

UNIVERSITY OF ILLINOIS  
Agricultural Experiment Station

---

URBANA, ILLINOIS, OCTOBER, 1907

---

CIRCULAR NO. 113

---

MAPLE SPRING DAIRY

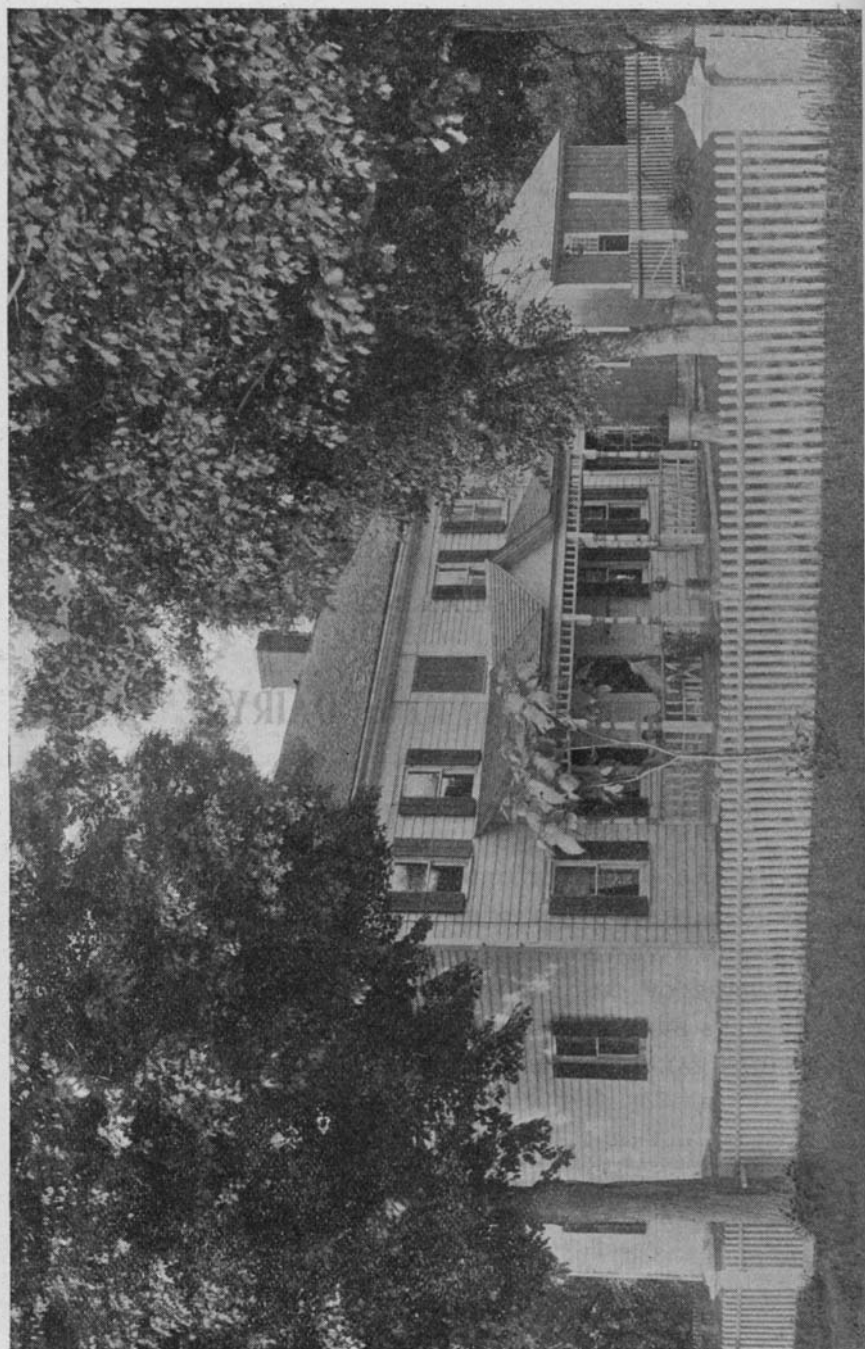
By WILBER J. FRASER, CHIEF IN DAIRY HUSBANDRY

FARM OF 96 ACRES RETURNED \$2,150 IN ONE YEAR.

ANNUAL PRODUCTION OF BUTTER FAT INCREASED 83 POUNDS  
PER COW IN TWO YEARS.

AVERAGE OF THE HERD FOR 1906, 307 POUNDS BUTTER FAT.  
RESULTS BROUGHT ABOUT BY COOPERATION BETWEEN THE  
AGRICULTURAL EXPERIMENT STATION AND A DAIRYMAN.

