**THE
COW
MAKES
FARMING
MORE
PROFITABLE**

INTERNATIONAL HARVESTER COMPANY
OF NEW JERSEY (INCORPORATED)
AGRICULTURAL EXTENSION DEPARTMENT
HARVESTER BUILDING, CHICAGO

The **COW** *MAKES* **FARMING** *MORE* **PROFITABLE**

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AND
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INTERNATIONAL HARVESTER COMPANY
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AGRICULTURAL EXTENSION DEPARTMENT

P. G. HOLDEN, Director
HARVESTER BUILDING. CHICAGO

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TRIBUTE TO THE COW

By E. G. BENNETT,
State Dairy Commissioner, Missouri

LITTLE does man realize the debt he owes the Cow. During the dark ages of savagery and barbarism, we find her early ancestors natives of the wild forests of the old world. As the bright rays of civilization penetrated the darkness of that early period, and man called upon the cow, she came forth from her seclusion to share in the efforts that gave us a greater nation and a more enlightened people!

For two thousand years she has been the co-partner of man, sharing alike in his prosperity and adversity, responding nobly to all that was done for her, until through her development she has become an idol of the people.

In 1493, when Columbus made his second voyage to America, the Cow came with him—and from that time to the present day she has been a most potent factor in making this, our own country, one of the great nations.

Her sons helped till the soil of our ancestors and slowly moved the products of the farm to market. They went with man into the dense forests of the new world, helped clear them for homes and made cultivation possible for the coming generation.

When the tide of emigration turned westward, it was the ox that hauled the belongings of the pioneer across the plains and over the great mountain ranges to new homes beyond.

The Cow is man's greatest benefactor. Hail, wind, droughts, and floods may come, destroy our crops and banish our hopes, but, from what is left, the Cow manufactures the most nourishing and life-sustaining foods.

The Cow is life itself to thousands of little ones stranded upon the hollow hearts and barren bosoms of modern womanhood.

We love her for her gentleness, her beauty, and her usefulness. Her loyalty has never weakened—and should misfortune overtake us, as we become bowed down with the weight of years, we know that in the Cow we have a friend that was never known to falter. She pays the debt. She saves the home.

COWS PRODUCE A BILLION DOLLARS

The Dairy Business Second Only To Corn Crop of United States—Brings Farmers Nearly One Billion Dollars Annually

There are about twenty-two million dairy cows in the United States, and the annual value of their products reaches the enormous sum of nearly one billion dollars. Only the corn crop exceeds the dairy products as a source of income to the farmers of the nation.

The rapid increase in our population together with the constant increase in the per capita consumption of dairy products are reasons why the dairy cow will continue to be an important factor in the development of the country.

Neither the production of butter nor cheese has kept up with the increase of population. In 1910 there were 20,625,000 dairy cows in the United States, an increase of about 12,000,000 head in fifty years. This wonderful growth in dairying and cheese manufacturing has added enormously to the material wealth of every community and state where these pursuits are carried on. It has also been a wonderful aid in conserving the fertility of the soil wherever it has been conducted intelligently. This one great advantage to the wealth of the nation can hardly be computed in dollars and cents.

One notable incentive to the expansion of dairy farming has been the great improvement in the quality of the product and consequently the increased price which has come to the farmer.

In 1870, practically all of the butter and nearly all of the cheese, except in the older states, as New York and Ohio, was made on the farm. The average price of farm butter was about 15 cents and nearly all of it was sold, or traded for dry goods and groceries, at the country stores. The export market for cheese governed the price in New York and Ohio, which practically were the only cheese-producing states in the Union.

In 1875 there was a great awakening—the coming of the refrigerator car worked a speedy transformation in the market. It placed Wisconsin and northern Illinois on the dairy map and opened up the channels of export to their cheese and butter. Later came the cream separator, which was a great factor in the development of the dairy business. Since that time the dairy business has been growing very rapidly.

Graphic Map Showing Number of Dairy Cows in United States, 1915,
Estimated. Each Dot Represents 2000 head.

Number Dairy Cows by States

State	Estimate January 1, 1915	State	Estimate January 1, 1915
New York	1,509,000	Mississippi	434,000
Wisconsin	1,626,000	Arkansas	387,000
Iowa	1,377,000	Kentucky	390,000
Minnesota	1,186,000	Georgia	406,000
Illinois	1,007,000	Tennessee	355,000
Texas	1,086,000	Alabama	384,000
Pennsylvania . . .	943,000	South Dakota . . .	453,000
Ohio	895,000	Virginia	349,000
Missouri	797,000	North Carolina . .	315,000
Michigan	814,000	Louisiana	268,000
Kansas	726,000	Vermont	268,000
Indiana	646,000	North Dakota . . .	339,000
Nebraska	625,000	West Virginia . . .	234,000
Oklahoma	494,000	Washington	253,000
California	541,000	South Carolina . . .	185,000
Oregon	210,000	Idaho	120,000
Massachusetts . . .	157,000	Montana	114,000
Maryland	177,000	Utah	92,000
Maine	157,000	New Mexico	68,000
New Jersey	146,000	Delaware	41,000
Colorado	205,000	Wyoming	46,000
Connecticut	118,000	Arizona	44,000
Florida	133,000	Rhode Island	23,000
N. Hampshire . . .	95,000	Nevada	24,000
Total for United States		21,262,000	

10 THE COW MAKES FARMING MORE PROFITABLE

Map of United States Showing Value of Dairy Products. Each Dot Represents \$100,000.

Value of Dairy Products by States, 1909

State	Census, 1909	State	Census, 1909
New York	\$74,939,815	Washington . . .	\$7,693,479
Wisconsin	51,238,399	Nebraska	7,631,658
Pennsylvania . .	38,363,882	Connecticut . . .	7,325,433
Illinois	26,720,849	Maine	6,722,779
Iowa	26,429,743	Texas	5,461,423
Ohio	25,574,635	Oregon	5,170,703
Minnesota	25,214,222	N. Hampshire . .	5,130,057
Michigan	22,099,178	Maryland	4,900,348
California	19,083,297	South Dakota . .	4,501,430
Massachusetts . .	14,840,927	Virginia	3,772,617
Indiana	12,768,710	Kentucky	3,729,237
Vermont	11,501,577	Colorado	3,407,723
New Jersey	9,685,352	Oklahoma	3,366,515
Kansas	9,549,129	Tennessee	3,211,978
Missouri	8,187,856	North Dakota . .	2,876,298
West Virginia . .	2,532,324	Alabama	1,358,504
Rhode Island . . .	2,017,444	Mississippi	1,001,562
Georgia	1,974,011	Delaware	966,173
North Carolina . .	1,787,245	Arizona	842,210
Utah	1,648,655	South Carolina . .	626,305
Montana	1,646,693	Florida	578,715
Louisiana	1,588,338	Nevada	443,588
Arkansas	1,505,882	New Mexico	434,199
Idaho	1,379,390	Wyoming	338,925

Total for United States \$473,769,412

Creameries in United States, 1914. Each Dot Represents One Creamery.

Number of Creameries by States, 1914

State	Number	State	Number
Minnesota . . .	848	N. Hampshire.	27
Wisconsin. . . .	812	Maine.	26
New York	576	Oklahoma. . . .	25
Iowa	562	Montana	25
Pennsylvania. .	445	Massachusetts	19
Ohio.	307	Idaho	18
Michigan	273	New Jersey. . .	13
Illinois	216	Virginia	12
Vermont.	181	Wyoming. . . .	10
California. . . .	152	Tennessee. . .	9
Indiana.	111	Delaware	8
South Dakota .	99	New Mexico. . .	7
Oregon	99	West Virginia .	6
Washington. . .	96	Nevada.	6
Texas	95	North Carolina	5
North Dakota.	67	Kentucky. . . .	5
Nebraska	52	Arkansas. . . .	4
Maryland. . . .	44	Louisiana. . . .	3
Kansas	43	Alabama.	3
Colorado. . . .	41	Mississippi. . .	2
Missouri. . . .	39	Arizona.	2
Utah.	38	Rhode Island. .	1
Connecticut. . .	29	South Carolina	1
		Georgia.	1

Total for United States 5,463

Map Showing Number Cheese Factories in United States in 1914. Each Dot Represents One Cheese Factory.

