

DAIRY FORM-AS-AN INDEX.
TO CHARACTER.

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Class "99".

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Introduction.

In this article, the writer has endeavored to show by the results of experiments, here and elsewhere, the effect of the type of animal upon the milk and butter production, and to emphasize the importance of form in its relation to yield. Also to determine, if possible, by numbers of illustrations, what the general form is, which is to be sought in a dairy animal. We also aim to show the benefits which accrue from such selections, from a financial standpoint, and also the means or methods in breeding and caring for animals by which this result is attained.

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The growing importance of the dairy industry in Kansas during the past few years, has attracted much attention to this new line of business in our state. This interest is manifested in the numerous, animated, discussions, which take place through the leading agricultural and stock journals, upon almost every phase relative to the dairy business.

With the increase of the demand for dairy products, there comes an increased effort on the part of the producers to supply this demand. And this constant aim at improvement and competition has suggested and developed many useful, economical appliances and methods, which have contributed to, and acted as a stimulus for the success of the dairy industry in the West. Along this line, we find improved methods of feeding, based on scientific principles, in which, by making use of our knowledge of Chemistry of Foods, and the comparative nutritive ratio of different foods, we have determined on the Method of Balanced Rations. Of these we will say more presently.

While methods of care and feeding are of great importance, there are other factors which exercise a great influence upon the dairy returns. Paramount among these factors is that of object in breeding. Great attention has been paid of late years to the breeding of cattle for dairy purposes. In most cases, it has been customary to designate some particular breed as a dairy breed, and another

as a beef breed, irrespective of certain peculiar type and individual qualities. Any contemplated or proposed improvement in the dairy business or herd, was always to be made within or of some particular breed. But, during the last few years quite a controversy has arisen as to the desirability of dual-purpose cows (e.g. for both milk and butter) for our western farmers. The dual purpose cow will perhaps do for the farmer, who does not desire any more milk and butter than is necessary for home consumption or petty exchanges. But if a man goes into the dairy business for money, he wants that animal that gives the most milk and butter. The dairy cow will repay all the money invested in her, in dairy products and calves, and a large dividend besides. A dairymen cannot afford to raise beef also, he must have dairy cows for his dairy.

This brings us to the question "What is meant by dairy cattle? Only recently, the suggestions have been made by various dairymen and persons interested, and also warmly advocated and discussed through some of the leading dairy journals (Especially Hoard's Dairymen) that "the type of animal was a paramount or determining factor in economical production of milk and butter." The discussions upon this subject have led us to this very serious query "Is there a specific dairy form? If so, has form any relation to character? Before proceeding further we will give a few facts and data taken from experiments made

at various places, which will assist us in our further explanation and conclusions on this subject.

(1). K. S. A. C. Dairy Herd.

The following data is taken from Press Bulletin No. 29 showing results of our experiments with the dairy herd at K. S. A. C., for the year 1898. This herd consists of 30 head of common, scrub cows, purchased by a farmer, not a dairy man in Lincoln county at an average price \$34 per head, in quality they were below the average cows of the state. These cows were carefully tested, and the result is tabulated in the following records.

No of Cow	Products			Cost of Feed.	Value			Receipts, Less cost of Feed.		Cost of Butterfat Per Lb.
	Milk Lbs.	Av. Test Per. Cent	Butterfat in Lbs		Butterfat	Skim milk @ 15¢ per lb.	Total	Gain	Loss	
20	9.116	4.21	383.7	\$32.80	\$60.88	\$12.29	\$73.17	\$40.37		.085
7	7.015	4.43	310.8	30.61	49.26	9.46	58.72	28.11		.098
15	6.509	4.27	277.9	29.20	43.89	8.70	52.59	23.39		.105
1	5.904	4.62	272.7	31.06	43.65	7.97	51.62	20.56		.114
6	6.269	4.09	256.4	29.95	40.56	8.44	49.00	19.15		.113
3	5.864	3.99	233.9	28.93	37.04	7.91	44.95	16.02		.123
10	6.580	3.51	230.9	30.79	37.16	8.87	46.03	15.24		.133
17	5.236	3.97	207.8	28.83	32.92	7.07	39.99	11.16		.138
18	5.023	4.12	206.9	28.97	32.69	6.78	39.47	10.50		.139
11	3.475	5.14	178.6	25.24	28.16	4.68	32.84	7.60		.168
19	3.913	4.14	161.9	27.27	25.41	5.27	30.68	3.41		.197
5	3.583	3.79	135.7	26.75	21.39	4.83	26.22		0.43	
Ave.	5.707	4.17	\$238.1	\$29.20	\$37.75	\$7.69	\$45.44	\$16.25		.122

