10-1924

Better Sires -- Better Stock: Build Better by Breeding

H. P. Davis

CIRCULAR 24 OCTOBER, 1924

Better Sires - - - - - Better Stock

BUILD BETTER BY BREEDING

BY H. P. DAVIS

THE UNIVERSITY OF NEBRASKA
COLLEGE OF AGRICULTURE
EXPERIMENT STATION LINCOLN
E. A. BURNETT, DIRECTOR

Better Sires—Better Stock

Build Better by Breeding

BY H. P. DAVIS

DEPARTMENT OF DAIRY HUSBANDRY

Improvement in livestock depends upon three principles: breeding, selection, and proper feeding and care. Each is important, but breeding is essential to any permanent improvement. Constructive betterment thru breeding is obtained primarily because of the operation of the laws of heredity, which, simply stated, are that—"Like tends to produce like." Applied to milk production it means that the high-producing dairy cow tends to produce a daughter who is a large milk producer, and that the bull whose sire's daughters were heavy milkers and whose dam gave a large flow, will likely transmit this quality to his own daughters. The further back the ancestors have been heavy producers, the more likely will the animal possess that quality. Consequently, the pedigree of a dairy cow or dairy bull that for 3 or 4 generations shows every ancestor to have been a proved large producer, gives good evidence that such an animal possesses the inheritance for large milk and butterfat production.

It is manifestly impossible and impracticable to increase the milk and butterfat production of a large area, such as the state of Nebraska, by disposing of all the low-producing dairy cows and by replacing them with higher producing ones purchased either within or without the state. Some good dairy cows can be added by purchase but their number as compared with the total will be small. In purchasing cows on any large scale there is also some danger of buying diseased animals, even tho the buyer and the state veterinary officials exercise the greatest care.

Economy and logic indicate that the most satisfactory method of obtaining higher-yielding dairy cattle is to breed them. Nebraska raises the feeds—corn, oats and alfalfa—that will grow dairy cattle and can raise them as cheaply as any region. The method is simple. Use purebred dairy sires on the present cows. By the use of good purebred dairy sires great improvement can be obtained in a single generation. The heifers sired by a purebred dairy bull out of scrub or common cows will possess 50 per cent or one half of the char-

acteristics of the sire. Such females are almost certain to be better than their dams. If these "half bloods" are bred to a purebred bull of the same breed, their heifers will be "three-quarter bloods" or will possess 75 per cent or three-fourths of the blood of a dairy breed. "Three-quarter blood" cows bred to a purebred sire of the same breed produce "seven-eighth bloods" or in other words they possess 87½ per cent or seven-eighths of the inheritance of the dairy breed to which the sire belongs. This plan can be continued, the next generation being 15/16, the following one 31/32, the next one 63/64. Following such a plan it is feasible to increase rapidly the production of the herd by grading up thru the use of good bulls. Many have followed this plan successfully.

Why should good purebred sires of a dairy breed be used for herd improvement instead of a "grade" bull out of one of the "best cows" in the herd? Too frequently the latter kind of sire is used, and at the end of a decade almost certainly the offspring produce less than their mothers and grandmothers. This is because the ancestors of the bull have not been selected for their milk qualities for any considerable period. They are mixed and carry all sorts of characteristics many of which are undesirable. The ancestors of a good purebred dairy sire, on the other hand, have been selected for hundreds of years for one quality—milk and butterfat production—and consequently those characteristics have become intensified or well-fixed and following the laws of heredity will tend to be transmitted to his offspring.

No one can tell with certainty just what the daughters of a particular sire will produce until after they have been milked. But it can be stated with certainty that the daughters of common or scrub cows sired by a good purebred dairy bull will be better producers than their dams. As nearly as can be estimated, the average production of the Nebraska dairy cow is under 2600 lbs. of milk per year. Assuming that to be the figure, if the milk tested 4 per cent butterfat, the average butterfat yield per year would be 104 lbs. Even at low feed prices such cows at best yield only a small return each year. If the average cow's yield is 104 lbs. of butterfat, approximately one-half of the dairy cows in the state are well below the production that will yield a profit.

A good example of improvement obtained thru the use of good purebred dairy sires is seen in the Holstein-Friesian herds of the University of Nebraska at the North Platte Substation, North Platte, and in the herd of the Dairy Husbandry

Department at Lincoln. The latter is the older and was established more than two decades ago. In 1923 the average of all the Holsteins in the latter herd for that calendar year was 15,626 lbs. of milk containing 565 lbs. of butterfat. The improvement in that herd has been brought about almost entirely thru breeding to good sires and the selection of the good animals. These herds are rather notable in that during the entire period of their development the sires used have represented a consistent effort to follow the principles of line breeding.

PRINCE ORMSBY MERCEDES DEKOL

Prince Ormsby Mercedes DeKol 47003 was the first sire used at Lincoln. He was the son of Sir Ormsby Hengerveld DeKol 31212 out of Daisy Mercedes Pietertje 2d 53643 a daughter of DeKol 2d's Paul DeKol No. 2 23366. He left only

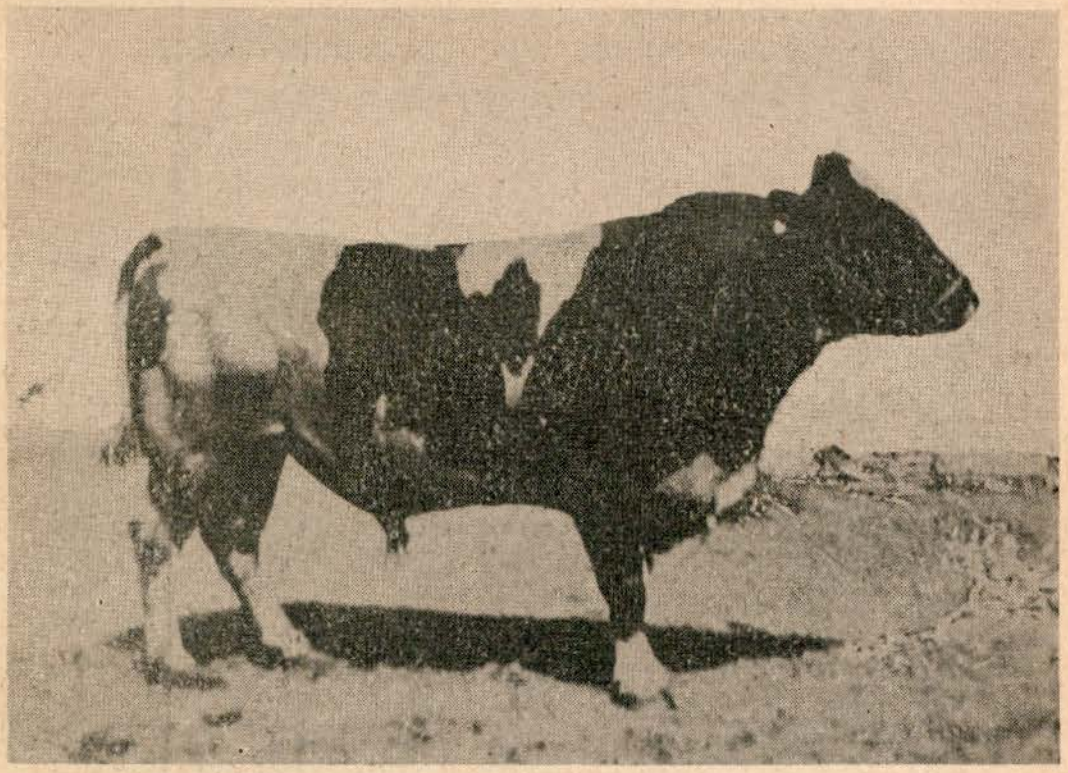


FIG. 1.—Prince Ormsby Mercedes DeKol

3 daughters in the herd that completed official yearly records but these daughters should be enough to establish the fame of any sire. See Table 1 A. Of course the largest producer was La Verna Lincoln 227365 whose yearly production of 29,555.5 lbs. of milk containing 1048.46 lbs. of butterfat or 1310.60 lbs. of

