30.94	6.91	40 3
14	Florie	4.44	31.00	6 98	50.5
15	Victoria	4.38	30 31	6.92	65.0
16	Bright eye	4.38	30.25	6.91	40.3
17	Liddy	4.36	30.75	7.05	79 0
18	Sally	4.32	30.38	7.03	48.0
19	Lively	4.32	29.94	6.93	44 0
20	Rhoda	4.26	29.69	6.97	52.5
21	Jane	4.25	29.44	6.93	42 5
22	Maud	4.24	29.13	6.87	36.1
23	Nelly	4.21	29 25	6.95	38 1
24	Ayrshire	4.21	28.81	6.84	47.0
25	Jane	4.15	29 06	7.00	45 2
26	Dinah	4 13	28.88	6.99	87.4
27	Parody	4.07	27.13	6.67	41 3
28	Gertrude	4.03	27.88	6.92	63 6
29	Ladybird	4 02	27.50	6.84	32.4
30	Flora	4.01	27 31	6.81	38.6
31	Parody	4.00	27.56	6.89	43.0
32	Sylvia	3.97	27.25	6.89	41.2
33	Flora	3.97	26.75	6.74	38 5
34	Pansy	3.94	26.81	6 80	36 2
35	Ann	3.91	27.44	7.02	39.1
36	Queen Bess	3.88	26 69	6 88	36.5
37	Blanche	3.86	27 38	7.09	37.3
38	Minnie	3.85	26 69	6 93	60.1
39	Ayrshire	3.79	25 81	6 81	44.2
40	Marchioness	3.78	25.69	6.80	50.3
41	Adelaide	3 77	25.44	6.75	28.3
42	Carrie	3 75	25.56	6 82	45 2
43	Minnie	3.75	25 44	6.78	45 2
44	Chrystal	3.75	25 31	6 75	47.4
45	Strawberry	3.75	23.06	6 15	78 3
46	Fanny	3.74	25.06	6.70	63.5
47	Chrystal	3.72	25 00	6 72	43.5
48	Pansy	3 68	25.25	6 86	35.5
49	Ann	3.67	24.25	6.61	50 0
	Mean 1-49	4.21	29.06	6.89	47.0

	NAMES OF COWS.	Average cake per head per day.	Yield of milk per head per day.	Milk per lb. of cake.	Weeks in milk.
					w. d.
50	Ladybird	3.64	23 94	6 58	35.1
51	Jewel	3 63	24 75	6 82	60 2
52	Queen Bess	3.61	24.56	6 80	44.4
53	Kate	3.61	24.06	6 66	36 3
54	Favourite	3.55	24 50	6 90	63.4
55	Connie	3.55	24.00	6 76	47.2
56	Maud	3.50	23.25	6.64	54.6
57	Snowflake	3.50	22 88	6 54	33 3
58	Florie	3.50	22.13	6 32	50 3
59	Maud	3.48	22.81	6.55	40.2
60	Gussie	3.47	23.00	6 63	38.0
61	Wonder	3.47	23 00	6.63	34.3
62	Wonder	3.45	23.13	6.70	42.5
63	Blanche	3.43	23.63	6.89	49.4
64	Flora	3 43	22.88	6.67	41.4
65	Edith	3.41	22.25	6.52	29.4
66	Minnie	3.38	24.13	7.14	39.6
67	Darling	3.38	22.88	6.77	41.2
68	Sweetbriar	3.38	22.44	6 64	77.3
69	Carrie	3.38	22.19	6.57	47.0
70	Daffodil	3.38	21.69	6.42	42.5
71	Edith	3.35	21 94	6.55	39.3
72	Snowflake	3.21	20.83	6.50	35.5
73	Darling	3.20	20.94	6.54	42 0
74	Adelaide	3.19	20.56	6.45	40.5
75	Connie	3.17	21.00	6.62	59.5
76	Rhoda	3.15	20.88	6.63	68 2
77	Vinca	3.14	20.88	6.65	67 1
78	Martha	3.13	20.75	6.63	47.1
79	Blanche	3.13	19.56	6 25	50.5
80	Jane	3.12	21.00	6.73	60 3
81	Kate	3.11	20 31	6 53	45.2
82	Kate	3.08	19 88	6 45	40.3
83	Carrie	3.06	19.63	6 42	36.1
84	Edith	3.00	18 56	6.19	50 3
85	Aurora	2.89	18.88	6.53	48.1
86	Surprise	2.88	18.06	6.27	72.1
87	Daffodil	2.79	17.56	6.29	37.5
88	Louisa	2.76	16.88	6 12	29.4
89	Dolly	2.68	17.06	6 36	40.1
90	Emma	2.67	16.63	6 23	44 0
91	Louisa	2.62	16.19	6 18	42.3
92	Bright eye	2 61	16.38	6 28	44.4
93	Baroness	2.45	15.13	6.18	48.0
94	Dolly	2.35	14.38	6.12	57.0
95	Butterfly	2.33	14.56	6.25	64.6
96	Butterfly	2.31	14.13	6.12	57.2
97	Sunbeam	2.28	13·88	6 09	40.6
98	Wonder	1.88	11.13	5.92	34.1
	Mean 50-98	3.12	20.32	6.49	46.6
	" 1-98	3.66	24.69	6.69	47.0

Thus making your practical ration exactly equal to the theoretical ration, according to Crevat.

May I ask if it would be possible to increase your milk returns still more. 1. By giving a little cotton seed meal on grass? 2. By adding 1 or 2 lbs. of malt germs or some such highly nitrogenous food? I made the experiment this winter with malt germs (cooms) with excellent milk results.

Thanking you again for your great kindness in helping my studies on this difficult problem and the encouragement I gather from your precious letter, Believe me, Dear Sir John,

Your most respectfully ED A. BARNARD.

Rothamsted, St. Albans, July 14th 1890.

Dear Sir,—You have worked out some very interesting results from the figures I sent to you.

With regard to your question whether the milk can be increased by adding more nitrogenous food, the table I enclose may possibly throw some light on the subject. As however it has only been quite recently drawn up, I have not had time to study the results. In a dairy of cows, as it is well known, the yield of milk decreases, from calving to dryness, and at the same time, each cow has a yield of milk differing more or less from another cow, some cows giving 6 or 7 gallons per day as a maximum, some 4 or 5 gallons. I therefore ordered the cake (decorticated cotton cake) to be given to each cow in proportion to the yield of milk. At the end of each week the yield of a cow in gallons per day was ascertained, and in accordance with the yield of the week the cake was allotted for the ensuing week. Scale: 4 lbs. of cake to be given for 28 lbs of milk yielded, and ¼ of a lb. more or less for every 2 lbs. of milk yielded. The principle is correct, but at the present time I really do not know what is the actual result in regard to economy. I merely send you the table, as you are interested in this question and beg you to return it to me when you have done with it.

Believe me yours truly, (Signed) J. B. LAWES.

Example of one cow (33 Flora)
began to milk april 21st 1887
dry January 16th 1888.
Weeks in milk: 38.5.
Cake consumed 1077½ lbs.—Average per day 3.97.
Yield of milk 7233¾ lbs.
Milk per lb. of cake 6 94.

FATTENING POULTRY.