Number of Cheese Factories by States, 1914

State	Number	State	Number
Wisconsin.....	1,720	Utah.....	8
New York.....	995	Maine.....	5
Michigan.....	196	Missouri.....	4
Ohio.....	111	Virginia.....	3
Pennsylvania..	106	North Dakota..	3
California.....	93	Arizona.....	3
Minnesota....	74	N. Hampshire..	2
Illinois.....	50	Connecticut...	2
Oregon.....	42	Delaware.....	1
Vermont.....	35	West Virginia .	1
Iowa.....	25	South Dakota .	1
Washington...	15	Nebraska.....	1
Indiana.....	13	Oklahoma.....	1
Colorado.....	8	Montana.....	1
		Kansas.....	1

Total, United States.....3,520

WHAT'S A HOME WITHOUT A COW?

As land, labor and feed increase in price, the cow will more and more displace the strictly meat producing farm animals.

She produces human food with greater economy than does the steer, sheep, or pig. The U. S. Census for 1910 shows an increase of about 20 per cent in dairy stock, while the total number of all cattle has decreased.

There is always an air of permanence and prosperity about a well-handled dairy farm. A man feels inde-

pendent when he knows his income is steady. The dairy business is a cash business. It calls for intellectual activity. The success of the man engaged in it depends upon his using his head, developing his judgment. The successful dairyman must live on the farm. His business requires his personal attention. He cannot live in town and expect the hired man out on the farm to take the same interest in the business that he would take himself.

Dairying builds up the farm. It requires fewer acres to produce a good living on a dairy farm than on a grain farm, and consequently leads to closer neighbors and more thickly-settled communities. The cow converts cheap rufage into profit, builds big red barns, means living on the farm—dairy communities are prosperous communities.

Don't keep three cows to produce 12,000 pounds of milk when two better cows will do it with the same amount of feed.

FOOD VALUES: BOTH GOOD, COW BETTER

A Holstein cow owned by the Dairy Department of the University of Missouri in one year produced more human food in her milk than is contained in the complete carcasses of four steers weighing 1,250 pounds each. This statement, impossible as it seems, is not only true, but does not even do full justice to the cow. The solids in the milk, which are completely digestible, are counted against the entire carcass of the steer, only part of which is edible.

Princess Carlotta is the cow that performed this feat. In one year she produced 18,405 pounds of milk. Below is given the amount of proteids, fat, sugar, and ash contained in this milk, and the amount of the same substances found in the carcass of a fat steer weighing 1,250 pounds, in an analysis made by Dr. P. F. Trowbridge.

	18,405 pounds milk	1,250-pound steer
Proteids.....	552 pounds	172 pounds
Fat.....	618 pounds	333 pounds
Sugar.....	920 pounds	none
Ash.....	128 pounds	43 pounds
	<hr/>	<hr/>
	2,218 pounds	548 pounds

The total amount of dry matter in the milk was 2,218 pounds, all of which is edible and digestible.

The steer, with a live weight of 1,250 pounds, contained 56 per cent of water in the carcass, leaving a total of 548 pounds of dry matter. In this dry matter of the steer is included hair and hide, bones and tendons, organs of digestion and respiration, in

fact, the entire animal, a considerable portion of which is not edible. The analysis of the steer's carcass was made from samples taken after grinding up one-half of the complete carcass and is not in any sense an estimation of the composition of the carcass.

Princess Carlotta produced proteids sufficient for more than three steers; nearly fat enough for two; ash enough to build the skeletons for three, and in addition, produced 920 pounds of milk sugar worth as much per pound for food as ordinary sugar.

It is because of this economical use of food that the dairy cow and not the steer is kept on high-priced land. When land is cheap and feed abundant the meat producing animals predominate, but when the land becomes high in value and feed expensive the farmer turns to the dairy cow.

WHAT A DAIRY COW CAN DO

In seven milking periods Katy Gerben produced 115,120 pounds of milk and 4,715 pounds of butter. This is an average of 16,446 pounds of milk and 674 pounds of butter for each milking period. In seven milking periods she has produced food nutrients in her milk equal to 39,879 pounds of beef.

It would require 47 steers weighing 1,400 pounds to produce this amount of beef. At 10c per quart she has given \$5,317 worth of milk.

KATY'S WORK TO AUGUST 1, 1915

Milk from Katy and Her Female Descendants, 282,255 pounds, or 131,281 quarts at 10c.....	\$13,128.10
Seven Bull Calves from Katy and Her Female Descendants.....	2,575.00
Descendants, in Herd, Five Heifers and One Bull.....	3,000.00
Income for which Katy is responsible.....	\$18,703.10

COW, GREATEST PRODUCER OF HUMAN FOOD—Prof. T. L. Haecker, for the past 23 years chief of the Dairy Division of the Minnesota Experiment Station,

says:

“It is interesting to learn that the cow, Lady Oak, in one day produced in the form of milk, human food equal in value to the food contained in the body of a calf weighing 115 pounds. In a year’s record this cow produced 993 pounds of fat, 631 pounds protein, and 1,052 pounds carbohydrates.

This product was

equal to 266 calves weighing 125 pounds each, or 142 calves weighing 200 pounds each; 28 yearlings weighing 500 pounds each, or 5 steers weighing 1,100 pounds each. Her daily yield of solids in winter was equal to 22.3 pounds of gain in a steer. These figures indicate the wonderful efficiency of the dairy animal as an economical producer of human food.”

Dairy Herd of Wm. H. Peters, Huntley, Illinois

THE COW BEFORE THE JURY

Know your cow. The man who owns a good cow, and knows it, is indeed fortunate. The same holds true of the

man who owns a poor cow and knows it, and has enough good judgment to send her to the butcher rather than to sell her to his neighbor for a star boarder in the herd. The good cows of the man who knows, have records, and are generally too valuable to sell. It is the man who milks cows day after day but considers it too much

bother to weigh and test the milk, who needs to know something about cow values.

Many farmers have owned cows which they thought were just ordinary individuals, and which they were induced to sell at a low price, only to learn later that they had missed an opportunity to develop great cows. This has been true with a large number of record cows in the leading dairy breeds. If the original owner had realized the returns on the time required to keep accurate records he would surely have profited many times over. Again many men have been misled as to the value of their cows that give a large flow of milk at freshening time, but decrease rapidly as their lactation period advances. An accurate record on every animal in the herd will solve the problem and reveal some surprising facts to every cow owner, regardless of his ability to select animals by their external characteristics. The chart shows the cow before the jury. When this jury sits in judgment on your cow, there will be no guessing afterward.

THE VERDICT OF THE JURY

dict of the jury" was:

that this one average cow gave an annual profit of about \$31.25, while the profit from 40 poor cows, in one whole year, was only \$31.00 — about the same as the profit received on the one cow. The one cow is the average of the $\frac{1}{4}$ best of 554 cows in 36 Illinois dairy herds, while the 40 cows are

the average of the $\frac{1}{4}$ poorest of the same 554 cows in 36 Illinois dairy herds. (Ill. Cir. 118). The poor cows each gave a profit of $\frac{1}{4}$ of a cent every 4 days, or about 77 cents per cow profit for the whole year, after deducting \$30 a year for feed. Each one of the poor cows required on an average, just as much feed and care as the average good cow which gave the owner, after deducting \$38 per year for feed, a net profit of \$31 a year; or, in other words, the 40 poor cows took 40 times as much feed and care as the one average cow. These calculations allow the skim milk, calf, and manure, to pay for the labor and interest on the investment.

The lowest 139 cows (one-fourth of all) yielded an average of 133½ pounds of butter fat during the year, and the highest 139 cows produced an average of 301 pounds butter fat.

139 Poor Cows Made \$107; 139 Good Cows, \$4,000

The profit from the whole 139 poor cows was only \$107, but the clear money from the best 139 cows amounts to more than \$4,000. Herds of these two kinds would have to be kept in the

following comparative numbers to produce exactly the same profit for the owner.

Good Cows	Poor Cows
1 Cow equals	41 Cows
15 Cows equal	612 Cows
25 Cows equal	1,021 Cows

Twenty-five cows of the better kind would return the dairyman a clear profit of \$783 per year. They could be kept on an 80-acre farm; they would require a barn only 32x45 feet and a 100-ton silo, and the cows themselves at \$70 per head would cost only \$1,750.

Cows differ widely in their productive ability and the only accurate measure of a cow's production is obtained by weighing and testing her milk. The most practical method is found in the co-operative cow testing association since it furnishes a cheap, accurate method of testing.