80 per cent butter still stands as the highest butterfat record of the state. She was out of the best cow in the herd at that time but despite the high production of LaMay 122176, 26,660 lbs. of milk, 773 lbs. of butterfat, Prince Ormsby Mercedes DeKol was able to increase the production of his daughter LaVerna Lincoln 2895.2 lbs. of milk containing 274.97 lbs. of butterfat. The other daughters, Allie Lincoln and Kittie Gerben Lincoln, produced respectively 336.25 lbs. and 67.94 lbs. more butterfat than their dams. The average of the 3 daughters was 3114.4 lbs. of milk, 226.39 lbs. of butterfat, more than their dams. This is an increase of nearly 16 per cent in milk and approximately 35 per cent in butterfat over exceptionally good cows. A bull that could bring about such an increase if used on Nebraska cows would produce daughters that would increase the annual receipts from dairy products by 30 million dollars. What is a bull worth? It depends on his daughters. The pity is that Prince Ormsby Mercedes DeKol did not leave 200 instead of 3 daughters.

KING SEGIS HENGERVELD VALE

King Segis Hengerveld Vale 60344 was the next bull used on the dairy herd at Lincoln. He represented the combination

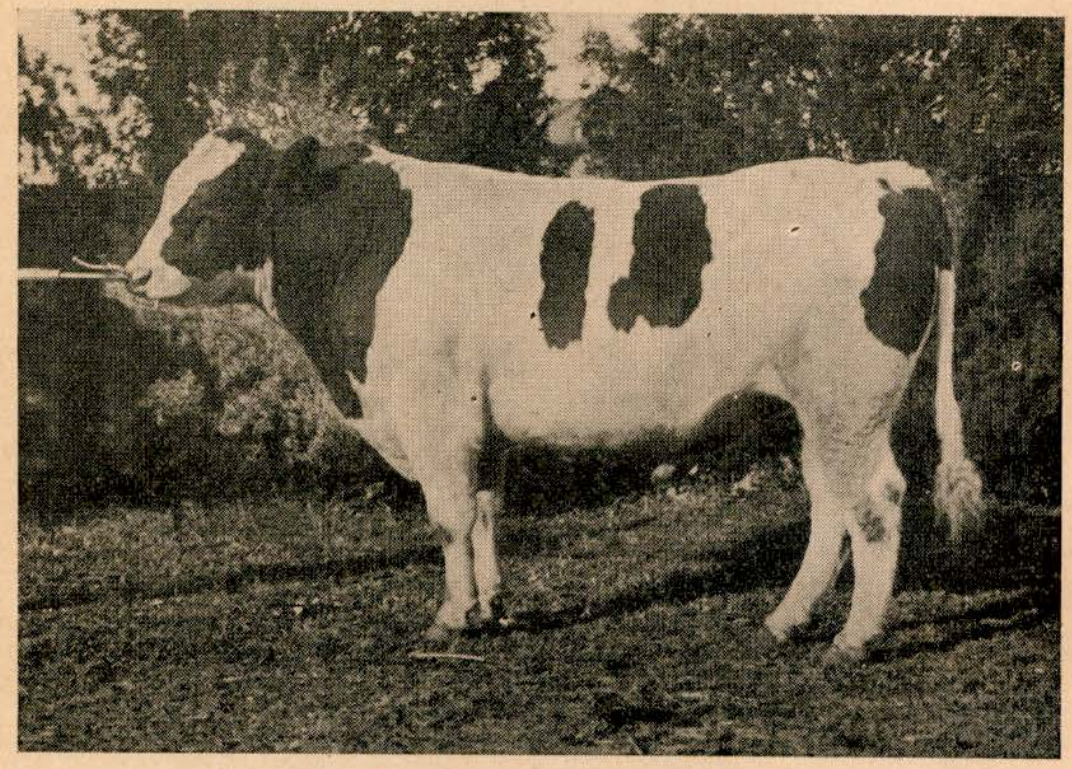


FIG. 2.—King Segis Hengerveld Vale

of the King Segis and Hengerveld DeKol breeding, being a son of the former out of a daughter of the latter. Altogether he left 10 yearly record daughters of which 7 were in the University of Nebraska herd and consequently had dams with records. See Table 2 A. The average production of these daughters was 17,734 lbs. of milk containing 605 lbs. of butterfat or 756 lbs. of butter. Of these, 3 made their records at 2 or 3 years and might have been expected to increase materially their production. The dams produced an average of 15,482 lbs. of milk containing 533 lbs. of butterfat or 666 lbs. of 80 per cent butter. These dams were very good cows as is evidenced by their records, yet King Segis Hengerveld Vale increased the production of his daughters over their dams 2252 lbs. of milk containing 72 lbs. of fat, or 90 lbs. of butter. This increase for a single year on 7 daughters amounts to 15,764 lbs. of milk, or more than 6 times the average yearly production of the Nebraska dairy cow. For 5 milking periods from 7 cows the increased milk production of the daughters over and above the production of their dams would amount to 78,820 lbs. or over 39 tons. This quantity is equal to the production of 31 Nebraska cows for one year. If butterfat were to be considered, the yearly surplus of King Segis Hengerveld Vale's 7 daughters over their dams would amount to 504 lbs. of butterfat worth, at 35 cents per pound, $176.40. By the use of this bull there actually was created $25.20 more wealth each year from each of his daughters as compared with their dams. If each of the 500,000 dairy cows in Nebraska were daughters of King Segis Hengerveld Vale the yearly increase in wealth over their ordinary yield would amount to $12,600,000. A good dairy sire creates wealth. Why not more money for the man who milks? More milk means more money.

KING GERBEN LINCOLN

King Segis Hengerveld Vale was the sire of several good sons, 2 of which were used in the herds of the University of Nebraska. When he was bred to Katy Gerben, that grand old foundation cow who died with a nail in her heart at 20 years of age, the resulting bull was King Gerben Lincoln 124930. This bull was used for a time at the North Platte Substation and later was sold. King Gerben Lincoln left 8 daughters at the North Platte Substation that made yearly records. These daughters averaged 17,662 lbs. of milk containing 605 lbs. of fat or 757 lbs. of butter. See Table 3 A. In milk produc-

tion each daughter of King Gerben Lincoln was equal to 7 ordinary Nebraska cows and in butterfat production 6 common cows. At 35 cents a pound for butterfat such a cow would bring in $211.75 in a year. Three or 4 cows of that kind would pay the grocery bill for the average family. The great difference between a cow of good production and one of poor production is in the inherited qualities for milk and butterfat production, provided both are properly fed. Few can afford to purchase on the market cows that will produce 600 lbs. of butterfat. No one that is milking cows can afford to be without a sire whose ancestors or whose offspring indicate that he will raise the production of his daughters compared with the dams. In most herds the only hope of improvement comes from the sire, yet scrub or grade is used merely because he is cheap. In fact, he is expensive but the cost in small production does not come for several years and so is not noticed. The farmer who uses a scrub bull pays for a good purebred sire but never uses him. Why not get what you pay for? King Gerben Lincoln was bred to high-producing cows yet the 3 daughters of the high-producing cows with records averaged 52 lbs. of butterfat higher than their dams. The