The following article is written in answer to questions put to us by Professor Roberts, Director of the N. Y. State Experimental Station and Professor of Agriculture at the Cornell University, Ithaca, N. Y. See letter below:

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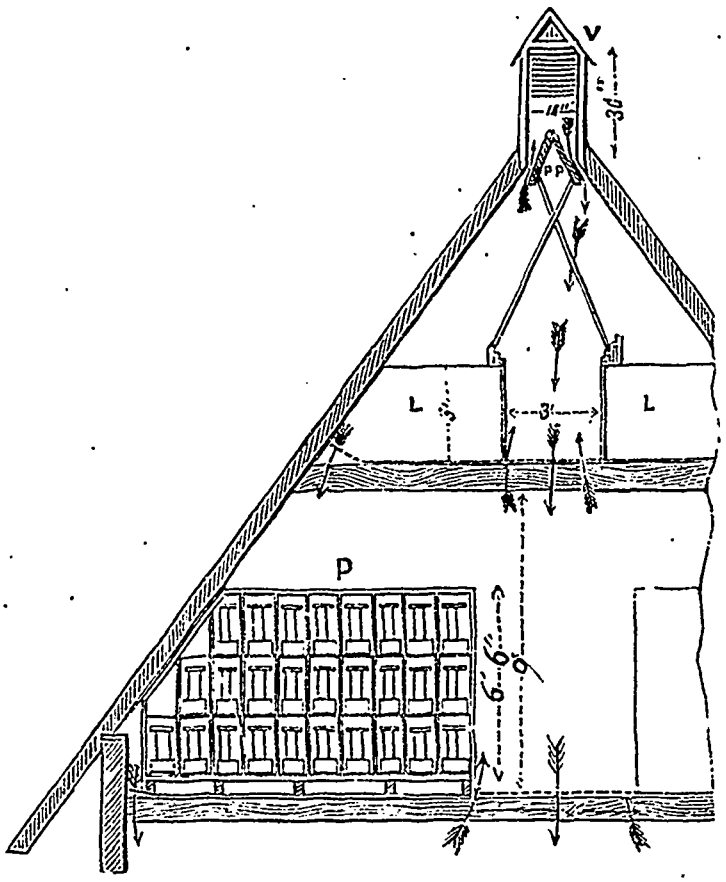


FIG. 1.

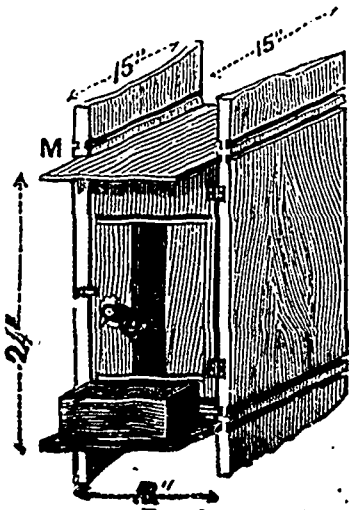


FIG 2.

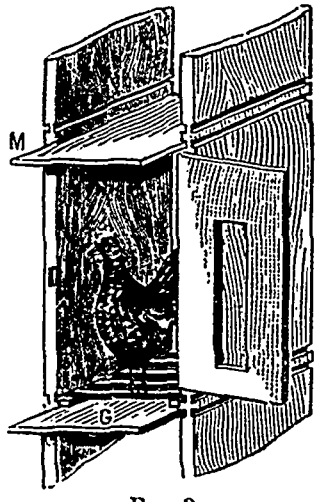


FIG. 3.

1885, (England) an article on *Fattening Poultry, by Henwife.* Under advice, a careful experiment was made, at the Sacred Heart Hospital, at St. Sauveur, Quebec, of the system proposed, with, however, the following changes:

THE POULTRY HOUSE.—In order to secure *heat in winter,* and *economy in construction,* the poultry house was made under the high peaked roof of a solidly built, warm, and thoroughly ventilated piggery, one story high. This poultry house, some 9 feet from the ground and itself 9 feet high at the peak,

communicates with the exterior of a 24 inches square lath ladder, having an incline of 1 foot in 2. Our poultry apartment,—which might be placed as well over a horse or cow stable,—is thoroughly heated and ventilated.

VENTILATION.—A few slatted traps, in the floor of the alley way, admit the ascending heat from below and let through the descending fresh air from above. The latter enters through one side of the double doored ventilator, whilst the vitiated heated air goes out by the opposite side. An advantage of this system is the tempering of the cold air, as it descends through the ascending heated air. Thorough ventilation is moreover secured through the farm boiler, which is kept going nearly all the time in the preparation of meat and other scraps for the piggery and hennery. Being low set, the draft of the boiler draws into the fire all heavy gases which the current of colder air near the floor keeps moving towards the draft of the boiler. It will be observed (see engraving No. 1) that a slatted opening, about a foot broad, is also made in the sides of the upper floors, to increase ventilation, giving thus three openings, a broad one in the upper passages, and narrow traps on each side.

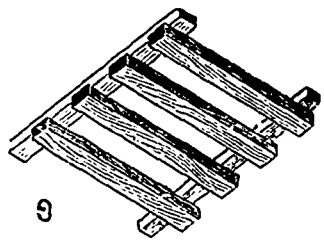


FIG 4.

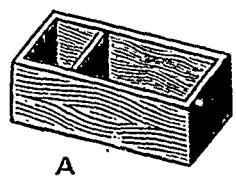


FIG. 5.

THE VENTILATOR, although most simple, works admirably. It is composed of two ⅓ inch thick boards, hanging from the very peak of the roof, and is covered over by a 24 inch square box with slatted sides, extending 24 inches or more over the roof, and is itself roofed over. (See engravings Nos. 1, 6, 7). This admits air and keeps out rain. The opening in the roof is 18 inches square. The doors are made to close up the openings tight on each side, by means of two light wooden rods extending within arms length and resting on a narrow board on each side, with a series of notches, a quarter inch thick, which admit of the ventilators being opened at will from ¼ inch to their full capacity. (See engraving No. 7)

SUBDIVISIONS.—The apartment is subdivided by laths into a 4 foot passage in the centre, and poultry rooms on each side, about 10 feet x 12, for 20 hens each. Double windows, closing tight, give light only, and remain closed, except in very fine weather.