"This improvement has come about by weighing and testing the milk; by selling the low producers; by buying and raising better cows; by using the silo and feeding a more nearly balanced ration; and by studying and supplying the individual needs of the cow."—*Charles Foss.*



COUNTRY HOME OF THE DAIRYMAN

It is the purpose of this circular to report the improvement wrought by applying true principles of dairying in actual farm practice, and to show what can be done by a little co-operation between the Agricultural Experiment Station and the farmer. These pages tell only the exact and proved results achieved in an Illinois dairy, which is the owner's sole means of support.

Mr. Charles Foss, a school teacher, began dairying upon a 96 acre farm, three miles north of Cedarville, Stephenson County, in 1900. He always fed his cows an ample ration, but at that time he did not feed a balanced ration, and he practiced summer dairying. From the best estimate possible it appears that the cows he kept averaged no more than 170 pounds of butter fat per year. The first four years he received about \$400 per annum from his cows, \$300 from his hogs, and \$300 from his grain. Last year his receipts were \$600 for hogs and \$1,150 for butter, the total production of the farm being fully \$2,150, or more than \$22 per acre, after deducting \$100 paid for bran.

The Agricultural Experiment Station asked Mr. Foss to weigh the milk of each cow in his herd for a week at a time

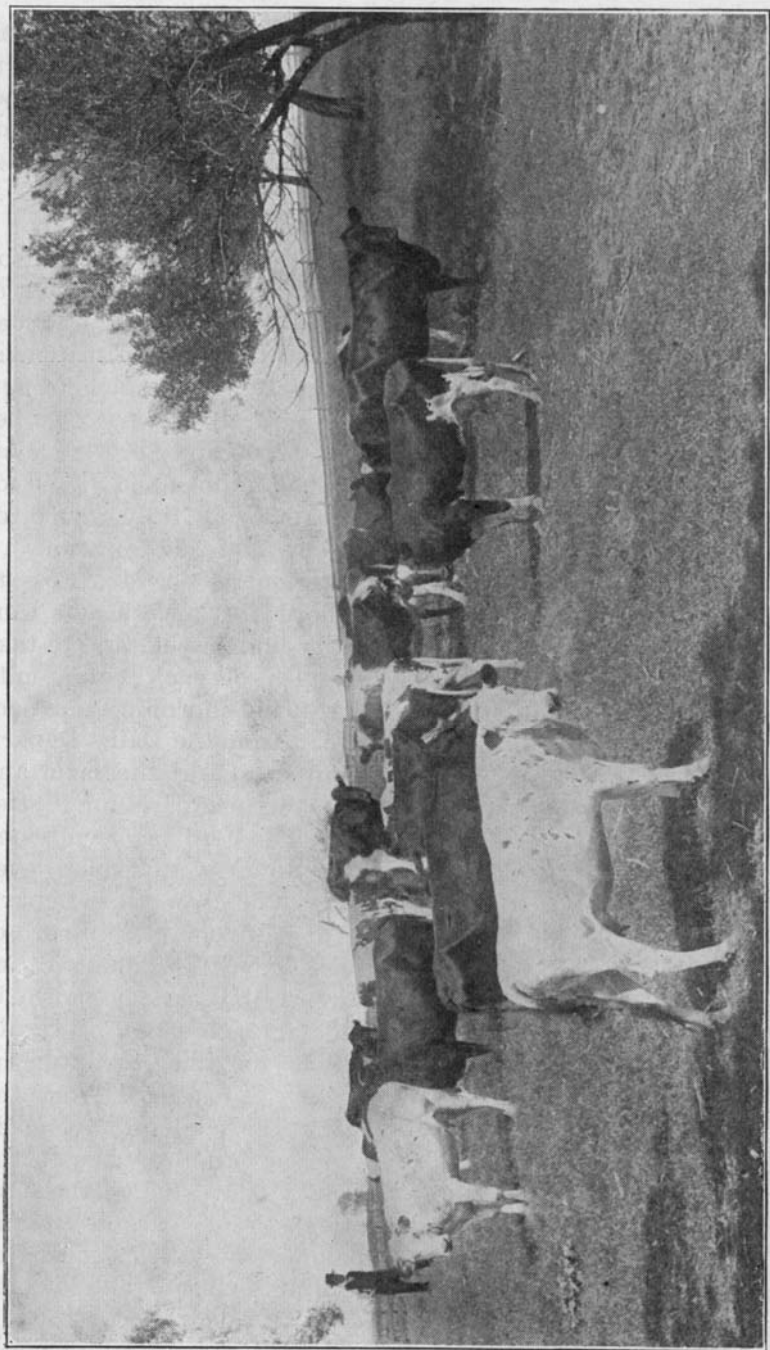
every ninth week, and to take samples of each cow's milk night and morning, and sent a man from the Dairy Department to call at the farm and test the samples for butter fat. The herd has been tested according to this plan ever since, and now this Department has a complete record of each cow's production for three full years, as shown in the table on page 5. In addition to this testing, the writer and others from the Dairy Department, have made a dozen or more trips to the Foss Farm, studied the situation there carefully, and pointed out various means of



