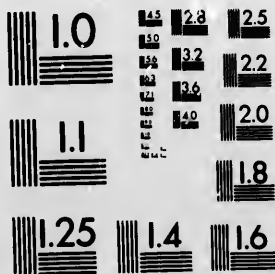


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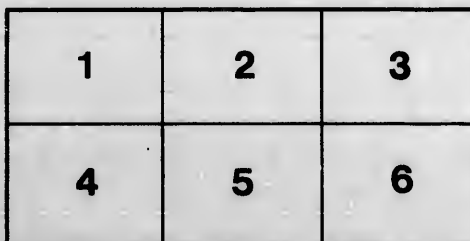
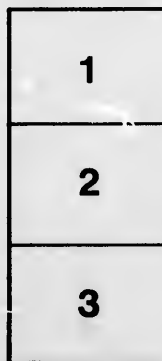
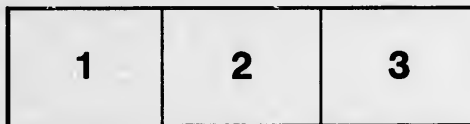
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J. A. Rudwick
EXTRACT FROM THE 16th REPORT

OF THE

Dairymen's Association of the Province of Quebec

SELECTION OF MILCH COWS

AND ECONOMY IN THEIR FEEDING.

LECTURE BY J. C. CHAPAIS,

Assistant Dairy Commissioner for the Dominion of Canada.



THE COLBURN COW.

ILLUSTRATED WITH TWENTY MAGIC LANTERN TABLEAUX

BY E. CASTEL, SEC. D. A.

MONTREAL:

THE HERALD PUBLISHING COMPANY,

1898.

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SUM

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LECTURE BY M. J. C. CHAPAIS. (1)

Assistant Dominion Dairy Commissioner.

SELECTION OF MILCH-COWS, AND ECONOMY IN THEIR FOOD.

SUMMARY:—*Crisis in Dairying*.—Competition the chief cause.—Fall in prices of dairy-goods on the market.—History of the causes of this fall.—How to meet it?—How can the cost of producing milk be lowered?—In two ways.—The first: the improvement of the milch-cows of Quebec.—The total profit to be realised by their improvement.—How to improve the herds of milch-cows.—Definition of a good milch-cow.—Choosing a good milk-breed.—Superiority of the Canadian cow.—Proofs of this superiority.—Individual aptitudes of milch-cows.—Heredity.—Pedigree.—Their importance in breeding milch-cows.—Study of four types of cows of different breeds, as regards the cost of milk.—Different appearance of these types.—Type of the beef-beast.—Type of the milk-beast.—Exterior form of good milkers.—Importance of a thorough knowledge of them.—Study of these marks in the best types of Canadian and United-States milch-cows.—The head.—The neck.—The shoulders.—The dew-lap.—The brisket.—The ribs.—The milk veins.—The milk-springs.—The tail.—The legs (*pattes*).—The udder.—Secondary signs.—Second way of lowering the cost of milk production.—Lowering the cost of the food of milch-cows: by the use of ensilage: by the use of tubers, roots, corn: by laying down better pastures than we have at present: doing so by the use of orchard-grass.—Its description.—Its qualities.—Its nutritive value.—Its seed.—Growing it with clover.—Proof of its economy in figures.—Importance of the practice of economy in the production of milk.

Mr. President and Gentlemen,

Dairying, like all the other agricultural industries, has been for some years in an awkward state, and it is to competition that this crisis is due. Our market for butter and cheese is the English market, and this, thirty years ago, was supplied by the United-States more than by any other nation. But a time came when the Americans, desirous, as people say, of taking two profits out of one deal (1), skimmed their milk and made butter from the cream, and then replaced the cream in the milk with cotton seed oil or lard, from which mixture they produced a debased cheese, known to the trade by the name of "Filled Cheese." This lost them their good name on the English market, and just at

(1). This lecture was illustrated by M. Castel's magic-lantern.

(1). Literally: "two millers' tolls out of one grist." "*Mouture*," French, for the miller's due, is still called in Scotland "*Multure*," from *Moudre*, to grind.—A. R. J. F.

that moment Ontario began to turn out a good cheese, and, about 1882, Quebec entered heart and soul into the movement. By the year 1893, Canada, by degrees, had displaced the States in the English market; and while their exports kept gradually diminishing, ours kept increasing in about the same proportion.

But in 1893, when, at the Columbian Exhibition, we carried off almost all the prizes for butter and cheese, the producers in the States of these goods were startled, aroused themselves, and began to reform their method of cheese-making, so that, now, they have partially regained their position on the English market. For our part, we have, year by year from that date, increased our production. Of about \$26,000,000 worth of cheese imported into England last year, it may be fairly said that Canada furnished, in round numbers, \$17,000,000 worth, out of which sum Quebec figures for \$8,000,000.