THE FATTENING COOPS.—In a darkish corner, about 8 feet by 12, divided from the rest by laths, lies the fattening compartment. It is composed of a passage and three tiers of coops, each coop being 24 inches by 13. (See engraving No. 1)

The lower tier stands some 6 inches from the ground, so that the cats, which here are bred as pets in the very poultry house, have access to all places which rats and mice might frequent. These coops are built so as to be taken down entirely and easily. The exterior frame, of 1¼ inch common boards, and 15 inches deep, is put up solidly, with screws. The frame pieces are also notched so as to receive the upright division boards, 1 inch thick and ⅓ inch deep. The back is closed with narrow strips, screwed, with an inch space between each strip for thorough, free ventilation. Each coop is closed in front by a very thin board door, hinged with leather to the uprights, and so short as to leave 1½ inch space below, for ventilation. (See engravings No. 2, 3) This door has through its centre, a 3 inch wide and 10 inch high

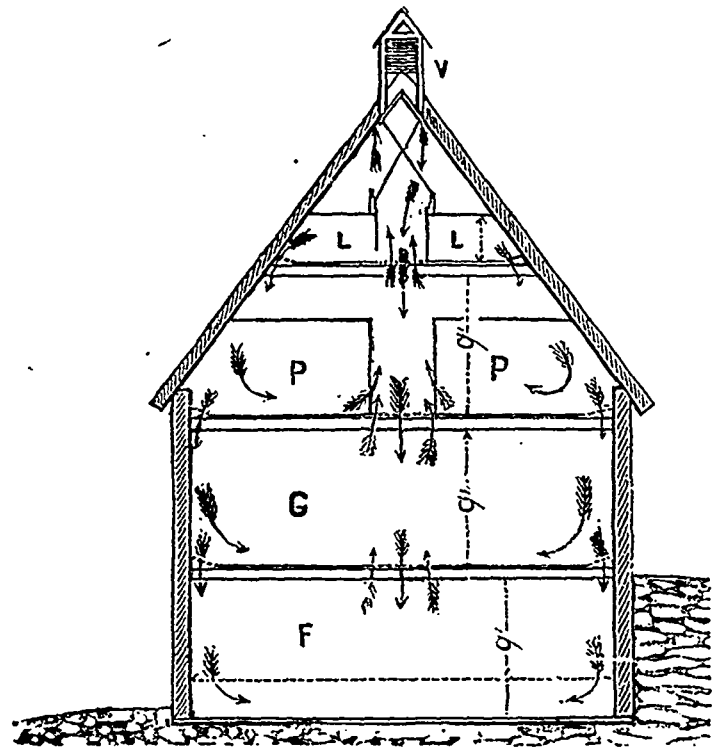


FIG. 6.

opening through which the poultry feeds. It is closed by a sliding board, when the animal has been fed, making the coop very dark. The bottom of the coop is formed of a moveable ½ inch thick board which slides into its place, through the necessary grooves in the uprights, and receives all droppings. This board extends some 4 inches outside the coop, making a short platform by which it is easily drawn in and out, to be cleaned every day. On this platform is placed a little wooden trough in front of each coop, 3 inches broad and deep, and 11 inches inside. It is made of inch board, quite tight, into two compartments, one 3 inches inside, for water, and the other, 10 inches, for feed. Over this is the rack (Engraving 4) on which the poultry stands. This rack, made of laths, slides into the uprights, 1½ inch over the bottom board above described

The appartment is kept scrupulously clean; the bottom board is dusted every day, and from time to time petroleum is smeared carefully over every part of the coops, inside and outside.

The above covers the question of coops, size, ventilation, &c., and of preparation for feeding.

PRINCIPLES IN FEEDING.—Let me now refer to principles. In the March number of the *Illustrated Journal of Agriculture*, page 36 (1890) is found a table giving the average full productive rations which animals of divers weights are supposed to consume per day, in hay equivalents. Here is an extract.

	lbs.		lbs.	lbs.
"The elephant – say	10,000	weight—takes daily	1.46 per	100 weight
" fatting ox "	3,000	" "	2.18 "	100 "
" " cow "	1,000	" "	3 15 "	100 "
" " heifer "	500	" "	4.00 "	100 "
" " sheep "	100	" "	6 80 "	100 "
" " lamb "	50	" "	8 60 "	100 "
" " turkey "	10	" "	14.60 "	100 "
" " cockerel "	5	" "	18 60 "	100 "
" " young pigeon "	1	" "	31.50 "	100 "
" " " mouse "	0 1	" "	146. "	100 "
" " v. young " "	0 05	" "	250. "	100 "

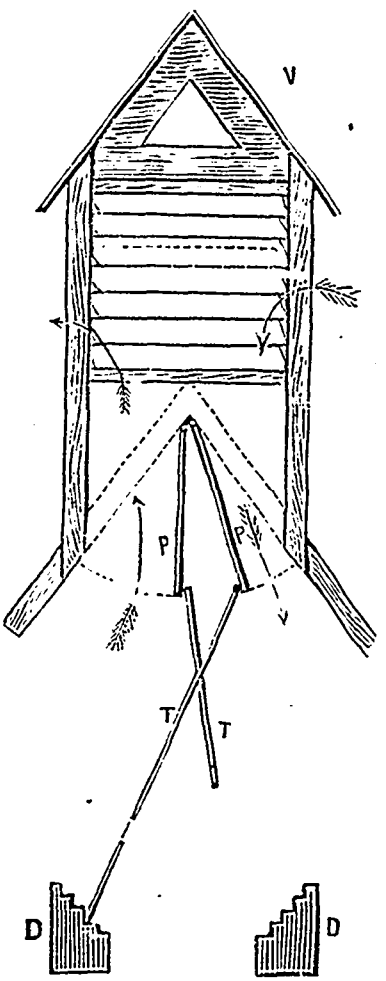


FIG. 7.

This table shows that one animal of 3,000 lbs. live weight; —or 50 animals weighing 8 lbs. each, making 400 lbs. in the aggregate;—or 98 animals, say full grown chickens, weighing 3 lbs. each, or 294 lbs. in the aggregate—would require exactly the same quantity of hay equivalents per day. Practical experiments have proved the exactness of this theory. But practice also proves that whilst the ripening, fat ox cannot possibly make more than 3 lbs. of fat meat on this ration, the growing turkey, of about 8 lbs. live weight, can be made to gain from 8 to 12 ounces each day, or for the aggregate of fifty, a gain of from 25 lbs. to 37½ lbs. of live weight daily, against 3 lbs. of fat beef, and on exactly the same quantity of *hay equivalents*. When the same quantity of food is supplied to chickens, weighing 3 lbs. on an average, the gain may, under the best treatment, of course, amount to from 4 to 6 ounces per day, or on the aggregate of 98 chickens, from 22 to 33 lbs. per day. These are facts of very great importance to practical men who wish to make the largest possible gain from a given capital, in animals and food, and in a given time.

A second principle, which should never be forgotten, is the the needs of growing animals for the full maintenance of life; as against their requirements when ripening into fat. In the first case, combustion for the maintenance of life is the principle requirement. Cheap food, in the shape of carbohydrates, and plenty of exercise are then principally needed. When the fattening process begins, the very reverse becomes the rule. Cleanliness, warmth, confinement in darkness, and the richest of appetizing food, in the largest quantity that the animal can quickly and thoroughly digest, are alone profitable. Such are the principles to be kept constantly in view.

In order to arrive at an understanding of our aim it becomes necessary to compare the chemical elements of meat, in its various forms:

The following table is taken from Dr. F. W. Parry's Treatise on food. It agrees with what is given in all standard works.

CHEMICAL ELEMENTS OF VARIOUS MEATS PER 100 lbs.

Kind.	Water.	Minerals.	Nitrogen.	Fat	Total solids.
Lean beef.....	72.00	5.1	19 3	3 6	28.00
Fat "	51.00	4.4	14.8	29 8	49.00
Lean mutton.....	72.00	4.8	18 3	4 9	28.00
Fat "	53.00	3 5	12.4	31 1	47 60
Veal —	63.00	4.7	16 5	15.8	37.00
Fat pork	39.00	2.3	9 8	48.9	61.00
Poultry (Letheby)..	71.00	1.2	21.0	3 8	26.00

The study of this short table explains partly the economy obtained in growing and fatting poultry as against beef, mutton or pork. The advantage gained in the saving of the mineral elements of the farm alone is itself of primary importance, especially on poor sandy soils, where the raising of poultry meets with so many advantages.