CHARLES FOSS.

improvement. \*Mr. Foss has not only welcomed this co-oper-

\*The Dairy Department has co-operated in a similar way with a number of dairymen who are seeking the best methods and the greatest improvement in their dairying, and who are eager to apply the suggestions of science.



THE HERD THAT AVERAGED 8,057 POUNDS OF MILK AND 307 POUNDS OF BUTTER FAT PER COW

ation, but has eagerly sought all helpful information, and has acted upon the suggestions offered, making many changes in his methods and equipment.

WHOLE HERD BROUGHT UP TO 307 POUNDS  
BUTTER FAT PER COW

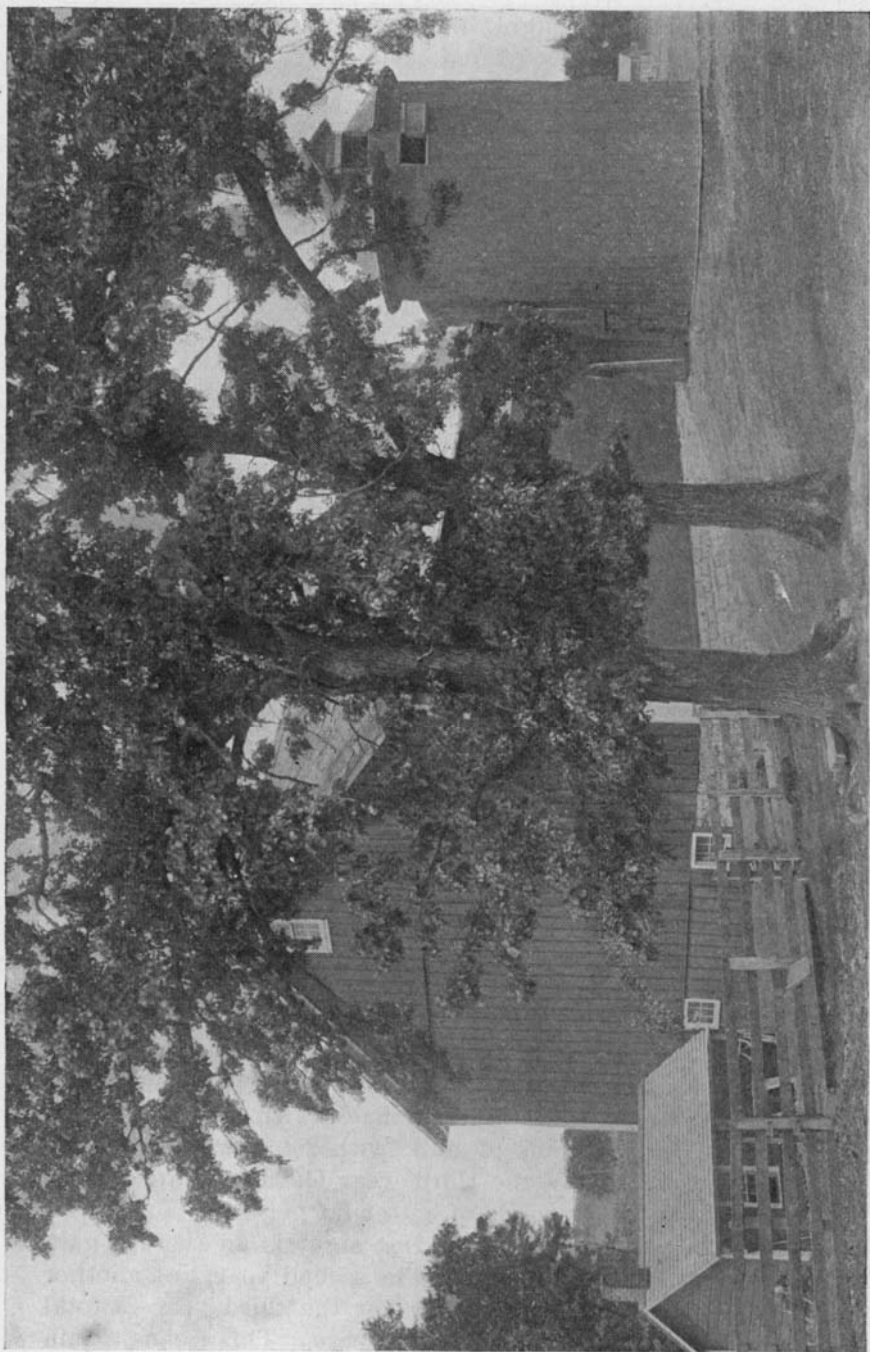
No. of cow.	1904.			1905.			1906.		
	Milk, lb.	Fat, per cent	Fat, lb.	Milk, lb.	Fat, per cent	Fat, lb.	Milk, lb.	Fat, per cent	Fat, lb.
1	5,970	4.55	272	.....	.....	.....	.....	.....	.....
2	8,579	3.19	274	8,062	3.2	262	10,201	3.55	363
3	4,818	4.27	206	.....	.....	.....	.....	.....	.....
4	3,212	4.7	151	6,663	3.9	258	6,895	3.88	269
5	6,360	3.72	237	6,196	3.5	218	.....	.....	.....
6	9,802	3.94	386	8,607	3.9	339	7,674	4.83	371
7	4,701	3.67	176	.....	.....	.....	.....	.....	.....
8	6,992	3.41	239	.....	.....	.....	.....	.....	.....
9	4,408	3.79	167	6,442	3.4	220	9,367	3.6	338
10	5,368	4.05	218	6,634	3.6	236	8,313	3.55	296
11	4,498	4.35	196	7,819	4.0	316	5,943	4.22	251
12	6,823	3.71	254	5,834	4.2	244	8,202	3.83	314
13	3,773	4.47	167	4,356	4.2	182	.....	.....	.....
14	5,890	3.26	192	7,731	3.1	238	8,211	3.21	264
15	.....	.....	.....	7,263	4.1	298	7,493	4.17	313
16	.....	.....	.....	9,660	3.28	317	12,999	3.30	439
17	.....	.....	.....	.....	.....	.....	7,889	3.83	303
18	.....	.....	.....	.....	.....	.....	6,669	4.15	277
19	.....	.....	.....	.....	.....	.....	8,607	3.31	295
20	.....	.....	.....	.....	.....	.....	4,342	4.8	*209
Total.....	81,194	.....	3,135	85,267	.....	3,128	112,804	.....	4,302
Av. per cow	5,800	3.86	224	7,105	3.66	260	8,057	3.81	307