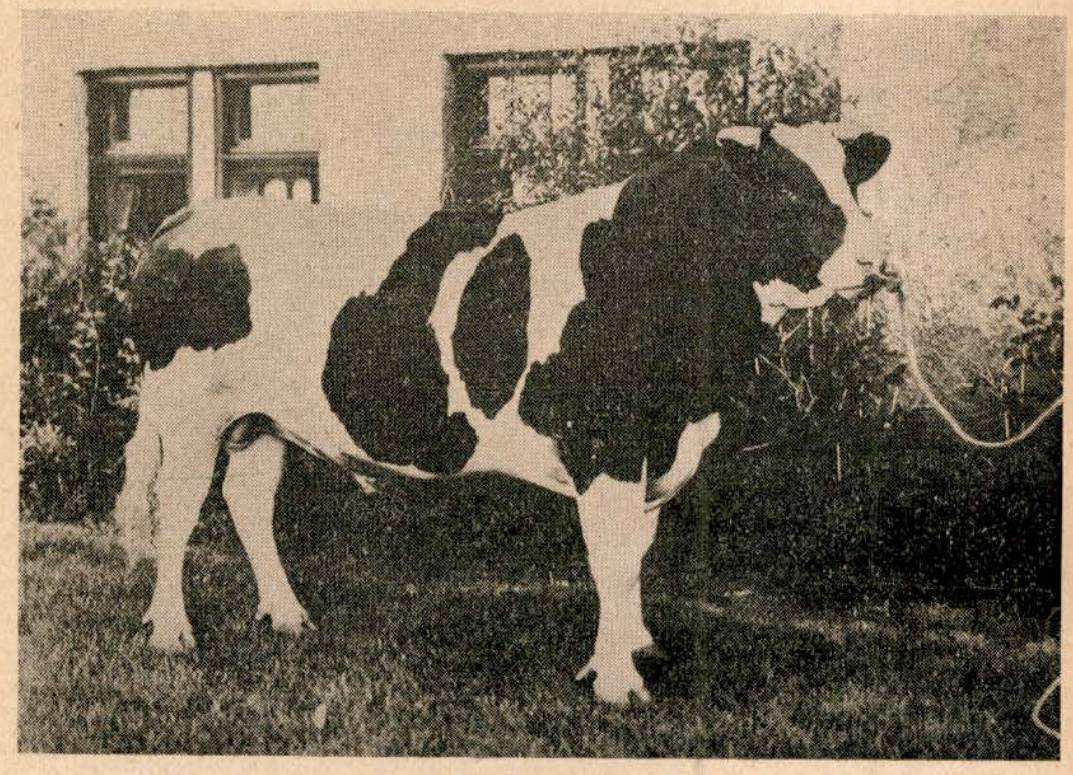


FIG. 3.—King Gerben Lincoln

difference in favor of the daughters was one-half the production of Nebraska's average dairy cow. Great transmitting sires wisely used would insure larger and more economical production.

KING DERBY LINCOLN

King Segis Hengerveld Vale was bred to Kittie Gerben Lincoln, a daughter of Katy Gerben and of Prince Ormsby Mercedes DeKol. The resulting male was called King Derby Lincoln. He was used for a time in the herd at Lincoln and left 9 remarkable daughters. The mothers of these cows were an exceptional group, averaging 613 lbs. of butterfat and including that famous cow LaVerna Lincoln who for years held the state record with a production of 29,555 lbs. of milk containing 1048 lbs. of butterfat or 1310 lbs. of butter. Despite this, King Derby Lincoln was able to raise the production of his daughters to an average of 20,244 lbs. of milk containing 719

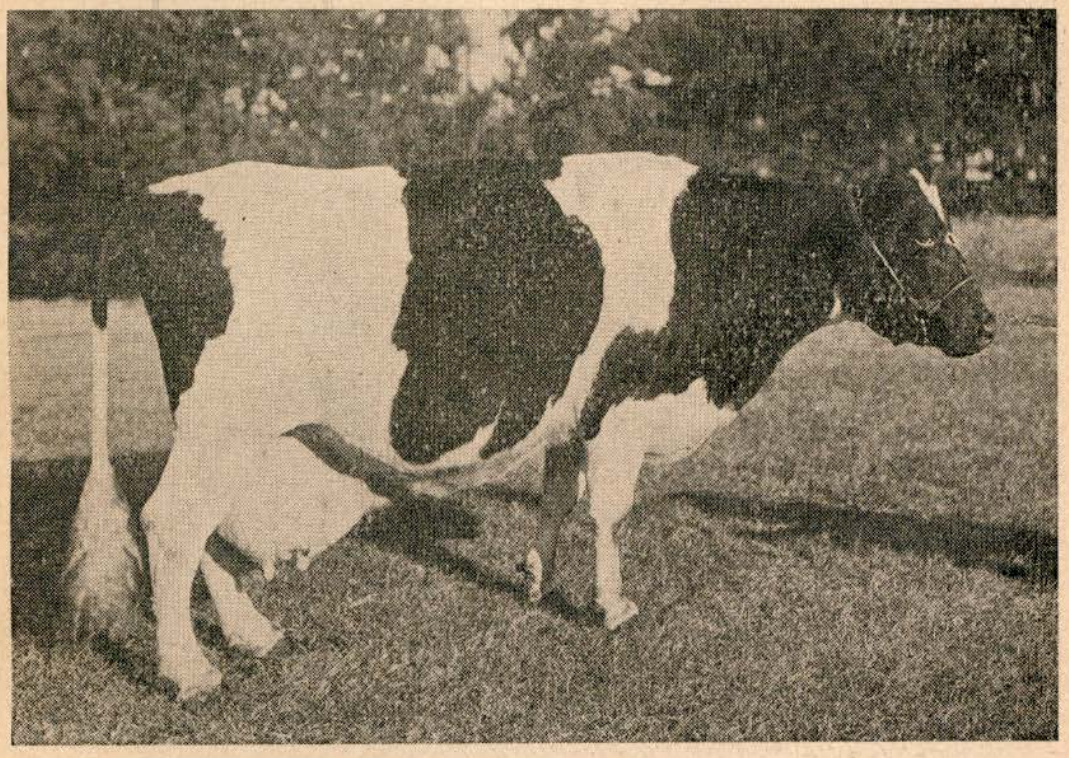


FIG. 4.—Katy Gerben

lbs. of butterfat or 899 lbs. of butter. Their story is not finished and it is certain that the younger cows will improve their records still more and raise the average production. In fact, every one will have a record above 600 lbs. of butterfat shortly.