Having given the principles which underlie the fattening of stock, more especially poultry,—let us now cite practical results:

Professor J. H. Elsom has lately stated that a Langshan fowl has gained, to his certain knowledge, ½ a lb. in a single day, and that growing turkeys have increased ½ a lb. a day regularly, on a rich nitrogenous diet.

The writer has obtained the following results, under the carefully supervision of the Ladies of S. H. Hospital at Quebec:

A pullet about 8 months old, weighing 4 lbs., was placed in one of the coops above described. A given quantity of food was carefully weighed before the experiment began and the remains were weighed with the same care after the experiment was completed. This animal was carefully fed three times a day, at early morning, at noon and at sun down – all it would eat clean in about 30 minutes. The remaining food was then removed, and only as much as could be eaten clean at each meal was again fed, through the 17 days during which the experiment lasted. The animal was then reweighed and killed. It had gained exactly 5 lbs. in 17 days—or nearly ⅓ of a lb. a day. The quality and quantity of food was as follows:

FOOD CONSUMED AND ITS DIGESTIBLE CHEMICAL ELEMENTS.

Quantity.	Food.	Sugar.	Nitrogen.	Fat.	Minerals.
2 lbs.	Cotton seed meal.....	0 54	0 61	0.15	0.15
3 "	Malt germs (cooms).....	1.26	0 62	0.06	0.20
1 "	Bran	0.45	0.11	0.03	0.05
1 quart	(Imperial) maiz ..... Say 2 lbs	1 24	0 18	0 12	0.03
4 lbs.	Potatoes	0 82	0.08	0.01	0.03
		4 31	1 60	0.41	0.46
3 "	Poultry meat is equal to...	—	0 63	.11	
	Leaving for maintenance ration.....	4.31	0 97	0.30	

I estimate—not having the information at command,—that 5 lbs. of increased live weight in poultry will give full 60 % of meat, or 3 lbs. net. Now according to Dr. Pavy's table, above, this would represent—nitrogen 0.63; fat 0.11—leaving for maintenance ration: sugar 4.31—nitrogen 0.97 and fat 3.30; or a full allowance.

The feeding was as follows: In early morning cooked potatoes mashed and mixed with cotton-seed meal, malt-cooms and bran. At noon, the same, but with a little water mixed, so as to form a paste which was baked in the oven and given hot; at sundown a feed of maize uncrushed was given, and the coops closed for the night.

It will be observed that the above experiment was made with an 8 months old pullet. Still better results should be expected from capons or from pullets kept entirely separate from the males until fattened. The importance of caponizing deserves full attention, but this is a separate subject which has been fully treated in the *Illustrated Journal of Agriculture*.

The cost of all the food consumed was less than 10 cents, or about 2 cents a lb. of increased live weight.

The rations given, as above, were selected merely because such food was at hand. Any other food, containing in the right proportion the needed elements to produce the required meat and fat, with also the required sugar for combustion, could have replaced fully what we gave. As an example, we might add that for farmers having plenty of sweet skimmed milk, too much of this, in a variety of mixtures, can hardly be ever given to growing or to fattening poultry.

The engravings accompanying this article explain themselves. In fig. 1, at P are the three tiers of coops, closed; at fig. 2, a complete coop with the fowl at feeding time; at fig. 3, the same opened, showing the fowl on its grating, fig. 4, with the bottom-board M ready to be removed for cleaning; fig. 5 shows the double trough, the small compartment being for water; fig. 6 shows a cut of the entire building, from manure cellar F, below, through the piggery G, the poultry house P P and the rabbit bins L L to the ventilator V, on the peak of the roof. The descending cold and ascending hot air currents are indicated by their respective arrows, from story to story, through the grated openings in the alleyways and on each side of the building; fig. 7 shows the details of the ventilator, P P showing the air-traps partly opened and kept in place by rods T T and their supports D D.

As stated above, this article is written in answer to our good friend's request, Dr. Roberts, Professor of agriculture at Cornell University, in answer to the letter printed below. During his visit to our private experimental work, Professor Roberts was shown our Canadian Jersey Cows, how fed, the records kept of each milking &c., which we described very fully in the march number (1890) of this Journal. Dr. Roberts kind letter is, as we take it, a very great compliment.

ED. A. BARNARD.

THE FATTENING OF POULTRY.

QUESTIONS FOR THE AGRICULTURAL EXPERIMENT STATION.

Ithaca, N. Y., October 8th, 1890.

MR. E. A. BARNARD, Quebec, Canada.

My dear Professor,

In discussing experiments this morning, I referred to the wonderful results secured at the Home which we first visited at Quebec. We are anxious to try the experiment of feeding chickens in the dark, may I bother you to give me some of the details, first of the coop or box in which the chickens are fed. That is size, method of securing air, and feeding. Second: kind of food used. Third: how the coops are kept clean, and fourth: age of chickens fed with best results. Fifth: results.

Give my kindest regards to the lady who took so much pains in showing us about. I will send in a few days a model of the barn roof I spoke to you about.

Very truly yours, I. P. ROBERTS.

On Green- or Soiling-crops.

I fancy most of my hearers have, at one time or other found, towards the middle of July, that their stock have, more or less suddenly, begun to fall off; the cows in their yield of milk, and the horses and young beasts in the accumulation or the acquisition of flesh. I am not speaking of those pleasant spots that lie along the banks of the vagrant *Coaticook*, or the rock-bedded St-Francis, in which blest paradises the grass is rarely wanting, even in the driest seasons, but of those districts in many of which the land, though by no means originally devoid of fertility, has been so thoroughly ruined by bad cultivation and the too frequent repetition of grain-crops, that the grass of the pastures, when once eaten down, refuses to spring again, rain it never so abundantly, until the season is so far spent that the production of meat, butter and cheese is cut hopelessly short for that year.

To such an audience as that I am now addressing, it will not be necessary to insist upon the necessity of supplying something to fill up the void created by the failure of the pastures. I presume at least $\frac{9}{10}$ of you are in the habit of sowing maize for mowing green for your stock, particularly for your milch-cows, and a very wise plan it is. But, because I think this practice is capable of a greater and a more profitable extension, I have thrown together a few notes—many of them by no means new,—which may perhaps prove interesting to some of you, on the various fodder- or green-crops suitable to the land and climate of this country.

Forage-crops, in this part of the world.—I am speaking chiefly of the district East of the city of Quebec,—if cultivated systematically, give very little trouble, cost very little, and are immensely profitable.

They give very little trouble, because, when once sown, they take care of themselves, requiring no hoeing; they cost very little, because all that need be expended in their cultivation is the price of the seed; and they are immensely profitable, because they supply the greatest need of our husbandry; green, moist, wholesome food in the driest time of the year.

The different plants I recommend to be sown for the purpose are the following:

Rye;
Lucerne;
Orchard grass and red-clover (mixed);
Perennial red-clover and perennial ryegrass (mixed);

Hungarian grass;
Sainfoin;
Tares or vetches;
Pease, vetches, oats, maize, and rape (together);
Corn;
Rape or colesced—for sheep principally.