\*For 11 months.

GAIN OF 83 POUNDS BUTTER FAT PER COW IN TWO YEARS

These figures furnish a very interesting study. It is seen that the 14 cows the first year averaged, 5,800 pounds of milk containing 224 pounds of butter fat; that the 12 cows the second year averaged 7,105 pounds of milk with 260 pounds of butter fat; and that the 14 cows the third year (1906) averaged 8,057 pounds of milk and 307 pounds of butter fat per cow.

The greatest fact apparent at first sight is an average gain of 36 pounds of butter fat per cow the second year, and another gain of 47 pounds of butter fat per cow the third year—a total gain of 83 pounds per cow for the two years. This means a gain



NOONDAY SHADE FOR THE DAIRY HERD

of 97 pounds of butter per cow in the year's production, which at the average price he has received amounts to about \$24.25. This gain is much more than the whole profit from the average dairy cow in Illinois. The above increase is known from an accurate record of the weight and test of the milk for a week at a time every nine weeks throughout the year.

#### AVERAGE FIRST FOUR YEARS WAS ONLY 167 POUNDS PER COW

There was no testing and record of what the individuals of this herd produced the first four years, but the following close estimate has been made from the total sales of milk:

Year.	No. of cows.	Milk, lb.	Butter fat per cow, lb.	Milk at 70 cts. per 100 lb.	Receipts per cow.
1900	10	35,602	135	\$276.64	\$27.66
1901	12	55,489	176	414.49	34.54
1902	12	52,254	165	407.74	33.98
1903	12	60,270	190	Milk at 80 cts. per 100 lb. \$493.07	41.09
Average for four years.....			167	\$398.00	\$34.32

Comparing the 1903 production shown in this table with the 1904 yield given in the first table, it is seen that there is a gain of 34 pounds of butter fat per cow; that is, from 190 pounds to 224 pounds. This makes a total increase of 117 pounds of butter fat per cow in the annual production which at the end of three years of testing had reached 307 pounds. The money returns per cow increased \$60 (from \$41 to \$101) during the same time.

If last year's production be compared with the average of the four years before testing was commenced, the gain is 140 pounds of butter fat or \$67 in money per cow. The money return has increased still more than the production because of the different manner of disposing of the product and the higher prices obtained. How did this rapid and remarkable improvement come about?