King Derby Lincoln created wealth. Because he could and did transmit high butterfat production, his 9 daughters produced $332.15 more worth of butterfat than their dams in a single year. For such a short lifetime as 5 milking periods, this bull with only 9 daughters added $1660.75 to the wealth of Nebraska over and above what the original cows produced. Consider that if sires like King Derby Lincoln had been used on the dairy cows of the state when the daughters came into milk, six-sevenths of all the cows could be discarded and the

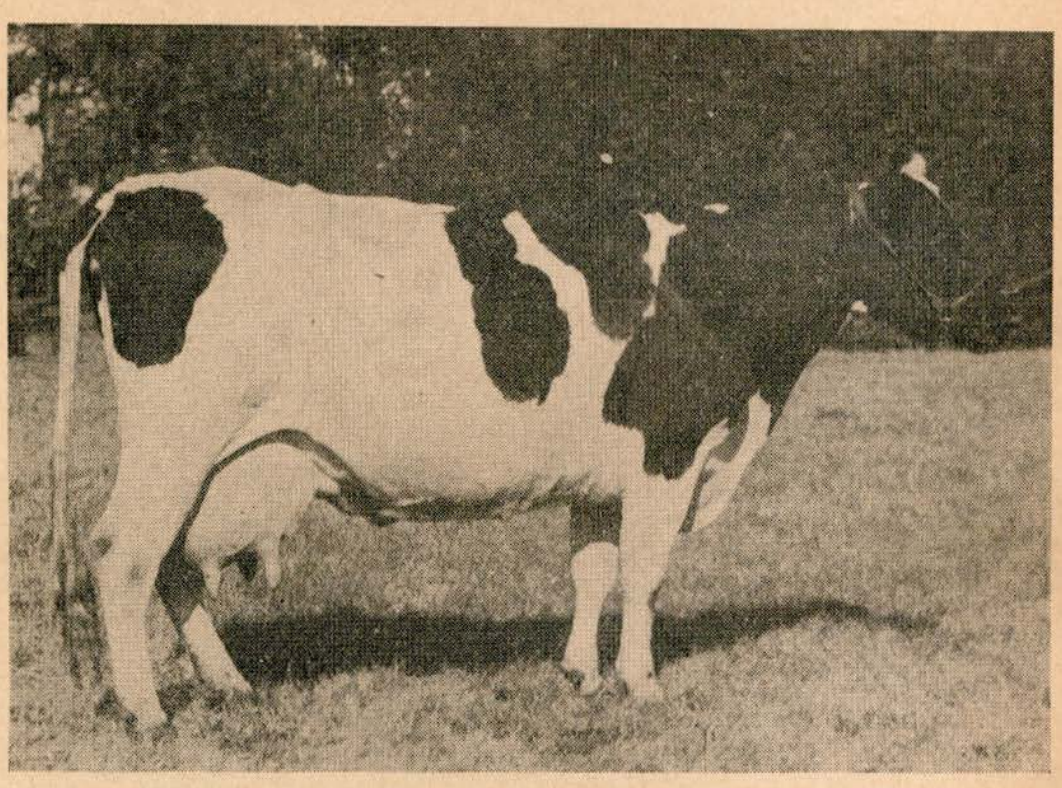


FIG. 5.—Kittie Gerben Lincoln

remaining one-seventh would still produce the same quantity of butterfat. In other words, 63,500 cows would produce as much as 445,000. The economic waste of feeding the large number of low-yielding cows is enough to bankrupt the state. When one cow will do the work of 7, why keep the other 6?

It is hard to estimate the worth of such a sire as King Derby Lincoln, yet bulls of such breeding can often be purchased for as low as $150. When buying a young sire, it is particularly important that in addition to his individuality his pedigree indicate that his ancestors have been good producers. Particularly his dam and his sire's dam should have good records. For many herds, almost any purebred dairy bull would sire

daughters better than their dams, but males are cheap enough so that a selected one can be used in practically every herd. That the "sire is half the herd" is a common saying. The truth is that in most cases he is the sole source of improvement. Too frequently, however, the investment in the sire is less

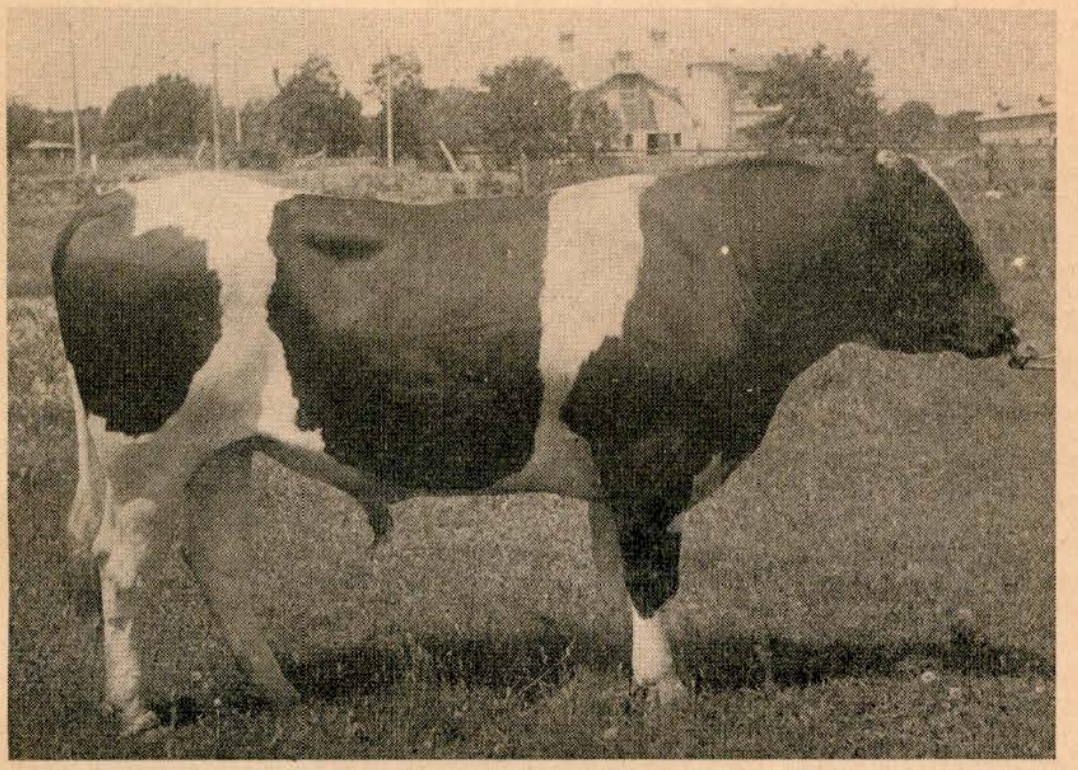


FIG. 6.—King Derby Lincoln

than in one cow and seldom is the expenditure for the head of the herd equal to one-fourth the value of the herd. Put the price of 2 or 3 good cows into the right kind of a bull and he will bring you large returns on the investment.

VARSITY DERBY MATADOR

King Derby Lincoln bids fair to be a good sire of sons. One son, Varsity Derby Matador, has 4 daughters which average 15,804 lbs. of milk containing 588 lbs. of butterfat or 735 lbs. of butter as 2-year-olds. This remarkable average will be maintained by later daughters coming into milk at the North Platte Substation where he was used. See Table 5 A. At first it may be thought that his daughters are poorer than their dams, but when the difference in age is considered they are well above their dams.

RELATION OF AGE TO PRODUCTION

For easy figuring, the production of younger animals may be compared with older ones on the following basis:

2 yrs. — 2 yrs. 2 mos.	70 per cent
2 yrs. 3 mos. — 2 yrs. 5 mos.	72½ per cent
2 yrs. 6 mos. — 2 yrs. 8 mos.	75 per cent
2 yrs. 9 mos. — 2 yrs. 11 mos.	77½ per cent
3 yrs. — 3 yrs. 2 mos.	80 per cent
3 yrs. 3 mos. — 3 yrs. 5 mos.	82½ per cent
3 yrs. 6 mos. — 3 yrs. 8 mos.	85 per cent
3 yrs. 9 mos. — 3 yrs. 11 mos.	87½ per cent
4 yrs. — 4 yrs. 2 mos.	90 per cent
4 yrs. 3 mos. — 4 yrs. 5 mos.	92½ per cent
4 yrs. 6 mos. — 4 yrs. 8 mos.	95 per cent
4 yrs. 9 mos. — 4 yrs. 11 mos.	97½ per cent
5 yrs. or over	100 per cent

In comparing a record, divide the pounds of butterfat by the per cent for the age. For example, N. P. Hengerveld Segis Rose, a daughter of Varsity Derby Matador, produced 474.67 lbs. of butterfat at 2 years, 1 month. By referring to the chart it is evident that at 2 years and 1 month the production is 70 per cent of that expected at maturity. 488.67÷.70=698.1 lbs., or the quantity that might be expected from her at maturity. It is evident therefore that this cow could be considered to have produced more than her dam, Gerben Segis Pledge Rose, whose butterfat production was 631.88 lbs.