The first eight for horned stock and horses; the last—rape or colesced—for sheep.

Rye.—Every farmer should grow a small piece of rye. I should have said two or three small pieces, for this cereal runs through its courses in the spring so rapidly, that a week or at most ten days after it is fit to cut, it is unfit to eat. The land chosen for rye to be mown green may be the cleanest piece of wheat or oat-stubble; a moderate dose of dung, or 200 lbs. of sulphate of ammonia will help the yield immensely; and the land should be prepared as follows:

First for *fall-rye*: a furrow of ordinary depth, harrowed fine; three bushels of sound rye sown to the *arpent*, and ploughed in 3½ inches deep; the land to be left untouched till the spring. Those who possess a drill may put the seed in with it, at the above depth. Harrow and *roll* in spring.

Spring-rye.—Autumn furrow well laid up at an angle of 45°, 3½ bushels of seed to the arpent, well harrowed and *rolled* as a finish.

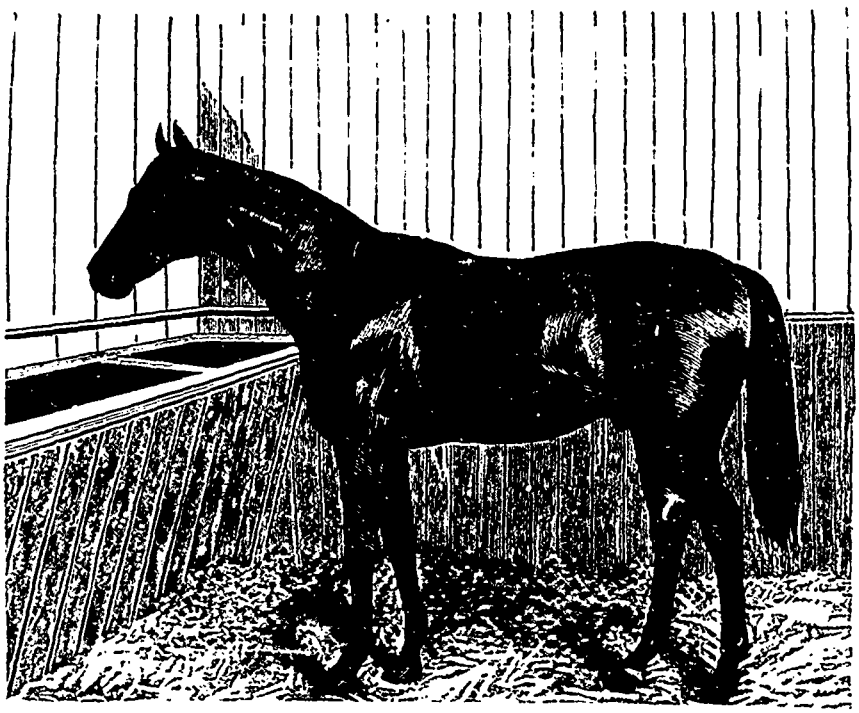
I am inclined to think that a bushel of wheat substituted for the same quantity of rye in the spring sowing might be advantageous. Although wheat is a slower grower than rye, it would thicken the bottom-feed and give a heavier cut towards the end of the season. One thing is certain: both cattle and horses prefer green-wheat to barley, rye, or oats.

The quantity of seed I recommend may seem extravagant to some of you; but, take my word for it, if you spare seed for green-crops you will have but poor returns at mowing time. In my country we sow four bushels of rye to the imperial acre, and we find it not only yields a greater bulk, but that it comes earlier to the scythe in consequence.

The land devoted to spring-rye should be divided into two parts, and sown with an interval of two weeks between the sowings. If the land is in good heart, an acre of rye ought to provide green-meat for twenty cows for ten days. Too large a feed of this earliest of all green food is dangerous. It should be allowed to lie and wilt for several hours after mowing, and should be given in the afternoon at first; as, in fact, should all green-meat.

Your horses will feel deeply grateful to you for a bunch of rye in spring. After their long course of dry food, it would cool their systems, and although they might have to return to their hay and oats, they would thrive all the better for the change of food if it only lasted a week or ten days. The first sign of spring we used to note in London was the sudden irruption of carts loaded with bundles of rye for the *mews* or stables, where large quantities of this food are consumed every season, and I presume the owners of the horses find their account in the practice.

Lucerne.—This most valuable plant is only of local adaptation. It abominates water at its roots, and cannot bear rough treatment. Lucerne will stand any amount of cold, but its frequent failures are due as a rule to an injudicious choice of soil. It is probably the oldest forage plant known to agriculture, and its plentiful yield, when it meets with proper treatment and a suitable soil, should induce every farmer of light dry land to give it a fair trial. When once established, it is very forward, that is to say, it will be fit for the scythe at least 12 days before red-clover. Should any one feel inclined to sow Lucerne in rows, I warn him that he will in all probability soon plough it up again, for land treated in this way can hardly be kept clean by any amount of hoeing: this I say from experience, in spite of the books. But there is a plan which does away with all manual labour during the growth of this crop, and I will try to describe it as plainly and as lucidly as possible.



THOROUGHBRED ENGLISH STALLION ORMONDE.

In the first place, lucerne demands a dry subsoil. Sandy loams, black loams, and clay-loams, will all suit it; but on heavy, tenacious clays, on which water lies all spring and autumn, it would be waste of time and seed to attempt to grow it.

Having chosen a piece of land near the homestead, clean it thoroughly: not a particle of couch-grass, or other root-weeds must be allowed to remain. On this spread, in autumn, a good dressing of your best dung, which plough down with as deep a furrow as your horses can manage. There is no fear of burying the manure too deep, as the roots of Lucerne will penetrate 6 feet below the soil in their search after food, provided there is no water in the subsoil.

When spring arrives, and the land is fit, sow your barley as usual, and after the land is well—particularly well—harrowed, sow broadcast 15 lbs. of lucerne seed to the acre, and after passing the chain-harrows over the piece, roll it with a good heavy roller. If you have no chain-harrows, a bush-harrow

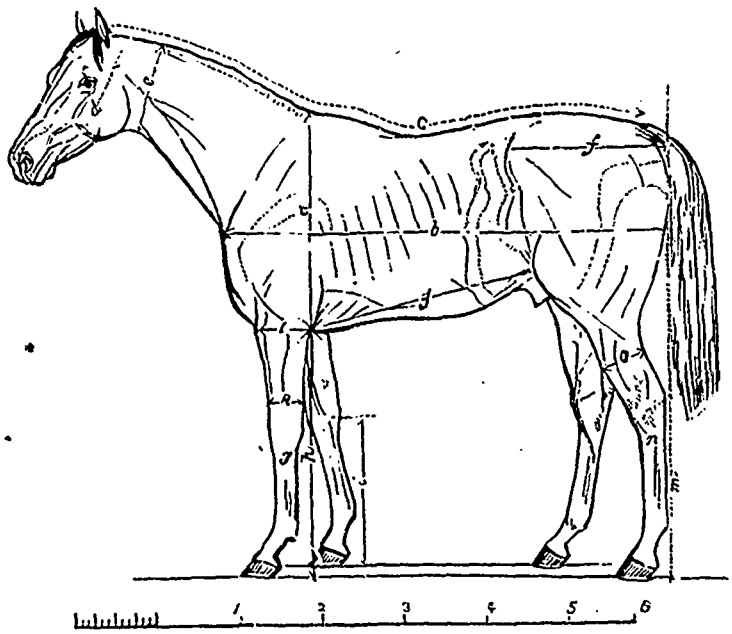
must serve, but the former do such perfect work that every farmer ought to have a set.