Price of butter per pound during the year varied thus Jan, 13¢; Feb, 17¢; March, 16½¢; April, 15¢; May 14½¢; June, 13¢; July 13½¢; August, 15½¢; Sept, 16¢; Oct, 18¢; Nov, 18¢; Dec, 17¢;

Cost of feed per 100 pounds; Corn meal, 55¢; Kaffir corn meal, 55¢; Linseed meal, #1; Bran, 55¢; Alfalfa, #4 per ton; Ensilage, #1 per ton; Pasture, 75¢ per month.

Feed of K. S. A. C. Herd.

At the start the cows were fed alfalfa hay and a mixture two-thirds bran and one-third O. P. linseed meal, a ration rich in protein, designed to stimulate the milk flow. As soon as the cow comes to nominal flow, they were put on a ration of alfalfa hay and Kaffir corn. This produced the greatest flow of milk at the least cost, but it was discontinued after 7 weeks, and other feeds used also. The daily ration was about 8 pounds per cow while on dry feed. While in pasture their daily feed was a 3 pound mixture of two parts corn meal and one part bran, also given plenty of alfalfa hay. In the fall they were pastured a short time on the wheat.

Results.

Average per cow, 5.707 lbs; best cow, 9.116 lbs; poorest cow, 3.583 lbs. Average yield of butter per cow 238 lbs; best cow, 383.7 lbs; poorest cow, 135.7 lbs; (for further cost of feeds and proceeds see the milk table).

This test shows the difference in value between

different cows with feed and care alike. This years record of our best scrub cow (9.116 lbs. of milk; 383.7 lbs butterfat equal to 451 lbs. of butter. Value of products \$73.17; returns less feed \$40.37) is one that many a pedigreed cow would be proud of. This cow is of mongrel breeding, but has a pronounced dairy form. The poorest cow's form is a good beef type, and her yield of 3.583 lbs. of milk and 135.7 lbs. of butterfat is worth .43¢ less than the food she ate. Is stronger argument needed to induce Kansas dairy men to cull their herds and keep only the best?

This test shows that Kansas cows can be made to give greatly increased yields with proper feed and care. We collected the records of 82 herds owned by creamery patrons in one of the leading dairy sections of the state, finding an average yield per cow of 3,441 lbs. of milk; of butterfat 104.5 lbs; Value of butter fat \$19.79. College scrub herd milk, 5,707 lbs; butter fat 238 lbs, value of butter fat \$37.75, and remember the college herd is inferior to the Average Herd.

Summary of Causes of K.S. A.C., Results.

Large yields of the college was attributed to two causes. First; at all times their rations were either balanced or contained an excess of protein—the material which builds blood and milk. While the Kansas cow, usually on dry feed, has only half enough protein. Second: kindness, shelter, they were never driven fast or abused. Third: A full milk yield was secured thro the summer drouth by extra feed.

Observations of Individual Cows.

We notice a difference of 5.533 pounds between famous No. 20, the best cow, and No. 5 one of our poorest, yet these cows received equal care and feed. What is surprising is that they were full sisters. To show the contrast we give their pictures on a preceding page. No. 20 is a fair type of dairy animal in most points. She is of no particular breed or pedigree. Her weight is about 1125 pounds. She is built long in the body, deep through lungs and chest, back of a typical dairy animal, rising at shoulders, the shoulders are narrow and angular at the top, hips wide, prominent hip-bones, plenty of room for the udder, but, her udder is not very large, udder is covered with soft hair, her skin is loose and mellow. General wedge shape with big "barrel" shows great digestive capacity, but rather square on buttocks, muzzle rather wide, and a general good dairy form.