BRIDGET

The poorest cow in an Indiana cow-testing association that produced only 2672 pounds of milk and 118 pounds of butter fat and made only \$3.15 income over the cost of feed.—Information and photograph furnished by C. R. George, Dairy Division, Lafayette, Indiana.

GET RID OF THE POOR DAIRY COW
The poor dairy cow cuts down the profit—She takes time, labor, feed and care—The cow-testing association will do it.

1. The cow-testing-association puts your dairy operations on a business basis.

2. The profit and loss account enables you to cull out the unprofitable cows.

3. The yearly records will indicate the high producers from which the calves should be saved to build up the herd.

4. The official tester is an expert on dairy subjects. His advice is yours for the asking. It will help you.

5. This information will enable you to introduce the most economical methods of feeding and the most up-to-date methods of handling your herd.

6. You can co-operate through your organization in the purchase of feed, in developing a better market for products, and in holding dairy meetings.

7. It fosters a better community spirit among the dairymen and breeders.

8. The cow-testing association is the cheapest and best way to keep records of your dairy herd.

According to the Department of Agriculture, there were 163 co-operative cow-testing associations in this country in 1914. Inasmuch as the first of these associations was formed in Michigan in 1905, this seems like a rapid growth until we consider the fact that in Europe there are nearly 3,000 such associations. Those who have had experience with these associations are united

in the opinion that every dairy community should have such an association.

The average dairy cow of this country produces something like 4,000 pounds of milk in a year and approximately 160 pounds of butter fat. This is not profitable dairying, according to the best authorities. Yet farmers cannot greatly increase dairy production unless they apply the scales and Babcock test to their individual cows and find out which cows pay for their food and which do not. The co-operative cow-testing association enables all the dairy farmers of a community to test all their cows. With an average of 25 members, the cost of such an association usually amounts to from \$1 to \$1.50 per cow per year.

Results of Cow-Testing Associations

What are the results from conducting a cow-testing association? To quote from the government report, "Seven herds in Michigan have remained continuously in the Michigan association since it was formed in 1905. In 1906, the average yield for each cow was 5,885 pounds of milk and 231.1 pounds of butter fat. In 1913 the average yield per cow was 6,123.4 pounds of milk and 284.7 pounds of fat. The profit from each cow was \$22.23 in 1906; in 1913 the profit per cow was \$51.08, or an increase of \$28.85 per cow."

Improvement in dairy production necessitates an improvement in the dairyman as well as improvement in the cow, and improvement in the dairy methods. The cow-testing association opens the dairyman's eyes and makes his business an exact profession.

The plan of the co-operative cow-testing association came from Denmark in 1895. Ten years later the testing association with some modifications was introduced into the United States.

You Can Have A Cow-Testing Association

The co-operative cow-testing association is founded on the principle that a number of dairymen who are situated near each other in a given community can organize and employ a man to do their testing cheaper and more satisfactorily than they can do it themselves. The most convenient association to operate is one composed of 26 members. This number permits the tester to spend one day of each month at each place without having to work Sundays or holidays. In some associations the tester fur-

nishes his own horse and buggy and drives from place to place, in others, each farmer takes him to the next testing place.

Duties of the Tester

The tester, supplied with an outfit, arrives at the home of the dairyman in the afternoon, weighs and takes a proportionate sample of the milk of each cow separately, and weighs the feed which she consumes. In the morning he repeats these operations. The samples from the evening and morning milkings are put together to form composite samples which are tested for butter fat. To find the production for the month, the tester multiplies his results for the day by the number of days in the month. The yearly production is the sum of twelve monthly credits.

In addition to the duties named in his contract, the tester is expected to concern himself with the welfare of the dairy interests of the community in which he works. He should be qualified and willing to assist the farmer in such problems as the balancing of rations and the planning of improvements.

Things Dairymen Should Remember

1. The cows do not know they are in a testing association and will not give more milk because of that fact alone.

2. If your herd does poorly the first year, do not blame the association and drop out. Remember that a knowledge of the producing qualities of each cow in your herd is essential if you desire to improve.

3. A dairy cow is a factory for the production of milk, but corn fodder and timothy hay are not the proper raw materials to use.

4. Alfalfa or clover hay and ensilage can be converted into milk by the dairy cow more easily than any other rufage except grass, therefore, we will do well to supply these feeds if possible.

5. Cow's milk is about 87 per cent water. Therefore, spare no efforts in making it pleasant and convenient for them to obtain a large supply which is pure, fresh and of the right temperature.

6. A dairy cow appreciates kindness and regularity. Loud talking, cursing and abuse should not be allowed in the dairy barn.

7. A warm, well-lighted, well-ventilated barn, kept in sanitary condition, will contribute much, not only to the comfort of the cows but to the owner as well. (Iowa Bul. No. 13.)

PIONEER TEST ASSOCIATION

The Pioneer Cow-Testing Association has been in operation in Iowa since 1909. Next to getting rid of the poor cow the greatest need in Iowa dairying today is better methods of feeding and care for the dairy herd.

The man who keeps cows that produce 349 pounds of butterfat a year can pay \$20 per acre rent and make as much profit as his neighbor who keeps cows that average 191 pounds of butterfat a year and pays \$6 per acre rent.

The 349 pounds of butterfat a year is the average of the best 75 cows in the Pioneer Association. The 191 pounds is the average of the poorest 75 cows in the same association.

Testing Takes the Guess Out of Dairying

Ten years in a cow-testing association ought to bring almost any Iowa herd up to an average production of 349 pounds of butterfat a year. **The testing association takes the guess out of the business, eliminates the poor cow, and improves the feeding and management. It is a simple, economical and efficient method of increasing the butterfat production of cows.** One hundred forty-seven unprofitable cows were sold as a result of the first year's work in the Benson and Pioneer Associations.

The Pioneer Test Association is reaping the benefits of organized effort, not only through the increased profit from its dairy animals, but also through the demand which it is creating for surplus stock. Prospective buyers have their eyes on these communities, and surplus stock will be snapped up at advanced prices.

Don't Be a Tail-ENDER

The test association encourages better methods by promoting friendly competition between its members. No man likes to be at the tail end of the procession, therefore the careless farmer adopts some of the ways of the careful farmer. Better feeding methods prevail, cracks in barns are nailed up, manure is hauled out, and buildings are kept cleaner and more sanitary. One creameryman expressed himself as follows: "I can tell the milk that comes from the herds in the test associations by opening the cans. It is cleaner and sweeter." The spirit of improvement spreads from the members of the association to their neighbors and the whole community is benefited.

While it is impossible to get definite figures on the subject it is probably true that the entire cost of running the Pioneer Test Association was saved through the purchasing of feeds in large quantities, and through improved methods of feeding, to say nothing of the increased butterfat production of the cows. Two to three dollars a ton can usually be saved on protein feeds by purchasing in carload lots. Why not add this saving to the dairy account?

Grow Your Own Feed

But it is not necessary to buy protein feeds. Grow them on the farm in the form of alfalfa, soy beans, cow peas, clover, and the other legumes. Alfalfa can be grown for about \$5 a ton, while wheat bran costs from \$20 to \$30 a ton.

Perhaps the men you hire do not like to milk cows. If not, get them together and talk the matter over. Discuss the difference in the producing power of cows and the value of different feeds for milk production. Line the cows up in a row and study them.

Perhaps your boy looks upon milking as a drudge. Drudgery is "labor without thought." Increase the interest of your boys in the cow and the drudgery will disappear. Divide the cows between your boys and the hired man and offer a prize to the one who gets the most butterfat from his cows during the year. It will be money well spent. Or, better still, you can afford to take your own boys into partnership and offer them a percentage of the net profits. Make them feel that they are part of the business and they will milk the cows dryer, feed them better, and pound them less.

COW-TESTING ASSOCIATION WILL MAKE MONEY FOR YOU

(Iowa Bulletin No. 13)

1. Two thousand, nine hundred and fifty yearly records from 177 different herds have been completed in the five cow-testing associations which have been organized in Iowa since 1909.

2. The average cow in the cow-testing association produced 217 pounds of butter fat per year at a net profit of \$32.77, after paying for the feed at market prices less the cost of hauling.

3. If the 1,500,000 milch cows of Iowa produced as much butter fat per year as the average cow in the cow-testing associations, it would mean an increased production for the state of 115,500,000 pounds of butter fat per year, worth at 30 cents per pound, \$34,650,000.