After the barley is cut and carried, a light dressing of strawy dung will help to protect the young plant of lucerne from the frost. In the spring following, it should be harrowed with light harrows, and rolled again. In the next autumn, when the ground has been mown for the last time, harrow severely with heavier harrows, until the ground is free from weeds, as the roots of the plant will by this time have gone down too far into the subsoil to be injured by the harrows.

A plant that yields four crops a year, as this will do, should not be stinted of food; so you will find it pay you to manure it every year with your best dung.

I see Mr. Evans, the well known seedsman of Montreal, quotes the price of lucerne seed at 20 cents a pound.

The above system of growing this valuable forage-plant was the one pursued by my farm-tutor, Wm. Rigden, of Hove, near Brighton, England. He never had less than twenty acres of it, and as he had 4 horses employed all day in drawing dung, and 3 horses all night in drawing night-soil, from the neighbouring town, he never spared manure.



MEASUREMENTS OF STALLION ORMONDE.
See portrait on preceding page.

Lucerne ought to be cut as it is coming into bloom; which, taking an average of years, will be about the end of May in this district. Mr. R. H. Stephens mentions in a letter, dated June 5th, 1879, that "We began cutting lucerne on Monday last May 29th.—It is now two feet to two and a half high, in spite of our having had no rain for four weeks. Last year, we cut it the second time on June 21st. We get four crops in a season. I fed five horses, two bulls, and some calves with it for four months." Unfortunately, Mr. Stephens does not mention how large the piece was.

I have never tried plaster for this crop, but *theoretically* it ought to suit it well.

Don't sow lucerne in the dampest corner of a field in the shade of some trees, as a friend of mine, who ought to have known better, did, and lost his crop; but give it plenty of light and air.

Orchard-grass and red-clover.—In succession to the first cut of Lucerne a mixture of two bushels of orchard-grass and 8 lbs. of red-clover will be found useful. The peculiarity of orchard-grass is that it grows in tufts or bunches, and the clover will fill up the gaps and add greatly, besides, to the alimentary value of the crop. This mixture should be sown broadcast with a spring crop of grain, and rolled in after the last harrowing as described for lucerne.

The best sort of clover to sow for soiling purposes with orchard-grass is the *true cow-grass*, or perennial red clover: *trifolium pratense perenne.* A piece the Messrs. Dawes of Lachine allowed me to sow on an acre of their land in the spring of 1889 has turned out a most valuable acquisition. From the 12th. June this year, their milch-cows have been daily supplied with this food as their evening meal. Mr. Tuck, their farmer, tells me he would not have known what to do for them without it. The quantity of food produced on this small piece of land exceeds all belief, and there is at this date—October 14th,—a good bite still on the ground. This is, I believe, the first time the true *cow-grass* has been tried in this country. The greatest care should be taken to get it true to sort, as even in England, whence I imported it, it is not easy to buy it pure from admixture. Nothing, except my favorite mixture, to be mentioned hereafter, can exceed this crop of orchard-grass and clover as a food for milch cows. Mr Henry Stewart, a well known agronome, told a friend of mine that, "when changing the food of his cows from orchard-grass and clover to timothy of good quality, the yield of his cows fell from 25 lbs. to 17 lbs. a week, and no increase of grain-food that could safely be given would restore the loss."

If any of you have good dry-lying land on the hillside, that you would like to lay down with some permanent forage-crop, I advise you to try *sainfoin.* About this plant there is this peculiarity: it takes three years to come to its best, but, in revenge, where the soil suits it, it will last seven or eight years. Immense quantities of this plant are grown on the thin chalk soil of the S. E. of England and the N. W. of France, and a beautiful sight is a field of sainfoin, when ready for the scythe, with its upstanding crimson flowers coloring the whole piece, and visible for miles and miles.

The seed of this plant is sold in two forms: in the husk, or milled. In the former case 3 bushels an acre will be required; of the milled 40 lbs. will be enough, and in both cases great care should be taken that the seed is well covered, as it is apt to dry up after once starting unless the land is pretty moist after sowing. A small piece I sowed last year on the Cross farm at Lachine met with but bad luck, as the water from the melting snow killed part of it; but the roots that escaped came along well in the spring, and the crop was fit to cut for hay June 17th, ten days before the red-clover alongside of it.

For hay, sainfoin should be cut just as the blossom is beginning to expand, and as it is a very early crop, I recommend that, to increase the first year's yield, a few pounds, say, 6 lbs. to the acre, be sown with it of hop-trefoil, *medicago lupulina.* Both the sainfoin and the trefoil become sticky if allowed to stand too long.

If your sainfoin does not look very gay the first season, do not be discouraged: it will, if the land is clean, pick up

wonderfully in the second season, and astonish you when the third summer arrives.

Hungarian Grass is another useful soiling crop. It has this immense advantage: it may be sown successfully from the first of May to the first of August. Hence, its utility where any other crop has failed. I know it has stood me in good stead more than once, particularly at St. Hugues, where, on a worn out farm I was seduced into taking, my cows would have been starved had it not been for this quick growing crop. At Sorel, too, in a spot where the grass had failed, I sowed 3 gallons per acre on the 2nd June, and on the 20th August I cut about 2½ tons of hay to the acre. If cut when first in bloom, Hungarian grass makes good hay. I have also sown it at the rate of ½ a peck with 4 lbs of rape-seed to the acre, on the 20th August, and had a good succulent bite for my cows by October the 1st; but as to this I was very fortunate, as the frost kept off till it was finished—about the 15th of that month—and the cows never went into winter quarters in better condition. On another occasion, the Hungarian grass was cut off by frost on the 15th September. It will stand any amount of heat, but ten degrees of frost is fatal to it.

The only preparation needed for this crop is good cultivation. There is no use trying it on rough land. Plough a fair depth, grub, harrow, and roll, sow 3 gallons broadcast, harrow in with light-harrows, and finish with the roller. The land *must* be made fine, and if you can afford a moderate dressing of dung, or 200 lbs. of sulphate of ammonia per acre, you may safely calculate on having from ten to twelve tons of green-meat of superior quality to the acre. But it *must* be cut young, or else, like trefoil, it becomes so sticky that the cattle do not care for it.

Tares or vetches.—Of this plant there are two kinds, the one with large seeds, commonly called *spring-tares*, the other called *winter-tares*, the seeds of which are much smaller. The best farmers of the Eastern Counties of England, however, always sow the smaller seed, as they find the crop it yields much superior in quality.

Tares are, in England, rarely sown alone; rye, oats, or wheat, about ⅓ of either, is always mixed with them. For sheep, two or three pounds of rape or coleseed are added to 2½ bushels of tares to the acre, and this forms a succulent repast for ewes and lambs in the early summer. As soon as the tares are fed down by the sheep, or mown for the horses, the land is ploughed at once, and sown with turnips, which, in their turn, are eaten off by sheep, cake or grain, pease, or beans, &c., being added, and it is on this succession of sheep-crops that our lighter soils depend for their success in producing almost incredible crops of grain. Tares for stock should always be in bloom before cutting.