No. 5 whose picture is also given, is of an entirely different type. Her weight is about 1065 pounds. She is short, blocky and of a pronounced beef type.

No. 10 whose yield was 6.580 is part Holstein, weighed 923 pounds, rather long bodied, curve in back, large udder, and wide hips, and a large "barrel". We were unfortunately unable to give a picture of No. 7 the second best whose yield was 7.015 pounds, as that animal was sold. However we give that of No. 15 yield 6.509 pounds.



No. 7.



No. 20



No. ~~33~~ 10



No. 33.



No. 11



No. 6

Members of K.S.A.C. Dairy Herd.



No. 24.



No. 5.



Campbell's King 4951

R. S. A. C. Dairy Herd.

At present, (May 1899) our heaviest milker is No. 33, she gives about 36 lbs. per day. She is a large Holstein, (see picture). Nos. 6 and 24 are also good milkers, daily yield 25 to 30 lbs. Our richest milker is No. 11 a little Jersey, a fine animal, she tests as high as 6% butterfat. (For comparison of cows see the photographic pictures.)

We now come to our second illustration, by experiments at

(2) Minnesota Experiment Station.

We find practically the same result or conclusion arrived at in the experiments of Prof. Hecker at the Minnesota Experiment Station (Here is a short account of his experiments taken from their report as printed)

The dairy herd there is composed of a number of breeds, Jersey, Holstein, G. Shorthorn, Polled Angus, & Gurnsey-Jerseys.

Results.

Careful experiments were made, each cow was charged with all feed consumed and credited with her yield of milk and butter fat, and every effort made to do justice to each animal. A careful record was kept of all feeds, and a chemical analysis was made of all foods used, each cow was weighed weekly. Each milking was weighed and tested by the Babcock test for butter fat. A few of the records of the different breeds are given on the ensuing pages, and are as follows:-

Group II. Beef Type, Blocky and Plump.

Name	Breed	Weight	Lbs dry matter Per day, per 1000 lbs live wgt.	Lbs dry matter for a lb of butter fat.	Lbs of Butter fat for 100 lbs dry matter	Cost of 1 lb Butterfat ¢.
Fancy	P. Angus	1256	15.41	32.47	3.08	18.1
Wido	Shorthorn	1245	14.61	32.36	3.09	18.2
Sully	Shorthorn	1219	19.96	28.29	3.45	16.4
Average		1240	16.66	31.25	3.20	17.5

Wido, The Shorthorn, is large, and blocky in outline, being level from horns to tail, deep, well rounded thigh, brisket low running well forward, neck short and heavy at shoulders, full crops, ribs well sprung and deep body in the middle. She is a fine animal, she ate 18.76 pounds of dry matter per day, required 32.36 pounds of dry matter for each pound of butter fat, making cost of butter 18.¢

Group III. Cows having less tendency to lay on flesh.

Names of Cows	Breed	Weight	Lbs dry matter per day per 1000 lbs live wgt.	Lbs dry matter for 1 lb of butter fat	Lbs of Butter fat from 100 lbs dry matter	Cost of 1 lb. Butterfat. ¢.
Beckley	Grade Jersey	942 Lbs	25.15	25.08	3.98	14.3
Clara	" "	909	21.16	31.05	3.22	17.8
Reddin	" "	1.027	21.02	24.44	4.09	13.8
Rossii	" "	903	16.75	25.12	3.98	14.6
Average		945	21.02	26.42	3.82	15.1

Generally classed as a fair dairy cow, but tend to lay on flesh.

Group III. Cows spare and angular in form, but lacking depth

Names of Cows	Breed	Weight	Lbs of dry matter per day per 1,000 lbs live weight	Lbs dry matter for 1 lb of Butter fat.	Lbs of Butter fat from 100 lbs of dry matter.	Cost of 1 lb Butter fat, ¢.
Jennie	G. Holstein	1,020	22.09	28.58	3.49	16.6
Bettie	Guernsey	802	23.33	24.30	4.12	13.8
Ulive	G. Guernsey	805	23.59	23.75	4.21	13.4
Averages		875	23.00	25.54	3.94	14.6

Group IV. Cows spare and angular, with deep bodies.