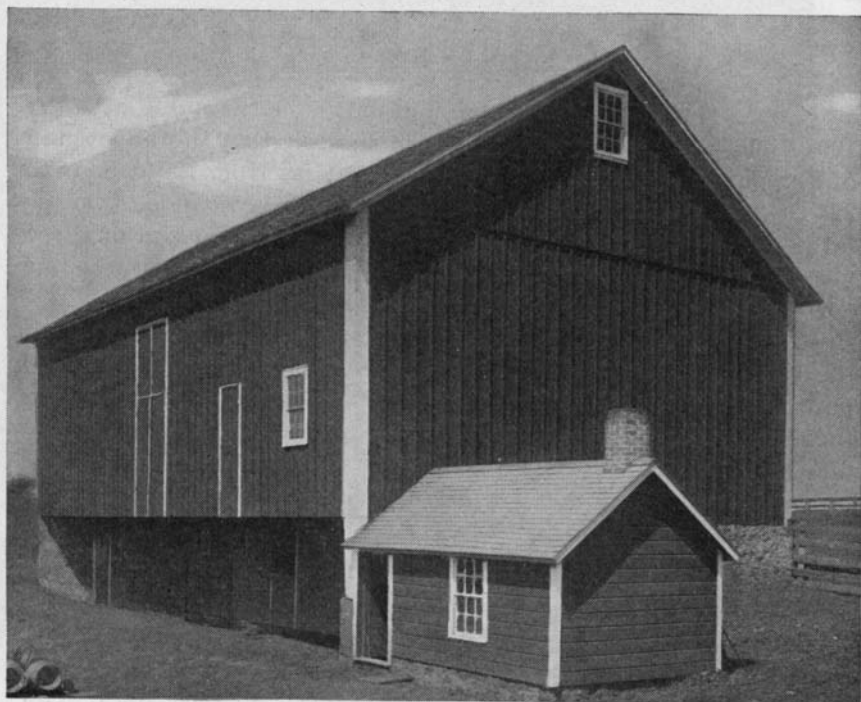
#### AT THE END OF THE FIRST YEAR

When Mr. Foss had the figures of the first year's record before him they showed some surprising differences in the production of those 14 cows. While the average is 224 pounds of butter fat, the lowest seven cows averaged only 179 pounds, and the highest seven averaged 269 pounds—a difference of 90

pounds per cow between these two halves of the herd. Four cows were disposed of, 3, 7, and 8, because they were low producers and for other good reasons, and No. 1, being dry, was sold for \$50, but Mr. Foss afterwards concluded that this sale was a mistake. No. 4, the lowest producer, was not sold because there was a special reason for her low record that year. No. 9 was only a heifer. Both of these proved fairly good cows the next two years, No. 13 was given another year's trial but as she improved but little was then sold. Two good cows were added to the herd.

#### THE SECOND YEAR'S RESULT

The second year only one cow produced less than 200 pounds of butter fat. The lowest one-half of the herd produced 223 pounds of fat per cow—within one pound of the average of the whole herd the first year—and the highest one-half of the herd produced 298 pounds of fat per cow, still showing a difference of