4. The most profitable cow returned her owner a net profit of \$125, while the poorest cow lacked \$25.92 of paying for her feed.

5. There were good cows and poor cows in every herd. The best cow from each herd returned an average of \$55 net profit per year, while the poorest cow from each herd returned but \$15.12 net profit per year.

6. The most profitable herd netted its owner \$71.22 per cow in one year, while the poorest herd was kept at a loss of 63 cents per cow.

7. Two hundred and fifteen, or 7 per cent, of the cows produced over 300 pounds of butter fat per year, while 321, or 11 per cent, were under 150 pounds. If all the yearly records had been as high as the 215 high ones, it would have meant an increased income of \$91,470.00.

8. The cows fed silage produced 27 pounds more butter fat and \$2.86 more net profit per year than those not fed silage.

9. The cows freshening in the fall produced 27 pounds more butter fat per year than those freshening in the spring and returned \$7 greater net profit.

10. The average net income from cows in the cow-testing associations, from two to ten years old, was \$314.22, or nearly \$35 per year.

11. Any member of a cow testing association can raise the production of his herd to a yearly average of

300 pounds of butter fat within six or seven years if he will eliminate the unprofitable cows, save heifers from high producers, use a pure bred sire from high producing ancestors and give more thought and attention to the feeding and care of the animals.

12. The cow testing association is the most efficient and economical method of detecting the loafers in the herd. It puts dairying on a business basis, arouses the interest of the owner, his boys, and hired man in the cows, stirs up local pride by bringing the people of the community together to talk over their business, and helps to make farm work enjoyable and interesting.

BABCOCK TEST BEST DETECTIVE

Discover the Boarders by Testing and Weighing Milk

By D. J. VINCENT,
Silver Lake, Wisconsin

The important essentials in conducting a profitable dairy business are namely:

Feeding, Breeding, Care and Selection.

I will briefly state our conclusions in regard to the above named essentials after having experienced in raising the daily production of the average cow in our herd from 16 to 30 lbs. of milk when fresh, up to 40 to 60 lbs. just because we paid attention to these points.

Feeding: For feed we grow all the rufage on the farm, silage for succulence and a leguminous hay such as alfalfa or clover. Part of the concentrates are grown on the farm and enough high protein feeds are purchased to make up a well balanced ration.

Breeding: As for breeding we believe the sire is more than half the herd and careful attention has been given to the selection of pure-bred sires that are good individuals as well as having good ancestors.

Care: We have found that it pays to house the dairy cow in a barn that is well lighted and ventilated. Also we have learned that the dairy cow will respond to good treatment.

Selection: The scales and Babcock tester are used as detectives and enable us to keep our herd free from star boarders as well as help us in saving the heifers from the best producers for our future herd.

YOU CAN HAVE A SILO

A silo should be a part of the permanent improvements on every farm. There is no doubt as to its advantages.

It is essential for the economical feeding of live-stock, and especially for the profitable production of milk. The results of hundreds of feeding experiments conducted in the past ten years with silage as a part of the ration give proof of its great value to the farmer.

A great many of our old methods are

wasteful. There will always be more or less of the corn crop shocked in the field, but corn left exposed to the weather loses from 25 to 30 per cent of its feeding value. Why waste the crop after you have grown it, when you can put it in a silo and preserve it with all its succulence?

There is very little loss in feeding silage. When you feed the fodder to the cattle, there is a great deal of loss. Cattle refuse to eat the stalks and they are wasted.

The acids and the juices in the silage aid digestion and help the stock utilize other feeds, such as oat straw and other cheap rufage. One of the good things about the silo is that any of the forage crops properly siloed make good feed; but corn is the best crop for the silo. United States Farmers' Bulletin 556 furnishes twelve good reasons why every farmer should have a silo:

Twelve Silo Reasons

1. More feed can be stored in a given space in the form of silage than in the form of fodder or hay.

2. There is a smaller loss of food material when a crop is made into silage than when cured as fodder or hay.

3. Corn silage is a better feed than corn fodder.
4. An acre of corn can be placed in the silo at less cost than the same area can be husked and shredded.
5. Crops can be put in the silo during weather that could not be utilized in making hay or curing fodder.
6. More stock can be kept on a given area of land when silage is the basis of the ration.
7. There is less waste in feeding silage than in feeding fodder. Good silage properly fed is all consumed.
8. Silage is very palatable.
9. Silage, like other succulent feeds, has a beneficial effect upon the digestive organs.
10. Silage is the cheapest and best form in which a succulent feed can be provided for winter use.
11. Silage can be used for supplementing pasture more economically than can soiling crops, because it requires less labor and silage is more palatable.
12. Converting the corn crop into silage cleans the land and leaves it ready for another crop.

There is no best silo, generally speaking. The best silo for us is the one which can be constructed on the farm at the lowest cost and pays us the greatest profit. The best silo for us depends entirely upon our location and our conditions.

The Pit Silo

A pit silo or a bank silo may be the best. They are adapted to many sections. Regions which are passing through the pioneer stage of their development, where the cost of material, labor, and transportation is high, need not be without a silo. Kansas, Nebraska, and Colorado farmers have constructed more than 1,000 pit silos in the past two years. In Montana, the Dakotas, and other northern states where the winters are severe, the pit silo is in general use. It not only gives perfect satisfaction, but it is the best silo for these cold regions.

Many people condemn this type of silo, but experience and investigation prove that it has many advantages.

Where the conditions are right, whether it be in the humid regions of the Corn Belt or in the semi-arid or dry sections, the pit silo if properly constructed will give good satisfaction.

A number of them are in use in Wisconsin, Iowa, Mississippi, and other states.

One of these silos can be constructed for \$20 to \$50.

Pit silos are not suitable for localities where the ground water is near the surface. They are nothing more than large cisterns dug in the ground 20 or 30 feet deep, cemented $\frac{3}{4}$ of an inch to 1 inch thick, and equipped with a derrick or other hoisting apparatus for taking out the silage; sometimes a block and tackle and a horse, or a hand windlass, is used.

A carrier may be constructed so as to distribute the silage along the feed racks instead of dumping it in one place.

Advantages of the Pit Silo

1. Small cost of construction.
2. Less expense in filling.
3. Is air-tight—keeps the silage in good condition the year round.
4. Maintains even temperature throughout the year.
5. Will not freeze up or blow down.
6. Can be constructed by the farmer at a slack time of the season without the aid of skilled labor.

The Pleasant Occupation of Hauling Corn Fodder in the Winter Time.

SILAGE MAKES CHEAP MILK—IT TAKES LESS GRAIN—Ohio experiment with eight cows for a period of four months, shows that one acre

of corn fed in the form of silage will produce from 35 to 50 per cent more milk than one acre fed as dry fodder. This experiment was carried on in Ohio (Ohio Bulletin 159). Eight cows were divided in two lots, four cows in each lot. The cows were fed for a period of four months. The object of the experiment was to

determine whether silage could be substituted for a considerable portion of the grain usually fed to dairy cows. The facts presented here justify the conclusion that silage can be made to take the place of a large portion of the grain ration.

Here is the average daily ration of the four cows in Lot 1, which received a grain ration: Stover 4.7 pounds; mixed hay, 6.4 pounds; oil meal, 2.5 pounds; corn meal, 3 pounds; wheat bran, 6 pounds.

Here is the average daily ration of the four cows in Lot 2, which received a silage ration: Silage, 58 pounds; mixed hay, 6.8 pounds; oil meal, 2 pounds; bran, 2 pounds.

In Lot 1 where grain composed the greater part of the ration the profit per cow was \$2.46. In Lot 2 where silage predominated in the feed, the profit per cow was \$5.86.

In Lot 1 where grain predominated, it cost \$1.06 to produce 100 pounds of milk, as compared with 69 cents in Lot 2, where silage was fed in excess of the grain.

Out of more than one hundred letters received from county agriculturists and prominent dairymen from nearly every state in the United States, the Agricultural Extension Department of

the International Harvester Company found it to be the general opinion that one acre of corn fed in the form of silage will produce 35 to 50 per cent more milk than one acre of corn fed as dry fodder.

ALFALFA AND SILAGE MEAN SUCCESS

Have Machinery to Do the Work and Reduce Expenses of Running the Dairy

By RAY BILYEA,
Walworth, Wisconsin

Dairying is a profitable business if the farmer does the work himself. The work is nothing compared to what it used to be, as there are all kinds of machinery for a farmer to use. There are four farmers here that went together and bought a silo filler and an International Mogul Engine to do their own silo filling. They also do a little outside work in exchange for help to fill their own silos.