But my favourite *soiling-crop* is a mixture composed as follows:

1 bushel of tares;	Per acre.
1 do " pease;	
1 do " oats	
½ do " corn on light lands, of horse-beans on heavy land;	
3 pounds of rape-seed.	

The land should be well prepared and dunged as usual, the grain and pulse broadcasted or drilled in, and after the final stroke of the harrows has been given, the rape should be scattered over the piece, when a rolling will finish the job.

Mr. Pierre Guèvremont, who is probably present, will tell you, perhaps, how very useful he found this mixture in the hot summer of 1886.

The seed should be buried pretty deep, as otherwise the corn or the horse-beans, as the case may be, will be difficult to cover with the harrows. Should there be no drill on the farm, the best plan would be to put it in with the grubber, or with the sowing machine.

Pray do not be afraid of the quantity of seed. The crop should be cut when the pease are in bloom, by which time the tares will be forward enough to be safe from any danger of scouring the horned-stock or horses. The daily portion of this and of all other soiling-crops must be allowed to wilt before being fed to cattle.

Maize.—So much has been said at previous conventions of this association on the cultivation of this plant, and of the most economical way of consuming it, that I need not expatiate on its value; but one observation I must be pardoned for making: it is my firm belief that one acre of land sown with the above mixture of pease, tares, oats, maize, and rape, will produce as much milk as an acre and a half of green maize. I do not speak of silage-corn, when the nearly ripe ears are cut up and mixed with the stems and leaves, but of maize in the usual condition in which it is given to cows in the month of September.

Rape.—In 1873, Mr. Cochrane of Hillhurst sowed 20 acres of rape and cut it when full grown for his cows. He told me it answered well, but I think he would have done better had he given it to his splendid Shropshires. The cultivation of rape is simple enough: make the land clean and fine; give it a fair dressing of dung or bone-dust, unless it follows a previous manured crop like corn or potatoes, in which case it will do without any manure; harrow well, sow from 6 lbs. to 8 lbs. of seed to the acre, and roll it in. Rape grows so thick and so fast that it needs no hoeing; and if the land is evenly covered with seed, not a weed can show its head. At maturity, rape stands about 3½ feet high, and if it is mown close to the ground, should yield from 12 to 15 tons to the acre. It will stand any degree of cold above zero, and I have had it perfectly green on the 7th December, so it is clearly the most hardy of all soiling crops. Still, as I said before, I grudge every bit of it not given to sheep, whose peculiar property it ought to be.

And why all this fuss about soiling crops? well, for this reason: the pastures of this province are not, as a rule, given to produce much food after the first flush of the grass is over; as for feeding the meadows after haying, I suppose everybody knows that meadows in which timothy-grass is growing should never be grazed at all. Owing to the bulbous habit of growth of that plant, the roots are easily drawn forth from the ground, and the injury once done can never be repaired. Consequently, towards the fall, the cattle, being restricted to the aforesaid inferior pastures, which by that time are, except in very moist seasons like the past, pretty bare, retire into winter-quarters in by no means a proper condition to bear the generally hard fare of straw and a little poor hay they are expected to support life upon till the long season of stabulation comes to an end; the steers and heifers lose flesh, the cows fall off in their milk just when butter fetches the best price in our centres of population, and the poor animals never, during the whole season, recover from the check, but go out to grass the following spring with the double duty of repairing the waste of flesh and fat, and of yielding milk at the same time, imposed upon them.

Now, however, I trust and believe, all this penury is on the eve of changing to a wiser process of management. In future, we shall see the stock of the farm rejoicing in unlimited supplies of succulent food from the silo during the winter months, and, after the first flush of grass has been cropped in June, falling back on a copious provision of well advanced soiling crops, which, sown at intervals, of, from 12 to 18 days throughout the season, beginning with the earliest day of spring, and ending with the sowing of a small piece of

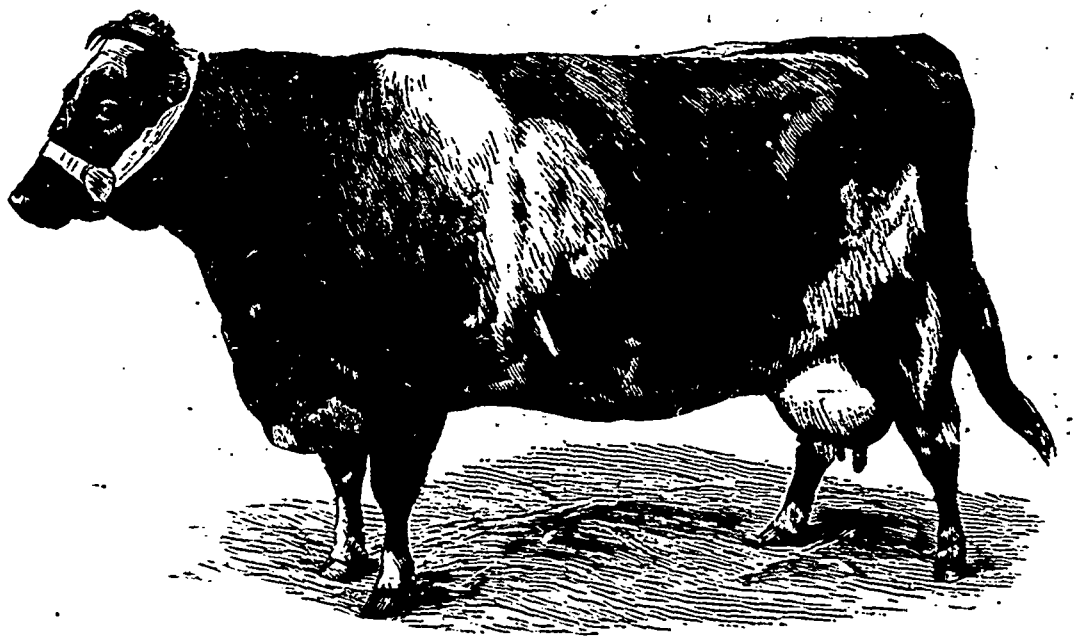
rape and Hungarian grass in August, will bring them into the stables and cowstalls by the 15th of October, in prime condition, a condition that the contents of the silo and of the root-cellar, combined with good sound dry food, will enable them to retain throughout the winter months with comfort to themselves and with profit to their owner.

In conclusion, allow me to say that I think a yard, provided with sheds and with shoots to carry off the rain, on three of its sides, but open to the South, will be found a more comfortable place to soil cattle in during the hot weather than a close stable. The only thing I see against it is that horned cattle will hunt each other about at first; but this might surely be obviated. One thing is certain: all pregnant animals require exercise, and although I am advocate for the confinement of cow-stock during the winter months, I would give them as much liberty as possible during the summer.

I have made no remarks on the saving of manure made by soiling stock in well sheltered, well littered yards, as you all know as much of this or more than I can tell you.

ARTHUR R. JENNER FUST.

(Read (in French) at the Sorel meeting of the D. Ass.)



SHORTHORN COW VICTORIA. (FIRST PRIZE, LONDON DAIRY-SHOW, 1890.)

CREAMERIES.