FRONT VIEW OF THE BARN AND DAIRY

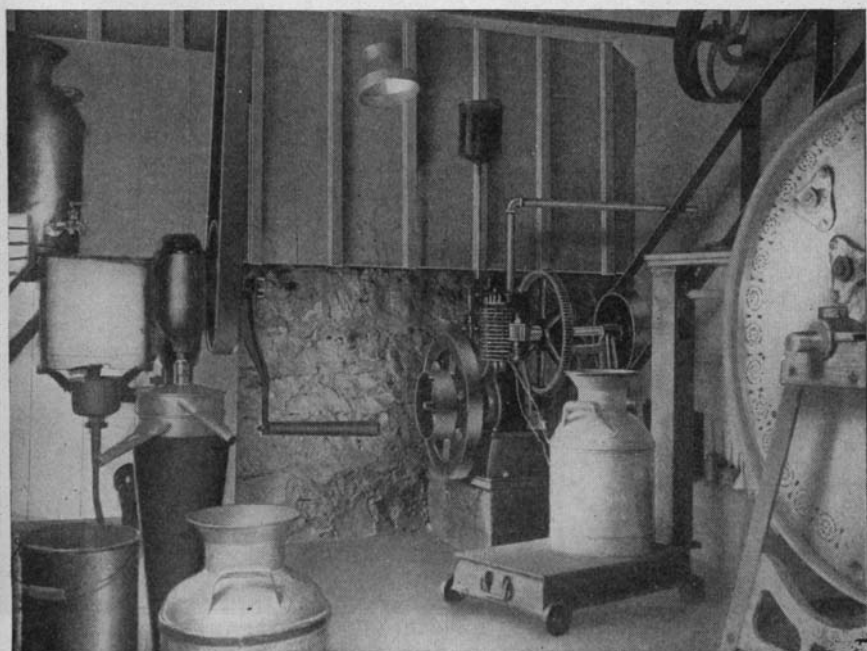


75 pounds per cow between the two halves of the herd. The poorest two cows were sold at once. Of the ten cows in the test for both of these years, six made a gain in production, and the total net gain was 271 pounds of butter fat. Mr. Foss attributes a considerable part of his gain these two years to feeding a balanced ration.

#### DEDUCTIONS FROM THIRD YEAR

While the average gain per cow the third year is 47 pounds of butter fat—greater than the second year's gain—yet the difference between the highest and lowest halves of the herd is 83 pounds per cow. It is this constant difference between the best and poorest cows (90 pounds, 75 pounds and 83 pounds per cow respectively for the three years) that shows where to strike for improvement—to get rid of the poorest cows every year, and when a new cow is added to the herd to see to it that she is a high producer.

Mr. Foss raised cows No. 17 and No. 20; these are heifers with their first calf, and it is seen that their production (303 and

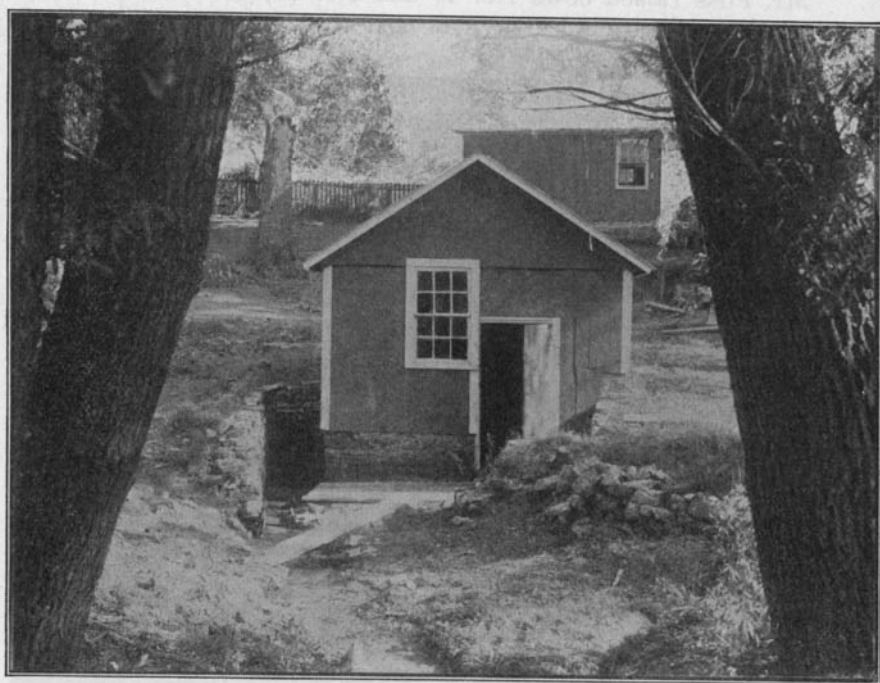


INTERIOR OF THE DAIRY

209 pounds butter fat) is excellent for heifers, especially as that of No. 20 is for only eleven months. These heifers show a large increase in production over the ordinary cow that is bought. No. 19 is a heifer that he bought, and he chose well in getting one good enough to produce 295 pounds of fat. These high records are likely to be increased this year.

#### GREAT GAINS FROM SILAGE AND SOILING CROPS

Of the ten cows that were in the test both the second and third years, nine made an average gain of  $62\frac{2}{3}$  pounds of butter fat the third year over the second, and the total net gain was 490 pounds. This great increase (amounting to \$20.17 per cow) was due largely to silage which was fed the last year, and to the fact that soiling crops were provided for use during the summer drouth, preventing a reduction of the milk flow. Such an increase in production would more than double the profit on the average cow in Illinois. Only one cow decreased in production the last year and that was plainly due to an accident.



SPRING HOUSE WHERE THE CREAM AND BUTTER IS HELD AT CONSTANT TEMPERATURE OF  $48^{\circ}$  F.