Seven-day records of production are made by Holstein cows, and in order that the bulls mentioned may be studied on that basis, these are given just after the yearly records in the tables. Yearly records are the most accurate measure of a cow's ability to produce, but when these are not available, 7 day records furnish a measure of her production.

Sires will tell the story of the success or failure of a dairy herd. Better sires, better stock; larger production, larger profits. Good purebred dairy bulls will mean more money for the man who milks.

[20M]

A GOOD PEDIGREE

VARSITY PIEBE LA VERTEX 302952

3 nearest dams average—
1130.12 lb. butter in a year
31.39 lb. butter in 7 days
6 nearest dams average—
27.82 lb. butter in 7 days

King Piebe Pontiac Segis 174303
(16-11-1-0)
Sire of Beauty Girl Gerben ReBecky
1 yr. @ 4 yrs.: 21869.4 lb. milk; 790.44 lb. fat; 985.55 lb. butter
7 days @ 4 yrs.: 683.5 lb. milk; 34.33 lb. butter
Varsity Piebe Quintelle
1 yr. @ 3 yrs.: 18840.1 lb. milk; 683.35 lb. fat; 854.18 lb. butter
Varsity Piebe Kismet
1 yr. @ 2 yrs.: 17914.6 lb. milk; 592.06 lb. fat; 740.07 lb. butter
7 days @ 3 yrs.: 612.7 lb. milk; 25.01 lb. fat; 31.26 lb. butter

La Verna Lincoln 227365
(3-1-1)
1 yr.: 29555.5 lb. milk; 1048.46 lb. fat; 1310.60 lb. butter
7 days: 729.0 lb. milk; 27.52 lb. fat; 34.41 lb. butter
Dam of Varsity Derby La Vinnie
1 yr.: 22421.0 lb. milk; 805.97 lb. fat; 1007.46 lb. butter

Piebe Laura Ollie Homestead King 110474
(45-35-17-12)
Sire of: 3 over 800 lb. fat or 1000 lb. butter; 5 over 700 lb. fat; 13 over 600 lb. fat.
May Walker Ollie Homestead
1yr.: 31610 lb. milk; 1218.59 lb. fat; 1523.23 lb. butter
Watson Segis Pontiac Homestead
1yr.: 25310 lb. milk; 927.85 lb. fat; 1159.81 lb. butter

Beauty Girl Pontiac Segis 229260
1 yr. @ 3 yrs.: 24924.7 lb. milk; 890.33 lb. fat; 1112.91 lb. butter
7 days @ 3 yrs.: 713.5 lb. milk; 29.72 lb. fat; 37.15 lb. butter

Prince Ormsby Mercedes DeKol 47008
(7-4-10-8)
Sire of La Verna Lincoln
1 yr.: 29555.5 lb. milk; 1048.46 lb. fat; 1310.60 lb. butter
Allie Lincoln
1 yr.: 22159.6 lb. milk; 846.22 lb. fat; 1057.77 lb. butter
7 daughters average 24 lb. butter in 7 days

La May 122176
1 yr.: 26660.3 lb. milk; 773.49 lb. fat; 966.86 lb. butter
7 days: 648.3 lb. milk; 18.10 lb. fat; 22.63 lb. butter

Oak DeKol Ollie Homestead 85529
(22-14-10-13.)
Sire of 7 over 500 lb. fat.
Johanna Fayne Rue 2d
1yr.: 21,925 lb. milk; 790.57 lb. fat; 988 21 lb. butter

Wisconsin Bess Piebe Laura 97555
(4-1-3-2)
7 days: 528.5 lb. milk; 23.70 lb. fat; 29.25 lb. butter
1 yr. @ 12 yrs.: 15,113 lb. milk; 529.47 lb. fat; 661.83 lb. butter

King Segis Pontiac Count 93909
(38-27-17-21)
Sire of 12 over 800 lb. fat or 1000 lb. butter
Princess Changeling Segis
1yr.: 31063 lb. milk; 1030.05 lb. fat; 1287.56 lb. butter

Prince DeKol Beauty Girl 98624
7 days @ 7 yrs.: 591.1 lb. milk; 17.37 lb. fat; 21.71 lb. butter

Sir Ormsby Hengerveld DeKol 31212
(69-20-31-50)
Sire of: 1 over 800 lb. fat or 1000 lb. butter; 4 over 600 lb. butter

Daisy Mercedes Pietertje 53643
(3-1-4)
7 days: 525.7 lb. milk; 17.43 lb. fat; 21.78 lb. butter

Alma Prince Jewel 32731
(6-3-3-6)
Sire of: Alma Lincoln Garben
14833 lb. milk
509.98 lb. fat
637.47 lb. butter

Mayhamb Pietertje DeKol 49751
(3-0-1)

TABLE 1A—*Prince Ormsby Mercedes Dekol 47003 (7-3-0-7)*[1]

Sire: Sir Ormsby Hengerveld DeKol 31212 (69-21-33-50)

Dam: Daisy Mercedes Pietertje 2d. 53643 (3-2-5)[2]

Record, 7 days at 5 years—525.7 lbs. milk, 17.43 lbs. fat, 21.79 lbs. butter

YEARLY RECORDS

DAUGHTERS	Age	Milk	Fat	80 per cent butter	DAMS	Age	Milk	Fat	80 per cent butter
		Pounds	*Pounds*	*Pounds*			*Pounds*	*Pounds*	*Pounds*
La Verna Lincoln 227365	7–1	29555.5	1048.46	1310.60	LaMay 122176	5–7	26660.3	773.49	966.86
Allie Lincoln 178368	9–1	22159.6	846.22	1057.77	Alma Lincoln Gerben 76710	4–9	14833.9	509.97	637.20
Kittie Gerben Lincoln 204651	5–5	18283.4	733.08	916.35	Katy Gerben 68099	6–10	19161.2	665.14	831.42
Average, 3 daughters	Mature	23332.8	875.92	1094.40	Average, 3 dams	Mature	20218.4	649.53	811.82
Average increase, daughters over dams		3114.4	226.39	282.58					
		Per cent	*Per cent*						
Percentage increase in milk		15.89	.....						
Percentage increase in fat		.....	34.87						