I am taking care of 28 head of cattle on 97 acres and doing it alone. I have a milking machine, so that reduces the expense of a hired man. Three acres of alfalfa produced 16 tons of hay this last year and there is no better hay for cows giving milk. **Alfalfa and silage are the main secrets of profitable dairy farming.** The grain I feed is oats two-fifths, barley two-fifths, shelled corn one-fifth, ground, weighing in all 900 lbs. and mixed with 200 lbs. of bran and 100 lbs. of oil meal.

SILO—ALFALFA—GOOD STOCK SAVE MANURE

By JOE GRESSER,
Wheeler, Indiana

1st: Have a silo or two and good clover hay, or alfalfa.

2nd: Have a pure bred sire for the herd and raise all heifer calves.

3rd: Operate a separator and feed the skimmed milk to the calves.

4th: Put all manure back on the land to raise better crops.

GROW YOUR PROTEIN—DON'T BUY IT

This is the result of an experiment in feeding milk cows at the Illinois Experiment Station.

The cows were divided into two lots. Lot No. 1 was fed for nine weeks on alfalfa, and Lot No. 2 on bran. They had other feeds, too, but in similar quantities.

The point is that the rations were similar, except that one lot received alfalfa and the other bran. The chart shows that the milk yield of those fed on alfalfa was, most of the time, a little above the milk production of those fed on bran.

At the end of the ninth week, the feeds were changed—those that had been fed on bran were changed to alfalfa and those fed on alfalfa were put on the bran ration.

Notice that immediately when Lot No. 2 was fed alfalfa the milk yield rose from 460 to 520 pounds, and that this lot kept above the other lot for a month. The total milk production for the nineteen weeks shows a balance of 375 pounds in favor of alfalfa feed.

This experiment was begun in December with fresh cows, which accounts for the decreasing yield.

Besides being as good as bran as a feed for dairy cows, alfalfa costs less than bran. The growing of it enriches the land, and keeps the money at home.

FEEED FOR THE DAIRY COW—GROW ALL OF IT YOU CAN—With few exceptions, any dairy farm located within the Corn Belt, will produce all the rufage

and the greater part of the concentrates needed for the dairy herd.

Growing the necessary feeding stuffs may increase the farm labor, but in the end will pay the farmer a handsome profit for his work. Corn and sorghums can be grown over a large portion of the United States. These crops furnish both concentrates and roughage. Alfa'fa

and red clover can be grown on nearly every farm in the northern Corn Belt, while cowpeas, soy beans, lespedeza, velvet beans, and bur clover are adapted to the cotton belt states. These crops furnish the protein feeds.

Silage, stock beets, turnips, sorghums, etc., are excellent succulent feeds.

Every farmer should grow on the farm, as nearly as possible, the crops which will furnish a balanced ration for his stock. (See page 36 for feeding rations for the dairy cow.)

Don't Feed Timothy To Dairy Cows

To profitably feed dairy cows the feeder must have a knowledge of what the cow requires and feed that which will best meet her requirements.

Much has been written about feeding balanced rations, but in spite of this the balanced ration is very much misunderstood. Many farmers imagine that it is something new-fangled and

FEED FOR THE DAIRY COW			
GROW ALL OF IT YOU CAN			
HAY			LBS
ALFALFA	CLOVER		
	COW PEAS	SOY BEANS	8-10
TIMOTHY	RED TOP	PRAIRIE HAY	
GRAIN			
CORN	KAFIR	OATS	BARLEY
			BRAN
			4- 8
COT'N	SEED	MEAL	GLUTEN FEEDS
			1- 3
JUICY FEEDS			
SILAGE	SORGHUM	ROOTS	28-40
RUFAGE			
CORN	FODDER	CORN	STALKS
STRAW			
			ALL THEY WILL EAT

impractical. This is not true. A balanced ration is simply a ration in which the nutrients contained are in the right quantity and proportion to secure the largest quantity of the best milk, at the least cost.

In making up rations for dairy cows, those feeds which are grown on the farm should be used as extensively as possible. Feeds which are grown on the farm are much cheaper than those which are purchased.

Corn silage should always be a part of the dairy cow's ration, except when the cow is on rich pasture. Corn silage, however, is not a balanced ration. Some grain and hay should be fed with it. From 30 to 40 pounds of silage a day, fed in two feeds, will be sufficient for a cow unless she is a very large animal.

One of the greatest mistakes that many dairymen make is that of feeding timothy hay to milk cows. Timothy hay has its uses, but much better feeds can be found for milk-producing cows. Alfalfa, clover, cowpea hay, vetch hay, soy bean hay and velvet bean hay are crops, one or more of which are adapted to most localities, which furnish the most desirable dry rufage for dairy cows.

Local prices, to some extent, must be taken into consideration when selecting the concentrated or grain portion of the ration. The prices of the feeds vary in different localities. Hence, in buying concentrates, two things should be considered, first, and above all else, the nutritive value of the feed, second, prices on the local market.

The greatest mistake we make, next to feeding "scrub" cows, is the "scrub" feeding of good cows.

FOOD VALUES IN FARM FEEDS

Feeding Stuff	Water	Ash	Crude Pro- tein	Carbohydrates		Fat
				Crude Fiber	N-Free Extract	
Green Fodder and Silage						
	%	%	%	%	%	%
Alfalfa.....	71.8	2.7	4.8	7.4	12.3	1.0
Clover—Red....	70.8	2.1	4.1	8.1	13.5	1.1
Corn Fodder....	79.3	1.2	1.9	5.0	12.2	0.5
Corn Silage.....	74.4	1.5	2.2	5.8	15.0	1.1
Rye Fodder.....	76.6	1.8	2.6	11.6	6.8	.6
Timothy.....	61.6	2.1	3.1	11.8	20.2	1.2
Hay and Dry Coarse Fodders						
Alfalfa Hay.....	8.4	7.4	14.3	25.0	42.7	2.2
Clover Hay—Red	15.3	6.2	12.3	24.8	38.1	3.3
Corn Forage— Field cured....	42.2	2.7	4.5	14.3	34.7	1.0
Cowpea Hay....	10.7	7.5	16.6	20.1	42.2	2.9
Oat Hay.....	16.0	6.1	7.4	27.2	40.6	2.7
Soy Bean Hay...	11.3	7.2	15.4	22.3	28.6	5.2
Timothy Hay...	13.2	4.4	5.9	28.0	45.0	2.5
Straws						
Oat Straw.....	9.2	5.1	4.0	37.0	42.4	2.3
Rye Straw.....	7.1	3.2	3.0	38.9	46.6	1.2
Wheat Straw....	9.6	4.2	3.4	38.1	43.4	1.3
Grains						
Barley.....	10.9	2.4	12.4	2.7	69.8	1.8
Corn.....	10.9	1.5	10.5	2.1	69.6	5.4
Oats.....	11.0	3.0	11.8	9.5	59.7	5.0
Rye.....	11.6	1.9	10.6	1.7	72.5	1.7
Wheat.....	10.5	1.8	11.9	1.8	71.9	2.1
By-Products						
Cottonseed Meal.	8.2	7.2	42.3	5.6	23.6	13.1
Linseed Meal....	9.2	5.7	32.9	8.9	35.4	7.9

SILAGE RATIONS FOR DAIRY COWS

(From Modern Silage Methods)

THE combination in which corn silage will be used in feeding milch cows will depend a good deal on local conditions; it may be said in general that it should be supplemented by a fair proportion of nitrogenous feeds, like clover hay, wheat bran, ground oats, linseed meal, gluten feed, cottonseed meal, etc. As it may be of some help to our readers, a number of balanced rations, or such as are near enough balanced to produce good results at the pail, are presented below.

Silage Rations for Milch Cows

No. 1. Corn silage, 35 lbs.; hay, 8 lbs.; wheat bran, 4 lbs.; ground oats, 3 lbs.; oil meal, 2 lbs.

No. 2. Corn silage, 50 lbs.; corn stalks, 10 lbs.; corn meal, 2 lbs.; wheat bran, 4 lbs.; malt sprouts, 3 lbs.; oil meal, 1 lb.

No. 3. Corn silage, 40 lbs.; clover and timothy mixed, 10 lbs.; wheat shorts, 3 lbs.; gluten feed, 3 lbs.; corn and cob meal 3 lbs.