## MR. FOSS TELLS HOW IT CAME ABOUT

Mr. Foss accounts for his advancement as follows:—"This improvement has come about by weighing and testing the milk; by selling the low producers; by buying and raising better cows; by using the silo and feeding a more nearly balanced ration; and by studying and supplying the individual needs of the cow." He says further:—

"Without the advice of the Department of Dairy Husbandry I never would have succeeded in the dairy business. I had read enough to know that its advice was sound and practical.

"I wouldn't think of giving up testing cows and keeping their records. That enables one to know what the cows are doing, and to increase the production each year if possible. Heifers should be tested, and if they do not make good records, I would not keep them. I would keep only the best. Raising the heifers is the only way to get the greatest improvement in the herd."

## HIS STANDARD IS 400 POUNDS OF BUTTER FAT

Mr. Foss has set his mark at 400 pounds of butter fat per cow and will keep on improving his herd to get that average if possible. He has already in three years' time brought the average production per cow above that of the highest one-fourth of the 554 cows in the thirty-six Illinois herds tested for one year by this Department, and without doubt above the highest one-fourth of the dairy cows of Illinois. Mr. Foss is a thoroughly awakened dairyman and there is no knowing how far he will carry the improvement of his little grade herd. His ambition is to get higher production and greater profits per cow rather than to have a large herd.

## CONSTANT FLOWING SPRING AT 48 DEGREES

One of the unusual advantages of this dairy is a spring that flows a constant stream of good water. This spring has been walled about with stone and a house built over it, as shown in the photograph. A steel tank is set in the water to receive the cans of cream. The temperature of the spring is 47 degrees in winter and but one degree higher in summer.

Another picture shows the interior of a very neat little dairy where Mr. Foss separates the milk and makes the butter. He attends personally to all the details of this work.

### SELLS BUTTER TO PRIVATE CUSTOMERS

Mr. Foss makes a good grade of butter, and as the result of his excellent facilities for keeping things clean, the spring in which to hold the butter and cream at a low temperature, and his knowledge of butter making, this butter is very desirable. He delivers the butter once a week to private customers in Freeport, and is unable to supply as many families as would like to take it. He sells on year-round contracts and as these were made a long time ago he has been getting an average price of only 28½ cents per pound the past year. This butter delivered at the house is actually worth at least seven cents above Elgin quotations. Last winter when butter was 33 cents on the Elgin board, Mr. Foss should have received 40 cents instead of 30 cents. The average price of butter on the Elgin board for 1906 was 25 cents, this means that Mr. Foss should have received an average of 32 cents.

### WHAT THE PRODUCTION MEANS

The average production of 307 pounds of butter fat already reached, means 358 pounds of butter per cow. This at 32 cents would return \$114.56 per cow. Mr. Foss can easily enlarge his herd to twenty-five or more cows on the same farm, and that number would bring in \$2,864 without any further increase in production. With \$600 from hogs (and \$250 worth of product consumed by the family) this would make an income of \$3,714 per year from 96 acres, or \$38.68 per acre.

It is by no means impossible for Mr. Foss to increase the production to 400 pounds of butter fat per cow, as he has set out to do, but if he should get the average production no higher than 350 pounds in the next two years, this at 32 cents for butter and the present returns in other products would mean an income of \$4,114 or \$42.85 per acre. There is little doubt that Mr. Foss will accomplish this if he keeps up his present efforts.

Is not such a handsome income worth working for?

### THE SIRE SIDE OF IT

Mr. Foss at first used a grade sire in his herd, but soon learned that it was a great mistake. Since beginning to co-operate with the Dairy Department, he has been using a pure-bred sire, and now he is raising a calf that promises to be one of the best sires obtainable. This calf was bred by the Dairy Department and sired by Sarcastic Lad, one of the leading bulls of the Holstein-Friesian breed, and the dam of this young bull is Beech-

wood's Lady Bona, with an average record of 8,604 pounds of 3.78 per cent milk containing 326 pounds of butter fat per year for five consecutive years. Her highest year was 12,628 pounds of milk with 485 pounds of butter fat. The grand dam was Belle Sarcastic with a year's record of 721 pounds butter fat, and the great grand dam was Rosa Bonheur 5th with a year's record of 17,043 pounds of milk containing 469 pounds of fat. With such ancestors as these, and with the individuality this youngster shows, his daughters should greatly increase the average milk production in Mr. Foss' herd.

### THE BIG FOUR OF THE HERD

The four cows shown in the accompanying picture are numbers 9, 2, 6, and 16 whose records are given in the table. They produced more than twenty tons of milk last year, averaging 10,060 pounds of milk and 378 pounds of butter fat per cow. This means more than seven-eighths of a ton of butter for the four. These cows have learned the knack of turning feed into milk and money, and their heifer calves are very likely to inherit the quality of high production. What an evidence of special dairy development! What a nucleus for further improvement of the herd! They have almost reached the 400-pound mark set by Mr. Foss. The pathway of his dairying leads straight ahead to more than that production for twice and thrice four cows.