TABLE 1B—*Prince Ormsby Mercedes Dekol 47003 (7-3-0-7)*

SEVEN-DAY RECORDS

DAUGHTERS	Age	Milk	Fat	80 per cent butter	DAMS	Age	Milk	Fat	80 per cent butter
		Pounds	*Pounds*	*Pounds*			*Pounds*	*Pounds*	*Pounds*
La Verna Lincoln 227365	7–1	729.0	27.528	34.41	La May 122176	5–7	648.3	18.105	22.631
Allie Lincoln 178368	9–1	588.4	22.592	28.24	Alma Lincoln Gerben 76610	5–9	439.6	15.696	19.620
Kittie Gerben Lincoln 204651	6–9	610.9	22.572	28.21	Katy Gerben 68099	8–3	472.2	15.384	19.230
Viola Ormsby Mercedes DeKol 147728	10–10	604.1	21.113	26.39	Ida DeKol Royal Aaggie 77586		No record		
Edith DeKol Ormsby Mechthilde 152628	3–9	465.1	15.348	19.23	Ethel DeKol Mechthilde 112738		No record		
Alma Magali Marie 243420	6–11	393.0	14.614	18.267	Alma Magali Virgo 90631		No record		
Bernice Ormsby Mercedes DeKol 130193	6–10	390.5	13.952	17.44	Pride DeKol Mechthilde 100208		No record		
Average, 7 daughters		540.1	19.674	24.59					
Average, 3 daughters with record dams		642.7	24.230	30.285	Average, 3 dams		520.0	16.395	20.493
Average increase, daughters over dams		122.7	7.835	9.792					
			Per cent						
Percentage increase in milk		23.60							
Percentage increase in fat			47.78						

[1]The numbers in parentheses with dashes between them, following a Holstein-Friesian bull, stand for the following: first number stands for the number of daughters with seven-day records; second number for the daughters with yearly records; third number for the sons with record daughters; fourth number for the daughters with record offspring. In a 3-series number, the yearly record daughters are omitted.

[2]The numbers following a Holstein-Friesian cow stand for the following: first number represents the daughters with records; second number represents sons with record daughters; third number represents the daughters with record offspring.

TABLE 2A—*King Segis Hengerveld Vale 60344 (15-10-6-7)*

Sire: King Segis 36168 (87-2-87-66)

Dam: Sadie Vale Concordia 3d's Hengerveldt 100308

Record, 7 days at 4½ years—494.3 lbs. milk, 22.77 lbs. fat, 28.46 lbs. butter

YEARLY RECORDS

DAUGHTERS	Age	Milk	Fat	80 per cent butter	DAMS	Age	Milk	Fat	80 per cent butter
		Pounds	*Pounds*	*Pounds*			*Pounds*	*Pounds*	*Pounds*
Roxeva Lincoln 262517	9–6	22952.8	809.75	1012.18	Roxanna Parthenia 60400	11–11	21628.4	757.00	946.25
Quavia Lincoln 308164	6–10	21817.1	738.55	923.18	Quincy Karen 90832	5–1	12925.5	429.93	537.40
Qualla Lincoln 262515	3–11	18210.8	629.52	786.90	Quatrain Lincoln 134506	3–11	16028.9	528.73	660.91
Eve Lincoln 262516	8–3	19699.7	611.16	763.95	Essie Lincoln 178369	2–3	11242.4	354.53	443.10
Ellen Lincoln 227364	3–10	15773.2	567.78	709.72	Estanna Lincoln 109245	4–8	11663.7	369.82	462.27
Alta Lincoln 273750	2–8	13242.6	466.46	583.07	Allie Lincoln 178368	2–10	13216.4	515.13	643.91
						9–1	22159.6	846.22	1057.77
Mildred Lincoln 227366	3–9	12443.3	412.58	515.72	Merry Eyes 98934	2–7	12727.5	448.32	560.40
Sadie Friend Segis 253861	4–6	17816.3	757.04	946.30	Sadie Friend Mercedes 64928		No record		
Nettie Hengerveld Segis 272494	5–1	16019.5	520.39	650.48	Nettie Manomet 2d F. 62765		No record		
Oak Dale Hengerveld Segis 200485	5	15218.5	503.61	629.51	Lady Wayne Twisk 2d 66914		No record		
Average, 10 daughters		17319.4	601.68	750.85					
Average, 7 daughters with record dams		17734.2	605.11	756.38	Average, 7 dams		15482.3	533.51	666.88
Average increase, daughters over dams		2251.9	71.60	89.50					
		Per cent	*Per cent*						
Percentage increase in milk		14.54	.....						
Percentage increase in fat		.....	13.42						

TABLE 2B—*King Segis Hengerveld Vale 60344*

SEVEN-DAY RECORDS

DAUGHTERS	Age	Milk	Fat	80 per cent butter	DAMS	Age	Milk	Fat	80 per cent butter
		Pounds	*Pounds*	*Pounds*			*Pounds*	*Pounds*	*Pounds*
Qualla Lincoln 262515	3–11	487.3	21.252	26.56	Quatrain Lincoln 134506	2–2	324.7	8.472	10.59
Quavia Lincoln 308164	8–3	498.2	21.131	26.41	Quincy Karen 90832	6–1	448.4	12.569	15.71
Eve Lincoln 262516	4–11	568.6	21.092	26.36	Essie Lincoln 178369	2–3	258.8	7.924	9.90
Oak Dale Hengerveld Segis 200485	5	513.9	20.781	25.98	Lady Wayne Twisk 2d 66914	5–6	432.2	18.274	22.84
Sadie Friend Segis 253861	4–6	457.9	20.463	25.58	Sadie Friend Mercedes 64928	5–2	460.5	15.612	19.51
Cornucopia Hengerveld DeKol Segis 220239	5–7	586.5	19.507	24.38		5–5	444.8	16.892	21.11
Roxeva Lincoln 262517	3–11	533.3	18.953	23.24	DeKol Model Beauty 68913	10–11	418.4	17.272	21.59
Alta Lincoln 273750	4–4	490.2	17.466	21.83	Roxanna Parthenia 60400	4–1	442.4	17.624	22.03
Ellen Lincoln 227364	3–10	427.7	16.206	20.25	Allie Lincoln 178368	9–1	588.4	22.592	28.24
Joan de Segis 299039	3–3	329.2	12.758	15.95	Estanna Lincoln 109245	4–8	344.7	13.201	16.50
Segis Hengerveld Concordia 152675	1–11	312.4	9.648	12.06	Zinnia Parthenia Leda 2d 171882	6–9	406.1	14.212	17.76
Mildred Lincoln 227366	3–9	230.8	8.050	10.06	Evelyn Hengerveld DeKol 73594	5–3	463.3	13.291	16.61
Alice Clothilde Rex DeKol Paul 2d 204427	7–1	497.4	16.286	20.35	Merry Eyes 38934	3–8	332.6	12.068	15.08
Nettie Hengerveld Segis 272494	5–1	446.8	14.062	17.58	Alice Clothilde Rex DeKol Paul 77728		No record		
Clothilde Segis Vale 223962	1–11	310.4	7.705	9.63	Nettie Mahomet 2d F. 62765		No record		
					Clothilde Ladoga Pet 120120		No record		
Average, 15 daughters		445.91	16.357	20.446					
Average, 12 daughters with record dams		452.91	17.275	21.593	Average, 12 dams with records		410.24	14.365	17.956
Average increase, daughters over dams		42.67	2.910	3.637					
		Per cent	*Per cent*						
Percentage increase in milk		10.40							
Percentage increase in fat			20.25						

TABLE 3A—*King Gerben Lincoln 124930 (12-8-1-4)*

Sire: King Segis Hengerveld Vale 60344 (15-10-6-7)

Dam: Katy Gerben 68099 (3-3-3)

Record, 1 year at 8 years—19,161.2 lbs. milk, 665.14 lbs. fat, 831.42 lbs. butter