No. 4. Corn silage, 20 lbs.; corn stalks, 10 lbs.; hay, 4 lbs.; wheat bran, 4 lbs.; gluten meal, 3 lbs.; ground oats, 3 lbs.

No. 5. Corn silage, 40 lbs.; clover hay, 10 lbs.; oat feed, 4 lbs.; corn meal, 3 lbs.; gluten feed, 3 lbs.

No. 6. Corn silage, 45 lbs.; corn stalks, 5 lbs.; oat straw, 5 lbs.; dried brewers' grains, 4 lbs.; wheat shorts, 4 lbs.

No. 7. Corn silage, 35 lbs.; hay, 10 lbs.; corn meal, 3 lbs.; wheat bran, 4 lbs.; oats, 3 lbs.

No. 8. Corn silage, 40 lbs.; corn stover, 8 lbs.; wheat bran, 4 lbs.; gluten meal, 2 lbs.; oil meal, 2 lbs.

No. 9. Corn silage, 20 lbs.; clover and timothy hay, 15 lbs.; corn meal, 3 lbs.; ground oats, 3 lbs.; oil meal, 2 lbs.; cottonseed meal, 1 lb.

No. 10. Clover silage, 25 lbs.; corn stover, 10 lbs.; hay, 5 lbs.; wheat shorts, 2 lbs.; oat feed, 4 lbs.; corn meal, 2 lbs.

No. 11. Clover silage, 30 lbs.; dry fodder corn, 10 lbs.; oat straw, 4 lbs.; wheat bran, 4 lbs.; malt sprouts, 2 lbs.; oil meal, 2 lbs.

No. 12. Clover silage, 40 lbs.; hay, 10 lbs.; roots, 20 lbs.; corn meal, 4 lbs.; ground oats, 4 lbs.

The preceding rations are only intended as approximate guides in feeding dairy cows. Every dairy farmer knows that there are hardly two cows that will act in exactly the same manner and will need exactly the same amount of feed. It is then important to adapt the quantities and kinds of feed given to the special needs of the different cows; one cow will fatten on corn meal, where another will be able to eat and make good use of two or three quarts of it. In the same way some cows will eat more rufage than others and do as well on it as those that get more food in the form of more concentrated and highly digestible feeding stuffs. The only safe rule to go by is to feed according to the different needs of the cows; study each cow and find out how much food she can take care of without laying on flesh, and how she responds to the feeding of foods of different character, like wheat bran and corn meal, for instance. The specimen rations given in the preceding can, therefore, only be used to show the average amount of common feeds which a good dairy cow can take in and give proper returns.

New Jersey Experiment Station. (1)—40 lbs. corn silage, 5 lbs. gluten feed, 5 lbs. dried brewers' grains, 2 lbs. wheat bran.

(2)—35 lbs. corn silage, 5 lbs. mixed hay, 5 lbs. wheat bran, 2 lbs. each of oil meal, gluten meal and hominy meal.

(3)—40 lbs. corn silage, 5 lbs. clover hay, 3 lbs. wheat bran, 2 lbs. malt sprouts, 1 lb. each of cottonseed meal and hominy meal.

(4)—40 lbs. corn silage, 4 lbs. dried brewers' grain, 4 lbs. wheat bran, 2 lbs. oil meal.

Maryland Experiment Station. (1)—40 lbs. silage, 5 lbs. clover hay, 9 lbs. wheat middlings, and 1 lb. gluten meal.

(2)—30 lbs. silage, 8 lbs. corn fodder, 6 lbs. cow pea hay, 3 lbs. bran, 2 lbs. gluten meal.

Michigan Experiment Station. (1)—40 lbs. silage, 8 lbs. mixed hay, 8 lbs. bran, 3 lbs. cottonseed meal.

(2)—30 lbs. silage, 5 lbs. mixed hay, 4 lbs. corn meal, 4 lbs. bran, 2 lbs. cottonseed meal, 2 lbs. oil meal.

(3)—30 lbs. silage, 10 lbs. clover hay, 4 lbs. bran, 4 lbs. corn meal, 3 lbs. oil meal.

(4)—30 lbs. silage, 4 lbs. clover hay, 10 lbs. bran.

Kansas Experiment Station. (1)—40 lbs. corn silage, 10 lbs. prairie hay or millet, $4\frac{1}{4}$ lbs. bran, 3 lbs. cottonseed meal.

(2)—40 lbs. corn silage, 10 lbs. corn fodder, 4 lbs. bran, 2 lbs. Chicago gluten meal, 2 lbs. cottonseed meal.

(3)—40 lbs. corn silage, 5 lbs. sorghum hay, 3 lbs. corn, 1½ lbs. bran, 4 lbs. gluten meal, 1½ lbs. cottonseed meal.

(4)—30 lbs. corn silage, 10 lbs. millet, 4 lbs. corn, 1 lb. gluten meal, 3 lbs. cottonseed meal.

(5)—30 lbs. corn silage, 15 lbs. fodder corn, 2½ lbs. bran, 3 lbs. gluten meal, 1½ lbs. cottonseed meal.

(6)—30 lbs. corn silage, 15 lbs. fodder corn, 2½ lbs. bran, 3 lbs. gluten meal, 1½ lbs. cottonseed meal.

(7)—30 lbs. corn silage, 10 lbs. oat straw, 2 lbs. oats, 4 lbs. bran, 2 lbs. gluten meal, 2 lbs. cottonseed meal.

(8)—20 lbs. corn silage, 20 lbs. alfalfa, 3 lbs. corn.

(9)—15 lbs. corn silage, 20 lbs. alfalfa, 5 lbs. kaffir corn.

(10)—20 lbs. corn silage, 15 lbs. alfalfa, 4 lbs. corn, 3 lbs. bran.

(11)—40 lbs. corn silage, 5 lbs. alfalfa, 3 lbs. corn, 3 lbs. oats, 2 lbs. O. P. linseed meal, 1 lb. cottonseed meal.

Tennessee Experiment Station. (1)—30 lbs. silage, 10 lbs. clover or cowpea hay, 5 lbs. wheat bran, 3 lbs. corn, 2 lbs. cottonseed meal.

North Carolina Experiment Station. (1)—40 lbs. corn silage, 10 lbs. cottonseed hulls, 5 lbs. cottonseed meal.

(2)—50 lbs. corn silage, 5 lbs. orchard grass hay, 4½ lbs. cottonseed meal.

(3)—30 lbs. corn silage, 10 lbs. alfalfa, 6 lbs. wheat bran, 5 lbs. cottonseed hulls.

(4)—40 lbs. corn silage, 15 lbs. cowpea vine hay.

(5)—40 lbs. corn silage, 6 lbs. wheat bran, 6 lbs. field peas, ground.

(6)—40 lbs. corn silage, 4 lbs. cut corn fodder, 3 lbs. ground corn, 4 lbs. bran, 1 lb. cottonseed meal (ration fed at Biltmore Estate to dairy cows). Silage is fed to steers and cows, and corn, peas, teosinte, cowpeas, millet and crimson clover are used as silage crops. These crops are put into the silo in alternate layers. "Will never stop using the silo and silage."

South Carolina. (1)—30 lbs. corn silage, 6 lbs. bran, 3 lbs. cottonseed meal, 12 lbs. cottonseed hulls.

Georgia Experiment Station. (1)—40 lbs. corn silage, 15 lbs. cowpea hay, 5 lbs. bran.

KEEP BACTERIA, DIRT AND FILTH OUT OF MILK—This chart shows two forms of milk pails, one is the open top which catches all the filth, dirt, and germs,

while the other is mostly closed. Which do you think would save the milk in the cleanest condition? Which do you think would keep out the most dirt? The milk is contaminated by the stable dust which settles into the open pail. Besides carefulness in milking it is important to have clean utensils.

Live steam and sunlight are needed to complete the job of cleaning milk pails and cans. Washing them until they look clean is not enough.

The best way to wash milk cans and other milk vessels is to use warm water first to clean them of all that can be seen. Then rinse, then scald in boiling hot water or steam, and finally give them a sun bath.

An outside rack or shelf on the south side of the milk house is not difficult to make, and will do the sterilizing act jointly with hot water or steam in the most approved modern fashion. It is a fashion that never has been improved upon.