FOUR HIGH GRADES THAT PRODUCED AN AVERAGE OF 10,060 POUNDS OF MILK AND 378 POUNDS OF BUTTER FAT PER COW LAST YEAR

Cow No. 16, as shown in table, on page 5, developed a notable record—13,000 pounds of milk (lacking one pound) and 439 pounds of butter fat, last year. This is equivalent to 512 pounds of butter, which at  $28\frac{1}{2}$  cents per pound, the average price received that year, would bring \$145.92. Allowing liberally for the cost of feed, she returned about \$100 profit.



COW NO. 16

PRODUCED LAST YEAR 12,999 POUNDS OF MILK CONTAINING 439  
POUNDS OF BUTTER FAT

#### A PERMANENT SYSTEM OF FARMING

It is coming to be a well recognized fact that a great problem in Illinois agriculture is to establish permanent systems of farming that will yield good profits and at the same time not reduce the fertility of the soil—systems that may be followed for centuries with as good or better results. Mr. Foss has such a system. Practically the only plant food sold from his farm is that which goes away in the bones and bodies of the hogs. The trifle that is sold in the butter is not worth mentioning. Instead of selling grain which is rich in the elements of plant food, some bran is purchased and brought upon the place to feed. All manure made on the farm is returned to the fields where it is most needed. A clover crop comes in the rotation once in three years. The land has been responding liberally to this treatment and is apparently growing richer all the time. There is no better system of farming for maintaining the fertility of the soil. The minimum amount, if any, of commercial fertilizer will ever be required in this system. There must be an ever widening difference between the value and production of such a farm and that of



AN IMPORTANT SIDE OF DAIRYING—MAINTAINING THE FERTILITY  
OF THE SOIL

a place on which little live stock is kept and from which the grain and hay crops are sold each year.

SIGNIFICANT STRAWS

Under the old system of dairying, this herd always suffered a heavy reduction in milk as a result of the drouth and short pasture in July and August. Last year, with the soiling crops of early corn and clover, the cows kept up their flow of milk throughout the drouth.

Two years ago a silo was built on this farm exactly according to the plan of one described in Bulletin 102 published by the Department of Dairy Husbandry of this Station. This silo was 14 feet in diameter and 32 feet deep inside measurements, holding 90 tons of ensilage. The foundation wall is of brick, 8 feet high, coming just above the surface of the ground, and the circular frame structure rests on this wall. The total cost of this silo was \$259.33 which includes \$45 for the personal labor of Mr. Foss.

The first year of butter making Mr. Foss did not get the best results from his separator and churn. Under the instruction of Mr. Lee, from the Dairy Department, the former gained a mastery of these machines and saved considerable more butter.

The corn on this place is all cut and either put into the silo or shocked and shredded. An abundance of shredded fodder is used for both feed and bedding, its unequaled quality as an absorbent saves practically all the liquid manure.

Most of the feed consumed is raised on this farm, but oats are sold and bran bought when the latter is the cheaper. Mr. Foss is now beginning to buy grain to feed.

About 300 loads of manure are made on this farm every year and spread as fast as made whenever the hauling will not injure the field. Every part of the farm receives a dressing of manure as often as once in three years.

It is needless to say that in the cultivation of crops on this place there is used the same care and thoroughness as in the improvement of the dairy herd. Mr. Foss puts a great deal more work on his ground than do many others who hurry their work through and have much less to harvest. He has no cattle tramping his corn fields and thus injuring the ground when it is soft.

A clover crop is grown on every field once in three years. He does not plant corn on any ground that has not been manured unless it is clover sod, and now much of his corn is planted on clover sod that has also been manured.

The rotation is corn, oats, and clover. Clover grows well on this farm. Mr. Foss had seventeen acres of clover hay this year, and has seeded four acres to alfalfa.

### THE SECRET OF PROGRESS

One of the best reasons for the rapid improvement of this dairy herd—and one that promises a great deal more improvement—is that Mr. Foss is willing and eager to learn all that can be learned about his business; that he is impressed with the fact that there is a great deal to learn about keeping cows and making butter; and that he is ready to invest a little more labor and expense in applying a new idea that promises large returns.

If a like attitude were maintained by the whole number of Illinois dairymen, it would result in nine cases out of ten, in just as positive an increase in the proceeds and profits of the business, and it would add literal millions to the dairy production of the state.



CONDENSED SKIM-MILK