YEARLY RECORDS

DAUGHTERS	Age	Milk	Fat	89 per cent butter	DAMS	Age	Milk	Fat	80 per cent butter
		Pounds	*Pounds*	*Pounds*			*Pounds*	*Pounds*	*Pounds*
N.P.Segis Gerben ReBecky 555189	3–7	18393.2	674.47	843.08	G. & B. ReBecky Segis 218659		No record		
Becky Bleske Gerben 352805	6–0	16419.4	527.16	658.95	G. & B. Becky Bleske Lyons. 218664		No record		
Pledge Rose King 431184	4–7	18406.3	654.88	813.60	G. & B. Segis Pledge Rose 218661	305 days 8–7	19747.3	619.91	774.88
Clothilde Topsy King 431183	4–7	18061.8	636.83	796.03	G. & B. Clothilde Topsy Lyons 218665	305 days 8–6	16187.3	527.52	659.40
Gerben Segis Pledge Rose 394157	5–4	20639.8	631.88	789.85	C. & B. Segis Pledge Rose 218661	305 days 8–7	19747.3	619.91	774.88
ReBecky Segis Gerben 394156	4–8	17281.1	605.76	757.20	G. & B. ReBecky Segis 218659		No record		
Queen Gerben Aaggie 350954	5–7	17721.3	605.18	756.47	Birdie Annette Aaggie 228558		No record		
Gerben Butter King 394158	5–2	14375.5	508.95	636.16	Nancy Gerben 210432		No record		
Average, 8 daughters		17662.3	605.64	757.05					
Average, 3 daughters with record dams		19035.9	641.19	801.48	Average, 3 dams		18560.6	589.11	736.38
Average increase, daughters over dams		475.3	52.08	65.10					
		Per cent	*Per cent*						
Percentage increase in milk		2.55	.....						
Percentage increase in fat		.....	8.84						

TABLE 3B—*King Gerben Lincoln 124930*

SEVEN-DAY RECORDS

DAUGHTERS	Age	Milk	Fat	80 per cent butter	DAMS	Age	Milk	Fat	80 per cent butter
		Pounds	*Pounds*	*Pounds*			*Pounds*	*Pounds*	*Pounds*
Clothilde Topsy King 431183	5–11	616.2	25.845	32.306	G. & B. Clothilde Topsy Lyons 218665	5–11	551.8	23.260	29.07
Queen Gerben Aaggie 350954	7–3	593.9	25.028	31.28	Birdie Annette Aaggie 228558		No record		
Pledge Rose King 431184	5–9	590.1	23.619	29.52	G. & B. Segis Pledge Rose 218661	7–3	598.3	24.875	3.109
Gerben Segis Pledge Rose 394157	7–0	482.7	22.680	28.35	G. & B. Segis Pledge Rose 218661	7–3	598.3	24.875	31.09
N.P.Segis Gerben ReBecky 555189	4–11	557.3	21.275	26.59	G. & B. ReBecky Segis 218659	4–2	594.6	20.893	26.11
Gerben Butter King 394158	6–6	483.0	20.936	26.17	Nancy Gerben 210432	5–6	489.1	20.691	25.86
Gerben Eliza Cornucopia 234184	2–7	456.7	18.816	23.52	Eliza Cornucopia 166458	6–5	489.6	15.551	19.44
Becky Bleske Gerben 352805	6–0	456.2	18.801	23.50	G. & B. Becky Bleske Lyons 218664	5–11	747.0	22.304	27.88
ReBecky Segis Gerben 394156	4–8	410.9	15.098	18.87	G. & B. ReBecky Segis 218659	4–2	594.6	20.893	26.11
Gerben Becky Bleske Lyons 352806	3–7	438.1	13.749	17.18	G. & B. Becky Bleske Lyons 218664	5–11	747.0	22.304	27.88
N. P. Bopeep Segis 210429	2–5	379.3	13.192	16.49	Bopeep Gerben 210429	3–6	352.9	14.011	17.51
BoPeep Gerben Lincoln 350953	5–3	384.1	12.118	15.15	BoPeep Gerben 210429	5–10	582.5	21.319	26.65
Average, 12 daughters		487.4	19.263	24.08					
Average, 11 daughters with record dams		477.7	18.739	23.42	Average, 11 dams		576.9	20.998	26.25
Average decrease, daughters		99.2	2.259	2.81					
		Per cent	*Per cent*						
Percentage decrease of daughters in milk		20.76							
Percentage decrease of daughters in fat			12.05						

TABLE 4A—*King Derby Lincoln 153017 (9-9-1-5)*

Sire: King Segis Hengerveld Vale 60344 (5-10-6-7)

Dam: Kittie Gerben Lincoln 204651 (3-2-1)

Record, 1 year at 5 years—18,283.4 lbs. milk, 733.08 lbs. fat, 916.35 lbs. butter

YEARLY RECORDS

DAUGHTERS	Age	Milk	Fat	80 per cent butter	DAMS	Age	Milk	Fat	80 per cent butter
		Pounds	*Pounds*	*Pounds*			*Pounds*	*Pounds*	*Pounds*
Varsity Derby Sultana 409594	4–6	25456.1	928.80	1161.01	Susanna Gerben 148539	5–9	14475.5	519.87	649.90
Varsity Derby Gelta 409593	5–3	24227.0	843.84	1054.80	Miss Gertrude Cornucopia DeKol 181981	6–1	15863.4	554.14	692.67
Quality Lincoln 348248	5–1	23893.5	818.85	1023.56	Qualla Lincoln 262515	3–11	18210.8	629.52	786.90
Varsity Derby LaVinnie 459393	4–2	22421.6	805.97	1007.46	LaVerna Lincoln 227365	4–2	17762.5	614.56	768.20
						7–1	29555.0	1048.50	1310.62
Varsity Derby Celia 381235	6–5	21959.5	782.58	978.22	LaVerna Lincoln 227365	7–1	29555.0	1048.50	1310.62
Varsity Derby Empress 409592	5–3	20314.3	707.61	859.51	Estanna Lincoln 109245	4–8	11663.7	369.82	462.27
Quinet Lincoln 339507	6–3	15271.2	590.07	737.58	Quincy Karen 90832	5–1	12925.5	429.93	537.49
Varsity Derby Esther 472944	4–2	15648.0	587.56	734.45	Estanna Lincoln 109245	4–8	11663.7	369.82	462.27
Varsity Derby Georgia 475484	2–3	13012.7	462.02	577.52	Miss Gertrude Cornucopia DeKol 181981	6–1	15863.4	554.14	692.67
Average, 9 daughters		20244.9	719.25	899.07	Average, 9 dams		17752.9	613.80	767.25
Average increase, daughters over dams		2492.0	105.45	131.81					
		Per cent	*Per cent*						
Percentage increase in milk		14.03							
Percentage increase in fat			17.18						

TABLE 4B—*King Derby Lincoln 153017*

SEVEN-DAY RECORDS

DAUGHTERS	Age	Milk	Fat	80 per cent butter	DAMS	Age	Milk	Fat	80 per cent butter
		Pounds	*Pounds*	*Pounds*			*Pounds*	*Pounds*	*Pounds*
Varsity Derby Sultana 409594	4–6	674.5	27.504	34.38	Susanna Gerben 148539	5–9	468.6	16.373	20.47
Varsity Derby Esther 472944	5–6	468.7	25.248	32.05	Estanna Lincoln 109245	4–8	344.7	13.201	16.50
Varsity Derby Gelta 409593	5–3	525.4	22.676	28.34	Miss Gertrude Cornucopia DeKol 181981	4–7	444.6	15.327	19.16
Varsity Derby LaVinnie 459393	5–4	500.4	22.653	28.31	LaVerna Lincoln 227365	7–1	729.0	27.528	34.41
Quality Lincoln 348248	6–5	584.3	22.524	28.15	Qualla Lincoln 262515	3–11	487.3	21.268	26.56
Varsity Derby Empress 409592	6–4	510.6	23.274	29.09	Estanna Lincoln 109245	4–8	344.7	13.201	16.50
Varsity Derby Georgia 475484	4–9	501.1	18.716	23.39	Miss Gertrude Cornucopia DeKol 181981	4–7	444.6	15.327	19.16
Varsity Derby Celia 381235	6	413.8	16.896	21.12	LaVerna Lincoln 227365	7–1	729.0	27.528	34.41
Quinet Lincoln 339507	2–6	356.2	15.134	18.92	Quincy Karen 90832	5–1	404.6	12.594	15.74
Average, 9 daughters		503.9	21.625	27.03	Average, 9 dams		488.6	18.038	22.547
Average increase, daughters over dams		15.3	3.587	4.456					
		Per cent	*Per cent*						
Percentage increase in milk		3.13							
Percentage increase in fat			19.88						