Seeing how great was the profit made by Canada and the States out of dairying, other countries set to work on the same lines a few years ago: Australia and New Zealand, to wit. And, now, from all these causes the English market is glutted with cheese, and this is the true reason why the price of that comestible is so low to-day.

The table on page 185 is a fair summary of the state of the trade in Canadian cheese:

The problem that now awaits solution is, how to make dairying pay in spite of the fall in prices; for it is, in truth, the only part of farming that returns any real profit. We have plenty of prospective industries that our governments are busy in promoting, such as the exportation of beef, mutton, poultry and fruit, assisted by a whole system of cold-storage and refrigerating compartments; but all this is still under study, and the real business, the most important of all for us farmers of the province of Quebec, is, and will be for many a day, let us hope, the dairy industry.

The gradual fall in the price of our cheese on the English market being granted, how are we to set about still getting a fair profit from our milk in that form. Several means may be tried. One of the first that occurs is *the decrease of the cost of the production of milk.*

I.

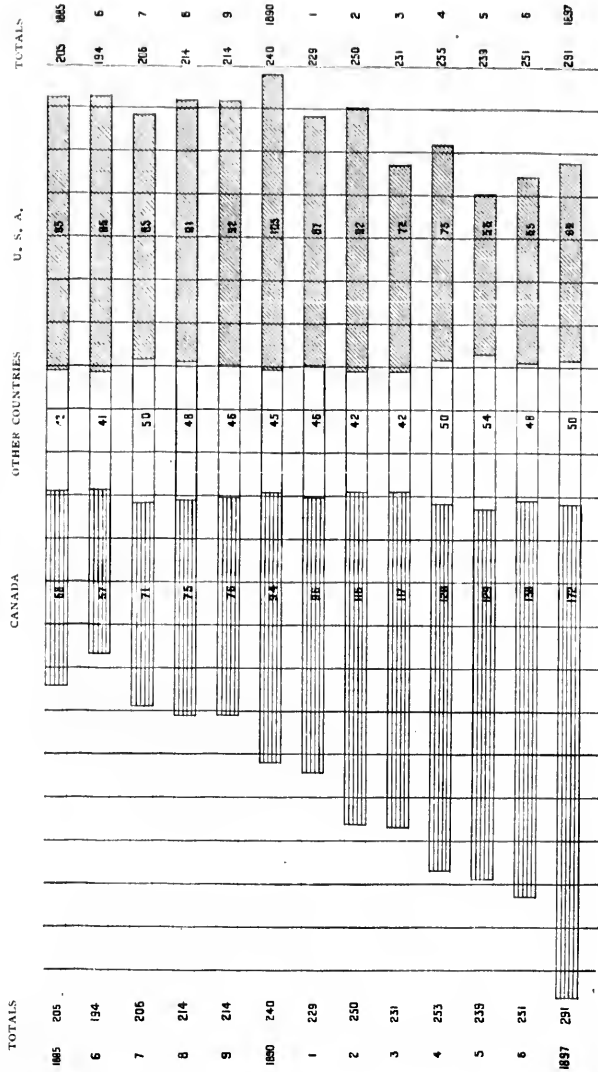
This decrease of cost may be obtained, in the first place, by *the improvement of our cows*, as regards the quality of milk they yield at present.

I do not exaggerate when I say that not more than one-third of the cows of the province are good milkers. And yet, how many out of this third do not give as much milk as they ought to give from bad food and bad lodging. It is then especially on that side of our dairy business that we must look. Let us reflect for a moment on the effect that only a slight improvement would have on the general profits of the industry.

From the last census, 1891, it appears there are 549,644 milch cows in the province. Let us suppose that science, or the improvement of the breeds, should

ENGLISH IMPORTATIONS OF CHEESE.

Millions of Lbs.



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increase the yield of each cow by a quart a day, from May to October; at three cents a quart this would increase the income of the province by \$16,486.00 a day, that is \$1,824,753 for the six months; and if the increased yield were two quarts a day, \$3,649,506 for the same period!