Names of Cows	Breed	Weight	Lbs of dry matter per day per 1,000 lbs live weight	Lbs dry matter for 1 lb of Butter fat.	Lbs Butter fat from 100 lbs of dry matter	Cost of 1 lb Butter fat ¢.
Annie	Jersey	787	25.80	21.68	4.61	12.8
Bess	Holstein	1,134	22.04	21.29	4.69	12.3
Dora	Jersey	874	22.33	18.44	5.42	11.1
Gertie	G. Jersey	849	23.20	21.53	4.64	12.3
Houston	Jer. Guernsey	911	28.24	20.16	4.96	10.8
Patsy	G. Jersey	849	22.20	22.27	4.49	12.6
Pride	Jersey	771	24.82	21.18	4.72	12.6
Rose	Shorthorn	1,106	17.87	21.37	4.67	12.9
Roxy	G. Jersey	950	23.52	21.91	4.56	12.4
Sweet Brier	Guernsey	966	25.65	23.06	4.33	12.8
Topsy	Holstein	1,108	20.91	20.04	4.99	12.0
Tricksey	Guernsey	924	26.46	20.88	4.78	11.4
Averages		852	23.58	21.15	4.73	12.1

Average of the four groups.

Group	Dry Matter Eaten per day	Lbs dry matter per day per 1000 lbs live weight	Lbs dry matter for 100 lbs dry matter	Lbs Butterfat for 100 lbs. dry matter	Cost of 1 lb of Butterfat in Cents.
I	20.81	16.66	31.25	3.20	17.5
II	20.37	21.02	26.42	3.78	15.1
III	19.95	23.00	25.54	3.91	14.6
IV	21.86	23.58	21.15	4.72	12.1

We can make our own estimates of the relative dairy qualities of the types from the above tables. We note in every case as they approach the typical dairy form, the yields increase.

(3) Experiment at Storrs College.

The experiments of Prof. Beach at Storrs College gives similar results, as this brief table will indicate.

For Entire Herd.	No Cows 25	Cost of food for 1 yr. \$40.80	Milk profit 1 yr lbs = 5,635	Cost of 100 lbs of milk = 72¢	Net Profit with milk at 1 per 100 lbs = 15.95	Net Profits Butter = 18¢
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Average of Breeds

For Ayrshire	4	\$40.65	6,166	66	\$21.00	\$7.22
" Jersey	4	43.35	5,982	72	16.47	23.47
" Grade	14	39.37	5,523	71	15.86	16.46
" Guernsey	3	41.39	5,140	80	10.01	11.46

Average of Types

For typical dairy	2	\$46.67	8,511	54	\$38.44	\$41.62
For dairy type	14	40.94	5,859	69	18.00	18.62
For dairy lacking digestive capacity	5	39.83	5,322	74	13.39	8.28
For beef type	4	38.59	3,918	98	Loss .58	Loss .55

6 These figures speak for themselves, They show the great profit in selecting typical dairy cows for the dairy. Many other instances might be enumerated as proving the same point, by experiments made at Maryland Experiment Station, Missouri Experiment Station, and by a large number of other stations and by private individuals.

Conclusions Drawn from these Experiments.

All these experiments go to prove that the conformation of an animal is a fairly accurate index to its qualities, and that the best results are usually obtained from animals of a certain type. By type here we mean a distinctive dairy type. Hoard says "a type that is to be taken as the outer measurement of their inner qualities, their economy as agents and forces of the dairy farm."

Our dairy men should breed to produce a larger number of dairy cows that fulfill the dairy purpose, embodying the particular features we desire. In considering this purpose one important law should be kept in view, this is the Correlation of Function and Form, that is if certain parts of the animal are typical the rest is likely to be.

Here it would be appropriate to define what is generally meant by a typical dairy form. While we find that almost every dairy man has his idea of such a type, and while these may differ in some minor details,

yet they substantially agree on the most essential points in the physical conformation, so, after studying a number of journals and with several dairymen, also after personal experience, we present the following, as a general form of a typical dairy animal, remembering that it does not embrace all the peculiarities seen in different animals, but those which we believe are requisite to judge the animal.