All utensils which come in contact with milk should be made of durable smooth, nonabsorbent material. Wooden utensils are hard to sterilize and therefore are not used in the best-equipped dairies. Badly battered or rusty ware is objectionable, as it is hard to clean, and contact with iron may injure the flavor of milk and milk products. Avoid all utensils having complicated parts, crevices, or inaccessible places which are hard to clean properly.

WE CAN IMPROVE OUR DAIRY BUSINESS

Here is some good dairy advice from Charles H. Benton, of Valparaiso, Indiana: The first and most important thing leading to success in the dairy business is that the farmer and all his help like the business. The cows must be controlled by kindness and not by the ancient method of foot, club and milk stool.

The next important thing is the keeping of proper records, not only of the receipts and expenditures but also

the annual profit from each individual cow. This may be done by weighing the milk, if not daily, at least once a week, and from these records the total for each week, month or year can easily be obtained. By testing the milk once a month you can easily get the value of the milk produced by each cow.

Many farmers are keeping too many boarder cows and this does not pay. The first year we weighed the milk from our herd, we set the standard that every cow under favorable conditions and proper feed must produce 6,000 pounds during the year. Any cow not producing 6,000 pounds of milk was to be sold. At the close of the first year, out of 35 cows we found 13 boarders and promptly sold them. At the close of the second year we did not have a single boarder and the cows produced from 6,000 to 12,000 pounds of milk each, during the year.

It pays to keep a pure bred sire at the head of your herd. Raise the calves from your best cows. Do not starve these calves, but feed them so they will grow into good big heifers. Breed them so they will be at least 2½ years old when fresh. By observing these conditions, you will be surprised at the increase of your milk or cream check.

Grow all the alfalfa hay needed. Have a summer silo as well as one for winter use. Buy only the mill feeds rich in protein, such as cotton seed meal and oil meal. Grow the carbohydrates in corn and barley. Weigh and test the milk from each cow. Keep a record of feed. In short, know what each cow is doing. Grow your milch cows. Use the best bred bull you can possibly afford to buy. Take an active part in all local farmers' organizations.

KNOW YOUR COWS

Begin With Good Foundation Stock—Breed Up— Feed Right—Care for Cows and You Will Make Money

By P. A. CAMPBELL,
Charles City, Iowa

Making the dairy business pay will depend first upon the selection of the right foundation animals, then in breeding them in such a way as to improve upon the foundation stock. The feeding, general care, and management is just as important as the breeding.

Many a good cow has been sacrificed because she has been poorly and wrongly fed, when if she had been handled by a successful feeder she would have produced a profit. It is essential that they shall be kept in a healthy condition at all times. The calves should be grown well, and then a steady consistent feeding of the right ration cannot help but produce results. **It is not always so much the amount of the ration as it is perhaps the ration fitted to the needs and demands of the cow.**

The average cow carries too little flesh for the most economical and proficient work. We like to feed so that she will be in good condition all of the time, but during the latter part of the lactation period will be steadily on the gain until such time as she freshens again. We like to keep the cow's bowels in a laxative condition, and to give her plenty of exercise at all times. When she is handled in this way the results are usually satisfactory.

START WITH WHAT YOU HAVE AND IMPROVE—We must depend almost entirely upon the grade cow for our future supply of milk. A pure-bred sire of one

of the leading dairy breeds may be purchased for \$100 to \$300. Where it is impossible for each farmer to have a sire for his individual use, they may join and organize a breeding association and in this way have the use of a sire of a high quality at a very nominal cost.

Over 75 per cent of the cows, on an average, in our dairy herds are classified as common cows. Their average yearly production per cow

is estimated at 4,000 pounds of milk and 150 pounds of butter fat. Farmers should decide upon a breed of cattle and stick to that breed. So many herds indicate that many farmers change breeds about as often as they change sires and never get enough blood of any one particular breed to bring their cows above the classification of common cows.

Three crosses from common cows with a pure-bred sire will result in cattle that both in appearance and production will resemble pure-breds, if the pure-bred sire used each time is of the same breed.

The following table will show the improvement from crossing six generations:

First generation.....	50	per	cent	pure	blood
Second generation.....	75	"	"	"	"
Third generation.....	87	"	"	"	"
Fourth generation.....	93	"	"	"	"
Fifth generation.....	96	"	"	"	"
Sixth generation.....	98	"	"	"	"

INFLUENCE OF ENVIRONMENT AND BREEDING ON MILK PRODUCTION

THE Iowa Experiment Station conducted an experiment to determine the influence of pure-bred dairy sires on the production of milk from a foundation of scrub cows, as well as the effect of improved feeding and management. Scrub cows from Arkansas were selected for the basis of this work in 1907. The work is still in progress. The data presented here are in the form of a preliminary report. (Iowa Bul. No. 165.)

Fig. 1. Developed Scrub cow. Best record 3534.3 lbs. milk and 190.29 lbs. fat. Age four years when photographed.

Fig. 1

Fig. 2. Holstein X Scrub, daughter of scrub cow shown in Fig. 1 above. Record at one and one-half years old, 5137.7 lbs. milk, 251.85 lbs. fat, an increase of 45% in milk and 32% in fat over dam's record at three and one-half years. Age two and one-half years when photographed.

Fig. 2

Fig. 3. Second generation Holstein grade heifer calf, daughter of Holstein Scrub cow shown in Fig. 2, by pure bred Holstein bull.

Fig. 3

NOTICE the increase in milk and butter fat production of the First Cross over the Scrub Cow. There is also an increase of nearly 50 per cent in the amount of milk given by the cow shown in Fig. 2. (Photos pages 43 to 47 Courtesy Iowa Experiment Station.)

Fig. 1

Fig. 1. Scrub cow. Best record, 4588.4 lbs. milk, and 201.67 lbs. fat. Six years old when photographed.

Fig. 2

Fig. 2. Holstein X cow, first cross, daughter of scrub cow shown in Fig. 1. Four year old record, 6822.8 lbs. milk and 283.75 lbs. fat, an increase of 49% in milk, 41% in fat and \$22.38 in profit over dam's best record. Age three years when photographed.

Fig. 3

Fig. 3. Second generation Holstein grade heifer calf, daughter of Holstein cow shown in Fig. 2, age seven months when photographed. Not until second generation do most Holstein grades show white markings typical of pure bred.

Fig. 1. Scrub cow, showing condition on arrival at the Iowa Agricultural Experiment Station. First year's record at station, 4 years of age, 2742.1 lbs. of milk, 131.04 lbs. of fat.

Fig. 1

Fig. 2. Same scrub cow shown in Fig. 1, three years later. Record, 5556.7 lbs. of milk, 244.79 lbs. of fat. Increase over first record, 2814.6 lbs. milk and 113.75 lbs. fat. Increase due to feed and care.

Fig. 2

Fig. 3. Old scrub cow, showing condition at time of arrival at Ames, Iowa Agricultural College Experiment station.

Fig. 3

Fig. 4. Same scrub cow shown in Fig. 3, one year later. Record for year, 3647.6 lbs. milk and 180.7 lbs. fat.

Fig. 4

THE record of Cow No. 2 shows the effect of **poor sire** on milk and butter fat production. Scrub Cow No. 1 has a better record than Cow No. 2.

Fig. 1

Fig. 1. Scrub cow. Best record 4916 lbs. milk and 204.91 lbs. fat. Mature when photographed.

Fig. 2

Fig. 2. Guernsey X scrub cow, daughter of scrub cow shown in Fig. 1 above. Two-year old record, 4286.8 lbs. milk and 193.59 lbs. fat, decrease of 13% in milk and 6% in fat from best mature record of dam, due to heifer's immaturity and lack of prepotency of sire. Age six years when photographed.

Fig. 3

Fig. 3. Second generation Guernsey grade heifer calf, daughter of Guernsey X scrub cow shown in Fig. 2 above, and by Rouge II's son. Color, red fawn, white markings. Age five months when photographed.

THE milk and butter fat record of Cow No. 2 shows the value of pure-bred sire with an increase of 75 per cent in milk and 27 per cent in butter fat over the record of the mother.

Fig. 1. Scrub cow. Best record, 4975.0 lbs. milk and 253.13 lbs. fat. Age five years when photographed.

Fig. 1

Fig. 2. Holstein X cow, first cross daughter of scrub cow shown in Fig. 1 above, by pure bred sire. Record, 8689.3 lbs. milk and 321.31 lbs. fat, an increase of 75% in milk, 27% in fat and \$6.80 in profit over dam's best record. Age five years when photographed.