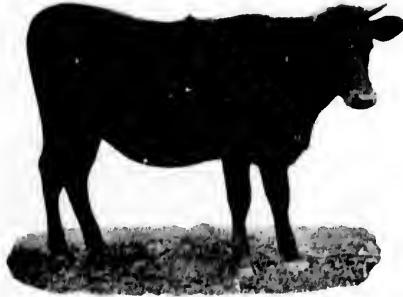
How is this improvement of our herds to be reached? In order to reply to this question, we must get at a true definition of a profitable milch cow. The most profitable milch cow, is the cow, never mind about her breed, that gives every year, for the longest time, the greatest yield of the richest milk at the least cost. This definition contains the words: "Never mind of what breed;" does this mean that no regard is to be paid to the breed of cows one selects for a herd, but that we may go happy-go-lucky at it? By no means. On the contrary, we had better look and see if there is not to be found here in our province a breed that supplies more generally than any other breed the above defined milch cow. As for me, the search is made and done with; and, without saying a word against the Holsteins, Ayrshires, Guernseys or Jerseys, I have long ago satisfied myself that the best cow for our farmers is the little Canadian cow. She has given her proofs, and I do not need to repeat the tale of her good qualities. I will only quote two facts, to show how she deserves appreciation, and how she is appreciated not only here, but also by foreigners. In 1895 a herd of Canadian cattle, bought by Messrs. Charles Colburn & Son, of Portlandville, N.Y., gave the following results to the Babcock test: one, 9.5 of fat per 100 lbs. of milk, another 8.6%, a third and a fourth, 8.2%. This, for the four cows, is an average of 8.6 of fat per 100 lbs. of milk, a very high test indeed. Mr. Colburn took his herd to the Atlanta Exhibition last October, and brought back three medals and \$625 in money prizes. This is a portrait of one of the cows.



THE COLBURN COW.

In September, 1895, Lt. Governor Howlan, of Prince Edward Island, had a fine Canadian heifer eighteen months old. He wanted to show her at the Charlottetown Exhibition, held at the latter end of September, but it having been represented to him that there was no class opened for her breed, he entered

her, by permission of the committee, among the English Jerseys. She suited the pure-bred Jersey very well in appearance, and won the second prize. This heifer is represented in the annexed engraving, from a photograph taken the day after the competition.



LT.-GOVERNOR HOWLAND'S CANADIAN HEIFER.

If the question of breed must not be neglected, there is another that must not be neglected either, and that is the individual fitness of the cow as a milker. Because a cow is an "Ayrshire," a "Jersey," a "Canadian," it does not follow that she must necessarily be a good milker. In all breeds there are good and bad milkers. The farmer, then, that desires to reform his herd must study with care the milking propensities of the cows that he wishes to introduce into his herd to reform it, and he must bear in mind two things: first, that the cow gives a good quantity of rich milk, and that her lactation lasts at least ten months out of the twelve; and secondly, that she inherits these qualities from her ancestors. It may accidentally happen that, from a caprice of nature, a good cow is the offspring of a bad one. But, as a general rule, the heifers of such a cow as the former produces will be bad milkers, because the character of the good milker, their dam, is not fixed by heredity. Such a cow is not a purchase for a farmer who aims at establishing a herd of good milkers, to perpetuate them afterwards, and to improve them by the rearing of the heifers that come from the cows that are the formation of the herd. What such a man needs is cows that for three or four generations come from good milkers, from mother to daughter. It is here we see the great share that pedigree has in the breeding of thoroughbred stock. The more marked the hereditary type, the easier the formation of good herds of first-class milkers.

In order to show you the enormous difference presented by different types of cows, in regard to the profit to be got out of them, I will show you the four cows, "Dido," "Becky," "Aline," and "Dora."



BECKLEY



OLIVE



DIDO



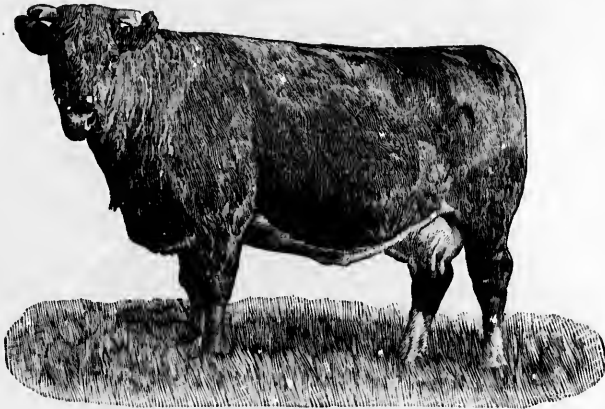
DORA

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These cows belong to the Minnesota Experiment-Station, the herd of which establishment has been for several years subjected to a series of experiments of a most interesting nature, with a view to establish the cost of a pound of butter. These tests, etc., were under the management of Prof. Haecker, and to his kindness we are indebted for the engravings of these four cows and of two others to be mentioned hereafter. The professor, for experiment purposes, divided his herd into four groups, each of which is represented on the slide you have before you. "Dido" is the type of the butcher's beast; "Becky" of the general purpose cow, with a tendency to make meat; "Olive" of the common ordinary cow; and "Dora" of the good milkers.

The first of these cows, "Dido," is a shorthorn, weighing 1,250 pounds. Her butter cost $15\frac{3}{4}$ cents a pound, the average of her group being 15 cents a pound.