In the majority of creameries, there are not enough workmen employed; generally, only a maker and an apprentice to deal with from 8,000 lbs. to 10,000 lbs. of milk a day, and sometimes even more. Thus, the maker is overworked; he has at one and the same time, to inspect the deliveries of milk, to look after his engine, to see to the regulation of the speed of the separators, and he is often compelled to carry on the churning of the cream at the same time to save fuel. No man can do all these things at once, so being obliged to neglect some one of these operations, his work as a whole suffers.

I recommend creamery-owners not to overwork their butter-maker but to allow him two assistants as soon as the daily deliveries of milk amount to from 6,000 lbs. to 8,000 lbs. The work will then be thus divided.

The head maker receives and enters the milk in his register; and at the same time regulates his separators.

The first assistant, who ought to have gained some previous knowledge of butter-making, manages the churning, washes, salts, and works the butter; the whole under the eye and control of the head maker.

Lastly, the apprentice has to look after the supply of fuel to the boiler and the other common business of the factory.

The butter-making finished, the two aids clean up, while the head looks into his daily accounts, prepares his dividend-list, shipments, &c.

Thus each has his place; the work is done with regularity, without loss or waste, and the proprietor will be all the better for it. But if the men are overworked, you may be sure trickery and losses will infallibly result from it.

A common fault that I will now point out, is that during the hot weather many makers persist in putting the butter in direct contact with ice to make it firm.

This is wrong, since those parts of the butter that remain some time in contact with the ice, turn white and become under the butter-worker veined or marbled; thus, the appearance and sale of the butter is depreciated, and it only passes for a second-class article.

It is far better to strive in every possible way to get the butter firm at an earlier period, and for that purpose, not to churn at too high a temperature: in summer, never higher than from 56° F. to 58° F. And as soon as the butter has "come" in grains, to wash it in the churn with the coldest water possible, so as to prevent its getting into a lump. Where there is no water cold enough naturally, it may be easily cooled with ice, in this way: place a tub pierced with holes and filled with bits of ice over the mouth of the churn, and let water run into the tub, where it will get cooled before it finds its way into the churn.

Besides these things, every creamery ought to be fitted with a nice chamber, in which the butter can be worked during the summer. For those that have not such a room, a refrigerator is indispensable. It is easily made, and the butter can be kept in it for some time to get firm before working.

My next article will contain a clearly described method of making creamery-butter, and I hope it will be useful to the makers.

F. MACCARTHY.

P. S.—In well managed French creameries, butter is washed three times in the churn, with water at different heats: 1st, at 60°, 2nd. at 55°, and 3rd at 45.50°. I have always found that butter washed in this way, is superior in grain, and its flavour more durable. I had one maker in particular under me who, by this mode of washing, obtained capital results, and his butter always sold for an extra price. (*From the French.*)

Cost of harvesting, &c., silage-corn.—Mr. Tuck has kindly given me the cost of harvesting, chaffing, and ensiling the 14 *acres* of maize on the Willows' farm of the Messrs. Dawes of Lachine:

Sept.	30th	1 day
Oc.	1st	1 "
"	2nd	1 "
"	4	1 "
"	6	1 "
"	10	¾ "
"	11.	1
"	13	1
	14	½
		8¼ days.

16 men at $1.25
4 boys at 50
1 engineer 1.50
5 horses at 1.00
} Men employed.

To this must be added the cost of coals, interest on engine and cutter, rent, taxes, &c., amounting in the whole to about $130.00, as nearly as I can make out, or between $9 and $10 an acre, which, supposing the crop to have been 20 tons an acre, would be equal to nearly 50 cents a ton. Wages, &c., are high at Lachine.

The land was *very* heavily manured, and twice ploughed. The labour of preparation and manure, I reckon to be worth about $22.00 an acre, equal to say $1.00, so the total cost of the silage seems to have been about $1.50 a ton.

Vermont University.—The union of classical studies and agricultural practice at this university has turned out to be such a failure that the farmers of the state have determined to separate the two departments. Mr. Chapin, in a letter to the Vermont Watchman, speaks of the "miserable exhibition at the State fair, after $50,000 have been spent in three years."

Farms on shares.—Mr. Barnard, in one of his recent notes on reports of the Agricultural Clubs, recommends young men intending to start in farming not to take farms on shares, wherein I heartily agree with him. As he says: a fixed rent is the thing, as in that case, if there is a term of years agreed upon, the farmer has a chance to recoup himself before the expiration of his term for any improvements he may make in the land.

Barley, at Kingston, Ont., fell 20 cents a bushel in price two days after the coming into force of the McKinley tariff.

Cheddar cheese.—At the great cheese-fair held at Frome, England, the 20th September, the finest Cheddar-cheese sold as high as from 63s to 65s a cwt. of 112 lbs.! At that date, Canadian Cheddar of the best quality was quoted in Hodgson's circular at 46s.

English 2-rowed barley.—Mr. Ewing, the seedsman of McGill Street, Montreal, showed me to day, Nov. 3rd, a sample of this barley grown by Mr. Dan. Drummond on heavy clay soil in the neighbourhood of Montreal. Unfortunately, the season for barley was a bad one all through, and this barley in consequence is a little stained in colour and not too well filled out, the kernel seems steely; still the grain would not make *bad* malt.

LONDON MARKETS,

Wheat, which immediately after the opening of August seemed inclined to go up considerably, has undergone a check, the fall in price for best white wheats being quite equal to 16 cents a bushel. *Duluth* is worth 41 shillings a quarter in Mark Lane, no Canadian wheat having, up to November 5th, reached England. Dantzic and best English white wheats are worth 3s a quarter less.

Hops are worth money in London: best East Kents are selling at £16 per 112 lbs., equal to 68 cents a pound! This time twelvemonth, the same quality only fetched 32 cents! I hope my readers will not be tempted by the above notes to embark largely in hop-growing. It is always a hazardous crop, and should be left to those brought up to it.

Canadian half-fat and store-beasts continue to arrive freely in Scotland, but meet with a poor sale; but Down-sheep, from any quarter, are always in demand and fetch good prices. Small wethers, say, 72 lbs. carcases, are worth $14.00 a head.

Cheese.—Finest Cheddar is worth 60s to 74s, per 112 lbs. At Leicester 81s 6d was paid for the best. Stiltons were worth 24 cents a pound. At the London Dairy Show, the first prize cheese, in the *ton lots*, was sold for 24 cents a pound—it was Scotch make!

Milking trials at the London Dairy show.—A most interesting report. A Shorthorn again heads the list, and my favourite Guernseys next.

The portrait of Victoria, of the dairy-tribe of shorthorns is worth looking at. A. R. J. F.

Store sheep are now being marketed freely at the autumn fairs, and trade is steady at about 3s. to 5s. per head lower than the rates current for similar class of stock at the corresponding period of last year. Canadian store cattle continue to come freely, but those sent to Bristol do not take the fancy of West country graziers. They are big enough for the money, but fall a long way behind the Irish stock in respect of quality.—*Eng. Ag. Gazette.*

Before more money is given to the agricultural colleges, we should know how previous appropriations have been spent, says the *Rural New Yorker*. "So say we all of us." Tell us something, gentlemen, that you do not already find done and fully explained in the agricultural press of the country.

Vermont Watchman.

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