Description of a Typical Dairy Animal.

She should be of a general angular or wedge-shape, long in body, with a large "barrel" or middle which shows large digestive capacity, because an animal that gives a large amount of milk, must necessarily be a large eater, and be able to digest amply, with strong assimilative powers. The chest should be deep through the lungs and heart, as this indicates a strong vitality, without a tendency to that ~~dead~~ bovine scourge, tuberculosis, (which is the bane of thorough-bred breeders). This breadth can be seen by getting in front of the animal and looking at its forelegs, which should be well apart. The neck and head should not be large, altho where they meet at the base of the skull should be broad which is said to indicate a strong nervous system, the eye should be full, calm, and expressive. Some breeders prefer an animal with a wide muzzle, but in the observation of the writer, many cows with tapering muzzles have pronounced dairy forms. The back should rise at the shoulders, and be lower

posterior to them, and rise again at the hips, the backbone should be large, as it has the weight of the digestive and respiratory organs to sustain, and it also indicates a strong nervous system. The shoulders at the top should be thin, the distance from the ribs to the hips is generally wide in dairy cows, due to the large paunch developed. The animal should be deep through this region vertically as it shows a relation of digestion to milk production. The udder is one of the parts we should always examine first in a dairy cow, for if it is defective, she is likely to be worthless as a dairy animal. The udder should be large and well forward and backward, thus giving ample room for a large cistern. It should always have a coat of fine hair. The veins in the udder, should be visible, large and prominent, with large holes; The teats should be of medium size, not too large and long, the crops should retreat, not be square as in beefy animals; The pelvic arch should be wide, thus giving plenty of room for the udder; The skin should be soft and mellow, even somewhat oily. Horns, if any, fine; And I would not select an animal very heavy boned unless she displayed unmistakably dairy qualities. Cow's teats should not be covered with hair. We have herein described what, in our humble judgment, is the most essential anatomical and physiological characteristics of a good dairy animal.

How to Obtain a Typical Dairy Herd.

It is of the greatest importance that a dairyman, if he desires a good herd, should study closely the means by which he can better or raise the general standard of his herd. He will find that it is important that he should pick or cull his herd, weeding out the poor producers. This picking out is necessary if one desires to bring out the better qualities in his herd. In many cases, characteristics of particular dairy cows are as well marked as breeds, so it pays to observe each animal and keep only those which show superior qualities.

There are many rules laid down to be followed, but while it is well to know them, we should not follow them blindly as they may be only arbitrary. But there are certain fundamental features peculiar to dairy types, so the breeder should try to perfect his herd, so that they can transmit the most desirable qualities to their offspring.

In order to insure the desirable properties in the offspring, it is of the utmost importance that we exercise knowledge and caution in breeding. In the first place, in selecting a bull, care should be taken to procure an animal of the pure type desired. The influence of the male is more than one half to the herd or offspring. Hence, if we cannot afford pure bred cows, we should endeavor to have a first class bull. A pure bred sire coupled with common cows of a good dairy type will their impress upon

the progeny. Being a thorough bred, he is more potent than the female in transmitting his characteristics to his progeny. The power of transmission is an old, fundamental one, and is at the bottom of modern stock breeding. It is not studied enough by breeders and farmers. The sire is half the herd as said here to fore! A scrub bull does more than any thing else to discount a dairyman's herd. It is better to select a mature sire than a young one. The present bull of the K. S. A. C. Dairy Herd is a pure bred Guernsey purchased of A. J. Phillips, West Salem Wis. Campbell's King (for such is his name) 4951, was born Feb. 10th, 1897 making him at present about 2 yrs, 4 mos, old. He weighs 1300 pounds, and is used to test the value of the Guernsey cross upon common Kansas cows. He is a good individual; and as his pedigree shows is highly bred in butter lines. Mr Hill who selected him for the college says "Campbell's King is fit to head any herd, and I am glad so good a bull is to go to Kansas. One of his ancestors Coralman 3193 gave 560 pounds butter in 1 year at 3½ years; Another Yeksa's Queen 6631 gave 600 lbs. butter in 1 year, and 9886 pounds of milk. The second or third cross has been found to, and should, render animals as good as full bloods. But in crossing cattle, as in crossing other stock, one should use caution, and be sure that he procures the results he desires and not reversions. Again

if you have a good dairy animal keep her, as such will always bring good prices. If you must sell, sell the poorest ones.