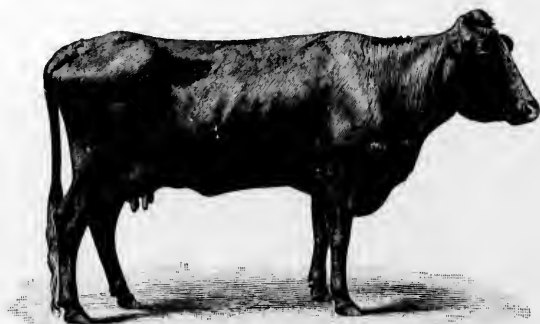
DIDO

The second, "Becky," is a half-bred Jersey, weight, 950 lbs; her butter came to $12\frac{1}{3}$ cents a pound, that of her group to 13 cents.



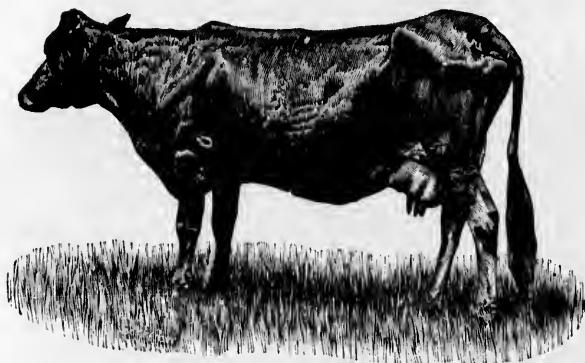
BECKY

The third, "Olive," a half-bred Guernsey, 800 pounds in weight, gave butter costing $11\frac{1}{2}$ cents: her group cost $12\frac{1}{2}$ cents.



OLIVE.

"Dora," the fourth, is a Jersey of 875 lbs. The group's butter, 10 cents Dora's, $9\frac{1}{2}$ cents.



DORA.

These figures are enough to show how important it is for the farmer to keep cows of good milk-type, able to yield good milk at a reasonable cost for food. Let us suppose then, for a moment, the case of a farmer whose cows are all of the first type; his dairy-work would be carried on at a loss with butter at the price it is at present. Contrariwise, if we can find a farmer whose cows are all of the latter type, we can assert without fear that his dairy work would result in paying him well.

Still more clearly is this shown by a second and more recent experiment by Professor Haecker, to whom we are indebted for the engravings of the two cows, "Ethel" and "Houston," with adjoining diagrams.



ETHEL.

Ethel weighs 1,200 lbs., a grade Durham. She was classified by Mr. Haecker at one time among the groups of butcher's cows, at another among the general purpose cows. In the experiment we are now considering, she calved December the 20th. On the 1st January, a few days after calving, her butter cost for food the same as Houston's cost.

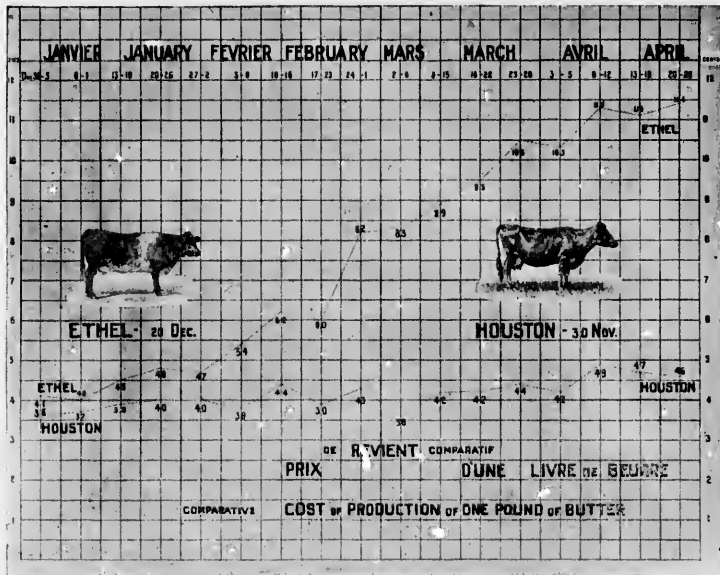


HOUSTON.

Now, the latter formed part of the same group as Dora, and was always the best of the group, and in the former experiment produced butter at a cost of only 9 cents a pound; but, since that she has done much better. Houston is a cross

between Guernsey and Jersey, and weighs 925 lbs. Calving, in the second experiment, on the 30th November, on the 1st January she was giving butter at 4 cents a pound, just the same cost as "Ethel's" butter.

Just as the diagram before you shows, the cows were kept under observation up to May 1st; and while the "Houston," Guernsey-Jersey, butter fell during three weeks to less than 4 cents a pound, as cost of production, and continued invariably below 5 cents all the experiment-time, "Ethel," the Shorthorn cross, gradually increased in the food-cost of her butter, week after week, till, four months after calving, it reached hard upon 12 cents a pound.