TABLE 5A—*Varsity Derby Matador 234809 (8-4-0-0)*

Sire: King Derby Lincoln 153017 (9-9-1-5)

Dam: Mesa Lincoln 126168

Record: 305 days at 8 years—17001.4 lbs. milk, 644.29 lbs. fat, 805.36 lbs. butter

7 days at 7 years— 476.9 lbs. milk, 25.326 lbs. fat, 31.66 lbs. butter

YEARLY RECORDS

DAUGHTERS	Age	Milk	Fat	80 per cent butter	DAMS	Age	Milk	Fat	80 per cent butter
		Pounds	*Pounds*	*Pounds*			*Pounds*	*Pounds*	*Pounds*
N. P. ReBecky Segis Hengerveld 594250	2–9	19410.3	704.36	880.45	ReBecky Segis Gerben 394156	4–8	17281.1	605.76	757.20
N. P. BoPeep Gerben Hengerveld 594224	2–7	15259.6	590.15	737.68	BoPeep Gerben 210429		No record		789.85
N. P. Gerben Hengerveld 662135	2–7	15477.1	583.49	729.36	Queen Militant Gerben 350952		No record		
N.P.HengerveldSegisRose705102	2–1	13069.5	474.67	593.34	Gerben Segis Pledge Rose 394157	5–4	20639.8	631.88	
Average, 4 daughters		15804.1	588.17	735.21					

TABLE 5B—*Varsity Derby Matador 234809*

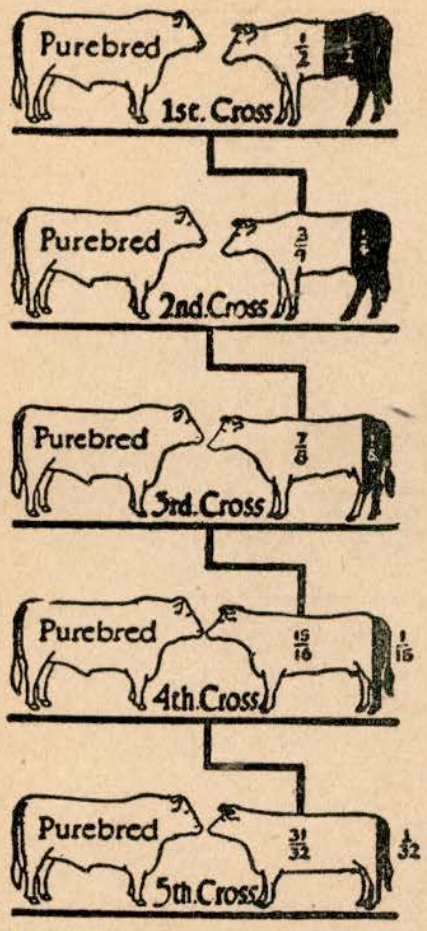
SEVEN-DAY RECORDS

DAUGHTERS	Age	Milk	Fat	80 per cent butter	DAMS	Age	Milk	Fat	80 per cent butter
		Pounds	*Pounds*	*Pounds*			*Pounds*	*Pounds*	*Pounds*
N.P.Hengerveld Segis Rose 705102	3–0	537.7	19.648	24.56	Gerben Segis Pledge Rose 394157	3–2	398.4	17.005	21.26
N. P. ReBecky Segis Hengerveld 594250	2–9	439.0	19.198	24.00	ReBecky Segis Gerben 394156	4–8	410.9	15.098	18.87
N. P. Hengerveld Rose 705104	2–11	402.9	16.866	21.08	G. & B. Segis Pledge Rose 218661	3–1	516.0	18.027	22.53
N.P. King Rose Hengerveld 662133	3–2	385.0	16.127	20.16	Pledge Rose King 431184	3–6	290.6	12.378	15.47
N. P. Gerben Hengerveld Bopeep 662134	3–2	371.8	16.023	20.03	Bopeep Gerben Lincoln 350953	5–3	384.1	12.118	15.15
N. P. Hengerveld Bopeep Gerben 705101	2–6	377.9	15.081	18.85	Bopeep Gerben Lincoln 350953	5–3	384.1	12.118	15.15
N. P. Gerben Hengerveld 662135	2–7	396.7	14.641	18.30	Queen Militant Gerben 350952		No record		
N. P. Bopeep Gerben Hengerveld 594224	2–7	372.1	13.622	17.02	Bopeep Gerben 210429	3–6	352.9	14.011	17.51
Average, 8 daughters		410.4	16.401	20.50					
Average, 7 daughters with record dams		412.3	16.652	20.81	Average, 7 dams		391.0	14.393	17.95
Average increase, daughters over dams		21.3	2.259	2.86					
		Per cent	*Per cent*						
Percentage increase in milk		5.44							
Percentage increase in fat			15.70						

PUREBRED SIRES AND HERD IMPROVEMENT

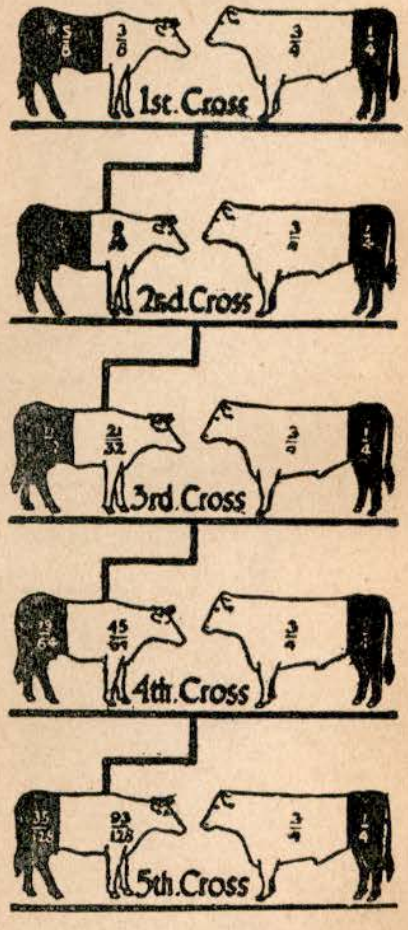
See How *Rapidly* the Proportion of Native Blood *(Black Portion) Diminishes* When a PUREBRED Sire is Used.

Progress in Five Generations Using **Purebred** *Bulls and Native Cows.*



With Purebred Bulls a breeder Achieves more in Two Generations than in Five with the Grade-Bulls (3/4 Full blood)

Progress in Five Generations Using **Grade** *Bulls and Native Cows*



Replace SCRUB & GRADE Sires With GOOD PUREBREDS.

Courtesy U. S. Department of Agriculture.