Care of Dairy Cows.

General good care and environment go far toward attaining desired results. This is somewhat underrated by some of our cattle breeders. Not that they have not enough knowledge, but simply, they do not apply what they do know. In many cases, they get into a habit of doing things, and hence are loathe to change. They should be on the alert for new ideas and inventions, which contribute to their financial gain.

They would find it not a waste of money, to invest in a few up-to-date, standard dairy and agricultural papers, and thus keep posted on all innovations in the dairy business. A few cheap, and simple things which would greatly aid the dairyman in coming to successful conclusions are sometimes omitted.

A Few Necessary Dairy Appliances.

Among these are, a milk sheet, an ordinary large sheet of paper, ruled for each cow's name, and respective weights of feed and yield of milk, with dates. Second, a pair of scales placed in a convenient spot on which to weigh every cows milk, it only takes a minute or so per cow. Third, a Babcock tester to test all the milk for butter fat. By this means you know exactly each cows yield,

as it is the only true way of testing. Besides, these testers are not expensive, costing from five to forty or fifty dollars.

Feeding.

In feeding balanced rations, be careful not to overfeed. Every dairyman should study the principles involved in feeding balanced rations. Here it would be well to define what is meant by a balanced ration; as generally understood, a balanced ration is the total quantity of a mixture which is to be fed to any animal in one day, with the object in view of securing the maximum efficiency with the least monetary outlay. Sometimes these factors conflict, in such cases we use the "golden mean". The most efficient rations are those which are secured by combining two classes of foods, the carbohydrates class and the protein class. Carbohydrates consist principally of such rough feeds as we produce, as hay, straw, and most cereal grains. Protein feeds are those found in the market, as linseed meal, cotton seed meal, soy bean meal, bran and middlings, etc.

Feed the cow all she will eat; encourage her appetite, for the more feed consumed by the dairy cow, means more milk and butter.

Watering.

Dairy cows drink large quantities of water. Therefore, they should have plenty of fresh, clean water conveniently located, so they can drink when they like it.

if not convenient for this purpose water them regularly and often during the day. In real cold weather, have the water under shelter, or better still, warm it.

Kindness to Cows.

Kindness is as essential to a dairy cow as to a person. In fact it is a factor the importance of which is too often overlooked by dairy men. In our experiments here at K.S.A.C., kindness to the cows is regarded as one of the greatest promoters of milk production, as a cow kindly treated yields far more proportionally than one which is not. See to it that your help is kind to your cows.

Shelter.

Shelter is of such vast importance that every dairy man should have a barn. It need not be an expensive one, yet constructed comfortably. The cows should not be exposed to inclement weather, even for short periods of time, as experience here and elsewhere has shown that it decreases the milk supply. Keep the stalls clean, remove all extra feed from boxes, have plenty of light and fresh air for each animal, as light is one of the best disinfectants known and is essential to the health of most living creatures. Fresh air is absolutely essential to healthy animals, but, avoid having draughts on your cows.

System.

Be systematic in your feeding, milking, and in all your dairy work, for of all places a dairy must be a model of cleanliness and system, a dairymen must be a man of industry and method. Order here, as elsewhere, is a first law.

Concluding Remarks.

From the foregoing remarks it is evident that we should constantly endeavor to better our herds, to increase their dairy yields, by better feeding, better breeding, so your cows will develop into animals possessing those characteristics which typify the true dairy cow, and which will be transmitted to their progeny. You will then have a dairy herd of which you can be proud.

With the lapse of time, and the scientific advancement of dairy interests, we believe that the question of the relation of dairy form to function will be as clearly established as are many of the other laws which govern life.

G. W. C.

— Finis —