In examining carefully these two cows, as we did the other four, are not you, as well as I, struck with the immense difference between the two types, or the better to state the point, the difference between *the butcher's cow*, "Dido," and *the dairy cow*, "Dora," between a bad milker like "Ethel," and a good milker like "Houston"? This leads me to speak to you about the necessity of a dairy farmer thoroughly understanding the points that characterises a good milker, so as to be able to select a good milker when he has to buy one. If he is ignorant of these points, and has to buy a cow at a time when she is dry or nearly so, he cannot judge of her capabilities by seeing her milk and weighing the yield, but must trust to the seller's good faith, and he, the seller, having to estimate the value of the animal on sale, will be always inclined, even almost unintentionally, to exaggerate that value. On the contrary, he who is well drilled in the knowledge of the points of a good milker will have an infallible guide to go by.

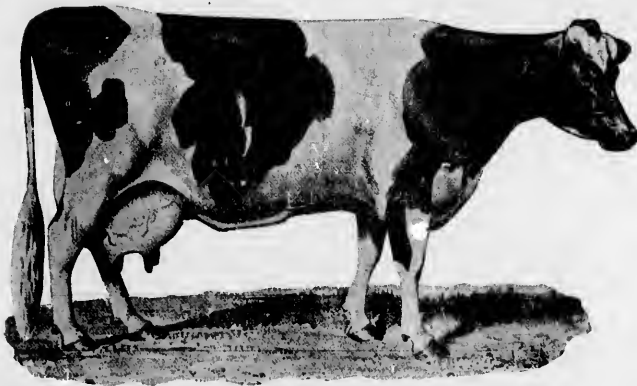
It is therefore useful to dairymen to know the points of a good milker, so we will study them together, by examining attentively the portraits of two of the best milch-cows of this continent.



MASSENA.

There, then, is "Massena," a Jersey from the well-known herd of Mrs. Jones, of Brockville, Ont. She has produced 640 pounds of butter in a year, and that is sufficient praise in itself. She presents within seven points the perfection of build and signs of a good milker.

Now, see "Pauline Paul," the Holstein (2199 H.H.B.), the property of Mr. D. F. Wilbur, Oneonta, N.Y. This cow, known in the States as "The Queen of the World's Dairies," has given, in 365 consecutive days, 1,154 lbs. of butter!



PAULINE PAUL.

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Studying the two almost perfect types, it will be easy enough to detect all the exterior points that distinguish a good milch cow. (1)

Head—The head of a good milker is delicate, feminine in appearance, lean, the horns fine, not only at the points, but from the spot where they are attached to the head.

Neck—The neck is slender and loose.

Shoulders—The shoulders are cut-away in front, at the place where they unite with the neck.

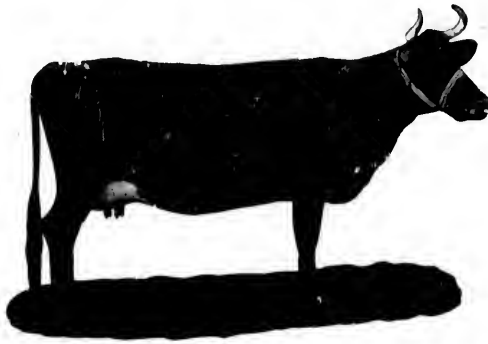
Dewlap—This fold of skin and flesh which, in the ox and the larger type of butcher's cow, falls from the throat to between the fore-legs, is almost entirely absent in a good milker.

As regards the "points" of the head, the neck, the shoulders and the dewlap, compare "Dido" with "Dora" on the one side, "Ethel" and "Massena" on the other.

Brisket—It is customary to compare the outward form of a good milker to a soda-water bottle; and, indeed, when we consider a cow like Massena, looked at from the side, we see at once that her fore-quarters are much less developed, much slighter than her hind-quarters. As soon as the line separating the shoulders from the cavity of the brisket is passed, the carcass is seen to increase in size. A good milker's brisket is very full; or, has, as the saying is, and very true it is, a carcass like a barrel; and when the physiology of the production of milk is thoroughly understood, it is easy to see how it must be in a good milker. Lots of milk presupposes lots of blood, and, consequently, well-developed blood-vessels. In a good milker, the heart and lungs, that, with veins and arteries, constitute the circulating apparatus of the blood, are very much developed, and as they are enclosed within the brisket, insist upon the last possessing a large cavity, a spacious chamber for their reception. Hence, that full carcass, or barrel, which we always find in a good milker. (Look at "Massena" again, and compare her with "Olive.")

Ribs—Another of the signs distinguishing a good milker is the space between the ribs: for it is clear that if the frame of the brisket is well developed, as we said just now, this must cause the ribs to be spread wide apart to form a larger cavity for the use of the heart and lungs. If we pass the hand over the ribs of a good milker, we perceive at once that muscles occupy a pretty large space between each rib, and the thing is clearly perceptible, even to the eye, in a cow that is not too fat, like the one in this portrait.

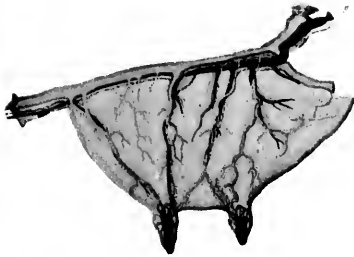
(1) While M. Chapais was explaining these points, M. Castel was displaying on the screen, as they were named, the cows mentioned by the lecturer.



DEMERS' COW.

She is a Canadian cow, the property of M. Demers, of St. Eustache, county of Deux-Montagnes. This cow won the first prize and championship of her class at the Montreal Exhibition of 1896.

Milk veins—This powerful circulation of the blood, shown in a good milker by the development of her barrel, is still more evidenced by the size of what are called the milk-veins. These are, as everyone knows, two large veins, that, extending themselves from under the belly of the cow, appear there like two thick cords running under the skin, and more or less developed according



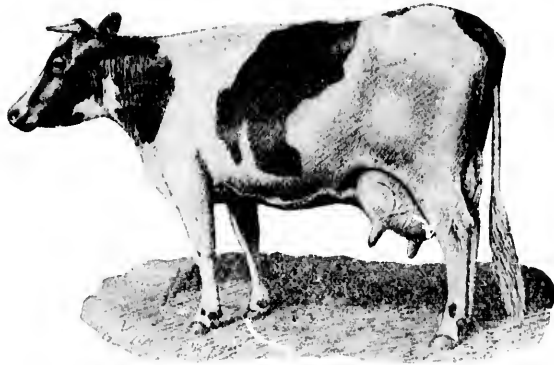
UDDER.



MAMMARY GLAND.

to the milking propensities of the cow, and these are lost in the udder, carrying thither, not milk, as the vulgar think, but blood, which is there converted into milk. When these veins have reached the udder they branch out into several smaller veins which distribute the blood through the different parts of it. The whole is clearly depicted in the two annexed cuts, which represent, the one a cow's udder whence the skin has been stripped, the other, one quarter of the same opened in such a manner as to show the mammary gland.

The milk-veins are very prominent in *Massena* and *Pauline Paul*, (*v. supra*) and in "*De Kol 2nd Pauline*" (*v. cat*), and this cow you ought to see, not only on account of this peculiarity, but also as a cow of very great powers of producing milk and butter; besides being a very striking instance of the transmissibility of hereditary gifts.



DE KOL 2ND PAULINE.

"*De Kol 2nd Pauline*" belongs to Messrs. Henry Stevens & Son, of Iacona N.Y. She holds the official record of four-year-old cows, having given in a week 24-148 lbs. of butter at 80% of fat. This record is by no means surprising when one recollects that "*Dekol 2nd Pauline*" is descended from both "*Pauline Paul*," whom you saw just now (*v. p.* 193) and from "*De Kol 2nd*," whom you you will see presently (*v. p.* 198).

Milk gates or fountains.—The milk-veins issue from the brisket of a cow through two orifices which are called, again improperly, milk gates or fountains. It is evident that the larger and better developed are the milk veins, the larger the orifices through which they flow. This explains why these milk gates or doors, when large, are a good prognostication of the milking tendency of the cow.

Tail.—A good milker's tail is always slender, long and supple (*v. Pauline Paul* and others). In the butcher's cow, formed as the tail is, firm, very stout,

in the udder, which is there conveyed by a branch out from the different milk ducts, which are branched, the other, mammary gland.

Paul, (*v. supra*) to see, not only the udders of productive cows, but the transmissi-

short bones (vertebræ), firmly attached the one to the other, it is short, stout and stiff; the vertebræ of the milker are the very reverse of the others, being long, slender and supple. As to the length, it has been ascertained that good milkers in general have a tail, the last vertebra of which hangs $1\frac{1}{2}$ inches to 2 inches below the point of the hock. This slenderness of bone and tail, as well as of all the bones in the frame of the good milker, is due to a temperament that leads her to utilize her food principally for the production of loose and watery tissue rather than for the formation of coarse bone.

Legs.—In a good milker, the legs are slender and lean, and so short that, in some, the teats are at their extremity not more than ten inches from the ground.

Udder.—Nothing in the cow better deserves our attention than the udder, since it is the laboratory in which the milk is made; in a good milker, the udder should, first of all, be large, well developed, elongating itself and rounding itself off under the belly in a fine curved line, and rising high between the thighs, which should naturally be wide apart, to afford more room for the udder when full. The quarters, too, of such an udder are well developed, and therefore the teats are placed well apart.

Here is a Guernsey, "Fantine the 2nd" (3,730 A. G. H. B.) entered by her owner Mr. Chas. Solveson, of Nashotah, Wis., in the competition of dairy-cows



FANTINE 2ND.

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e (*v. Pauline*
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at the Columbian Exposition at Chicago (600 lbs. of butter in a year, including being dried off for 5 weeks before calving). A very proper cow in general, but in her udder surprisingly good. Massena's udder is not so good in front; but it is the only deficient point in that superb cow (*v. page 193*). In competitions she usually lost 7 marks out of the 100, 5 of which were for a faulty udder, 1 for the neck being a little short, 1 for the line of the back being a little sunken.



DE KOL 2ND.

We have here a view of the udder of "De Kol 2nd," taken from the rear; it is perfect of its kind. The official record is 83½ lbs. of milk in one day; 536½ lbs. in 7 days, during which she gave 26.57 lbs. of butter. She is the dam of De Kol 2nd's Pauline, whom we saw in the engraving, and also of De Kol 2nd's Queen, record 28 lbs. 7 oz. of butter in 7 days. Does not this tell in favor of the influence of heredity?

The udder of a good milker when emptied should be flabby and in folds; soft as a rag, to use a common phrase. Big udders are sometimes met with that remain big when emptied; these are what are termed fleshy udders, and never belong to a good cow: their bulk is due to an abundance of flesh, that leaves but little room for milk.

Secondary Indications.—There are several other signs of a good milker that one meets with in the same animal as the others I have just mentioned. Such are a fawn-color round the eyes, the vulva, the interior of the ears, and between the thighs; the existence of tiny yellow pellicles inside the ears and on the udder: the suppleness of the skin and the fineness of the hair on the udder; the marks called the "escutcheon," on that part which the believers in this sign call the "mirror." I call these signs secondary, because they only act as corroboratives of the indicia given by those I have mentioned.

By a little study of the signs of good milkers on animals of the best class, and by accustoming oneself to examine every cow one sees from the point of view of her signs as a milker, the eye becomes trained, and in a very short time one becomes a capital judge. And this is what every farmer interested in dairying should aim at, if he desires to get together a first-rate dairy-herd of cows.



DACTYLIS GLOMERATA—ORCHARD GRASS.

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II.

I said, at the beginning of this address, that one of the means of lessening the cost of milk, was the improvement of our cows, and I have just shown how this is to be managed. Another means suggests itself, secondly, and that is to diminish the cost of their food. Many things have to be studied as to economical cow feeding. Ensilage, which, unfortunately, is not yet common enough among our farmers, is one thing that will greatly tend to lessen the cost of producing milk. I do not intend to enlarge upon this to-night. The reports of our association, which each of our members receive, are full of it. The substitution of potatoes, mangels, carrots, corn, for most of the hay and grain, is another of the things that farmers may employ in lessening the cost of the ration his cow receives, and which, consequently, will lessen the cost of their milk-yield. This is another thing that may be found fully treated in several of our reports.

III.

A third way of lessening the cost of milk is to create a rich and productive pasture for our cows in summer, at a cheaper rate than that we now provide by means of the clovers, though the clover is doubtless the best of all pasture-plants for milk cows. But, unfortunately, it has the serious defect of only lasting two years, so that we are obliged to break up the land and sow clover again every two years, if we want to renew the pasture. We have then to find some other pasture-plant that will stand longer and be, therefore, less costly. This plant we have already, if we choose to make use of it, and, in my opinion, it is, after clover, the best suited to pasture. I mean the Orchard-grass or Cocksfoot, of which the following is a representation.

This grass is so valuable for the improvement of pastures, that I think it well to give you as many details concerning it as possible. The following is its botanical description, by the Abbé Provencher, in the *Flore Canadienne*: Perennial, stem two to four feet high, rather rough. Leaves linear, plane, rather keel-shaped, glaucous, slightly rough, with the sheath divided only in the upper part. Ligules pointed, jagged. Spikelets generally four-flowered, greenish or violet-tinged, in unilateral compact glomera, making a unilateral panicle, with distinct branches. Flowers more or less ciliated on the keel of the lower glume or husk. Glumes very unequal. Anthers large and yellow. Is found in Canada, in meadows, in grassy spots, especially where shaded. Flowers in June.

Orchard grass grows all over our province, up to 47° 3' N.L., and probably still further north. It does well in all kinds of soil, dry or damp, though not if swampy, and it accommodates itself to land too poor for other grasses. This quality makes it very useful for sowing on poor land and on dry sloping banks, to prevent land-slips. In fact, it does well everywhere, especially, of course, on good clay loam. It stands heat and frost well, and yields lots of grass, particularly if it is fed or cut frequently. Shade seems to suit it; hence, its name of orchard-grass. Must not be sown with timothy, as it is too hard for feed by the time timothy is fit to cut. Nothing can be better for permanent pasture,

because it is perennial. Sown with common red clover, or the small red, it becomes fit for mowing or grazing at the same time as they do, and springs again rapidly as soon as cut. It lasts much longer than common red clover, which never lasts more than two years, and all animals like it excessively in a pasture.

To show the nutritive value of orchard grass, I give here a short comparative table of its analysis, both green and as hay, with that of clover as a comparison. It shows the quantity of water, salts, protein, cellulose, and of other non-nitrogenous matters, and of fat, contained in 100 lbs. :

	Orchard-Grass		Red-Clover	
	Green.	Green.	Dry.	Dry.
Water.....	73.0	70.8	9.8	15.3
Salts.....	2.0	2.1	6.0	6.2
Protein.....	2.6	4.4	8.1	12.3
Cellulose.....	8.2	8.1	32.4	24.8
Other non-ni. matters.....	13.3	13.5	41.0	38.1
Fat.....	0.9	1.1	2.6	3.3

The seed of Orchard-grass sticks long to the stem after it is ripe, and there need be no hurry to harvest it. It is something like a small abortive oat, is long in shape, blunt at one end, and with an elongated point at the other; 2½ lines long and one-half a line in diameter. Very light; not above 14 lbs. to a bushel. It is sold in the glume or husk, and is whitish or grayish in colour. Out of a hundred seeds, in a good sample, fifty ought to grow.

Orchard-grass is sown, like all other seeds here, with a grain crop; if with clover seed, the two *must* be put in separately, thus: Suppose your land is in good heart and properly fitted, sow the grain first and harrow it in well, and then follow with 8 lbs. of orchard-grass to the arpent; give one turn of the harrow, and then sow the clover mixture of 10 lbs. of common red, or small clover, 4 lbs. of alsike, and 1 lb. of white clover, rolling the field afterwards. You will not see much orchard-grass the first year, as it only runs to seed the second season, when you will see a quantity of tufts all over the piece, as it tillers a great deal and grows in tufts. If you want it for hay, mow as soon as the spikelets appear, never later, as it would be too hard for hay. It is not advisable to sow it in meadows, but if it is desired to be sown alone for hay, it will require a seeding of from 25 lbs. to 28 lbs. an arpent (30 lbs. to 33 lbs. an acre). Hay from this plant loses 59% in drying.

In order to show the vast saving made by the use of a grass of this kind to prolong the duration of pastures, let us see for a moment, how much the renewal of a clover pasture of five acres every two years would cost. For a good pasture, 10 lbs. of small red, 4 lbs. of alsike, and 1 lb. of white clover are needed.

Calculating these at ordinary market prices, say ten cents for the red and the alsike and sixteen cents for the white, we have the following statement :

10 lbs. of small red.....	\$ 1 00	
4 lbs. alsike	40	
1 lb. white	16	
		\$ 1 56
		× 5
For 5 arpents		\$ 7 80

Labor would cost :

1 ploughing.....	\$ 2 00	
Sowing, harrowing and rolling.....	1 00	
		\$ 3 00
		× 5
For 5 arpents.....	\$15 00	\$15 00
		\$22 80

So the cost of 5 arpents of pasture, every year fresh sown down with clover alone would be \$22.50.

Whereas, with a mixture of orchard-grass and the clovers we should have a pasture lasting 4 years on ordinary and 6 years on very good land.

Cost of laying down pasture for 4 to 6 years :

10 lbs. small red	\$ 1 00	
4 lbs. alsike.....	40	
1 lb. white.....	16	
8 lbs. orchard grass.....	1 44	
		\$ 3 00
		× 5
For 5 arpents.....		\$15 00

For labor :

1 ploughing.....	\$ 2 00	
Sowing, harrowing, rolling	1 25	
		\$ 3 25
		× 5
For 5 arpents.....	\$16 25	\$16 25
So 5 arpents of land cost every 4 or 6 years, with clover and orchard grass mixed.....		\$31 25
And, as during 4 years, there would be required two seedings with clover, we get the following figures for the four years.....		\$44 00
Pasture with mixture of clover and orchard grass.....		\$1 25
Balance to good.....		\$14 35

But were we dealing with first-rate soil, when the pasture will live out 6 years instead of 2, then the balance would be larger still.

Cost of pasture, with clover alone for 5 acres, 6 years or 3 seedings	\$68 40
Cost of mixture for 5 acres, 6 years.....	31 25
Balance to good.....	\$37 25

As may be easily seen, this question of the economizing of the cost of the production of milk deserves to be studied in every point. In it there is no detail too trivial for the practical farmer who aims at getting from dairying the maximum of profit at the least outlay. This is the only way to contend with success against the competition that is causing the progressive fall of the profits of the dairy industry.

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