Fig. 2

Fig. 3. Second generation Holstein grade calf, daughter of first cross Holstein cow, shown in Fig. 2, by pure bred sire. Calf seven months old when photographed.

Fig. 3

THE SELECTION AND MANAGEMENT OF THE DAIRY SIRE

**With the Increase of Cow-Testing Associations
and Keeping of Records, Evidence Piles Up
Against the Poor Bull**

By F. G. SWOBODA,
Antigo, Wisconsin

VERY MUCH of all the improvement made in our live stock is due to the use of pure bred sires. Even the native cow with a record of good production, owes this quality to some more or less removed good ancestry.

While some of Wisconsin's four hundred thousand boarder dairy cows are boarders because of poor feeding, most of them are boarders because of poor breeding.

With the increase of cow-testing associations and keeping of private records, evidence piles up against the poor bull. At the bar of the thinking farmer he has long since received the death sentence. But still he flourishes. **If every live stock owner who breeds to poor sires realizes that every time he does so he robs his own pocket book, the scrub would soon go.**

Life is too short for a man to expect to improve his stock by the use of any but pure bred sires.

Where Economy is Waste

The use of the common or scrub sire cannot fail to produce the scrub cow. The fact is, that many a profitable native cow, mated with this type of sire, because of the cheap service fee, is producing inferior offspring.

What is a Good Sire Worth?

"A good sire is half the herd," is a common sales ring expression. "A poor sire is the whole herd," is another. When it is considered that every calf dropped in a herd carries half the blood of the sire the importance of having at least this half of good quality is very plain. It is claimed on good authority that a good sire will increase the production of his daughters 10 per cent above the production of their dams. -

Granting this fact to be true and starting with a good sire on cows producing 200 pounds of butter fat a year, the following would be the result:

Product	Butter Fat per Year
First year, dam.	200 pounds
Fourth year, daughter.	220 pounds
Seventh year, grand daughter.	242 pounds
Tenth year, great grand daughter.	266 pounds
13th year, great great grand daughter.	292 pounds
16th year, great great great grand daughter	321 pounds

After fifteen years of such breeding, providing all went well and the first calf that each heifer produced was a heifer, the production of the great great great grand daughter would exceed that of the original daughter by only 121 pounds. This amount looks small, but if one were to take the 1,700,000 cows in Wisconsin, the increase at the end of 15 years at 30 cents per pound would be worth \$61,200,000.

The little country of Denmark, as the result of this practice of better breeding and cow testing, raised the production of its cows from 112 to 234 pounds of butter fat in twenty years. Individual Wisconsin dairymen have done as well and better. In no state has the farmer who wishes to select a pure bred sire a better opportunity than in Wisconsin.

In sizing up the sire as an individual the following points should be considered: his capacity, conformation, temperament, disposition, size and health.

Points of a Good Sire

1. Good depth of body and well sprung ribs.
2. Back straight to tail head (avoid dropping rump).
3. Good breadth of chest, with good heart girth (avoid droop back of shoulders).
4. Good length of neck and clean cut intelligent head. Wide nose and large nostrils.

In selecting the dairy sire, be careful not to choose an animal showing tendency to beefiness.

The breeding of the bull must be considered. What of his sire? What of his dam? What of the grand sires and grand dams? Have the females in the pedigree records of production of milk and butter fat? Are these records high or just ordinary? Have the sires produced any daughters with records? Quite apart from individuality the records of the ancestry are important factors in determining the figure at which an animal is sold, both in the sales ring and at private sales.

From \$100 to \$300 for a Good Sire

The question of what price to pay was submitted to a number of Wisconsin's best breeders in the following form. "At present prices of stock, what price ought a farmer with 12 to 20 cows, grade or native, be willing to pay for a sire to use in his herd, a young sire ready for service?" The replies to this question varied, but generally covered a range from \$100 to \$300, \$150 to \$300, being the figures most often given. The main idea brought out was to get a good bull with individuality and strong backing of yearly records.

Care and Handling of the Sire

It is a serious mistake to use a sire before he is a year old. Give him a chance to make a good growth. Be careful not to breed too heavily the first year. Never allow a sire to run with the herd. Keep him in a box stall, if possible, where he can see the other cattle.

How to Feed the Bull

For rufage, clover, or clover and timothy hay, corn stover, a limited amount of silage. Some of our best breeders prefer to leave out the silage. For grain ration various mixtures are used. A mixture of oats and bran in equal parts is recommended, six to twelve pounds per day, depending on extent of service. Another ration consists of two parts bran, two parts ground oats, two parts corn meal and one part oil meal. The cost of feed for a bull for a year varies with the breed and size of the animal. Leading dairy-men place the cost at \$50 to \$75 a year.

Exercise the Bull

To be kept in good condition a bull should have exercise. Too often bulls are kept tied in a narrow stall month after month with no exercise whatever. A few good dairymen use the bull in a tread power to pump water and run the separator, others have him so well broken he can be driven. Carelessness in this matter results each year in many deaths and serious injuries in the state. "He has always been so gentle," is the common explanation.

Every bull should have a ring in his nose and be handled and led with a bull stick or staff. All bulls should be dehorned. While this does not entirely result in subduing a bull, it does help. While he may have a perfect record for gentleness as a bull he is liable at any time to a very sudden revulsion of sentiment.

Profitable dairying means good pure bred bulls, properly raised calves, and well fed, well kept cows.

FACTS AND FIGURES IN THE MANAGEMENT OF A DAIRY HERD

**A Cow Producing Under 200 Pounds of Butter Fat a Year
is an Unprofitable Cow—Set the Mark at
300 Pounds—Nothing Less**

By J. W. RIDGWAY,
College Station, Texas

THE amount of profit made from dairy cows will depend entirely on the productive qualities of the cow herself, and the expense and character of the feed that is given her. The following table illustrates what might be expected from cows of different productive capacities:

	Cow 1	Cow 2	Cow 3
Annual butter fat production	100 lbs.	200 lbs.	300 lbs.
Market value of cow	\$25.00	\$40.00	\$100.00
Annual receipts—value of butter fat at 27c per lb.	27.00	54.00	81.00
Value of calf	3.00	3.00	20.00
Value of manure	19.00	22.45	25.30
Value of skim milk	8.40	16.80	25.20
1/8 final value of cow for beef	3.00	3.00	3.00
	<hr/>	<hr/>	<hr/>
	\$61.00	\$99.25	\$154.50
Annual expenditures—			
Feed	\$35.00	\$45.00	\$55.00
Labor, feeding and milking	20.00	20.00	20.00
Interest on barn, milkhouse, and equipment value, \$100 at 5 per cent.	5.00	5.00	5.00
Insurance and depreciation on build- ings and equipment at 5 per cent	5.00	5.00	5.00
Medical attention	1.00	1.00	1.00
Interest on value of cow, 5 per cent.	1.25	2.00	5.00
Depreciation of cow, 12½ per cent.	3.12	4.62	12.12
Taxes on buildings and cows, 12½ per cent.	.60	.70	1.00
Risk at 4 per cent.	1.00	1.60	4.00
Service fee	2.00	2.00	2.00
	<hr/>	<hr/>	<hr/>

Total expenditures.....	\$73.97	\$86.92	\$110.12
Total receipts.....	61.00	99.25	154.50
	<hr/>	<hr/>	<hr/>
	\$12.97	\$12.33	\$44.38
	loss	profit	profit

Proving the Facts With Figures

Value of cow: Cow No. 1 is worth no more than beef prices and owners of such cows will find it more profitable to dispose of them as such rather than attempt to milk them. Cow No. 2 producing 200 pounds of butter fat in a year barely "breaks even," making something like \$1 per month, yet we find a great number of such cows in every state today.

Is it profitable to keep them in our herds? She is valued at \$40, as that is the price they are actually selling for on the market today. In cow No. 3, we find a profitable animal and a valuation of \$100 is more conservative, yet we find plenty of men who would rather pay \$80 for two such cows as No. 2 than \$100 for No. 3; yet it will take almost four cows like No. 2 to make as much profit as cow No. 3.

Value of Butter Fat: Reports from our Texas creameries last year would indicate that an average of 27 cents per pound for butter fat was paid during 1913. Of course, some dairymen are getting much more than this for their products, but the point is, this is a fair average and every dairyman in Texas can get at least this much.

Value of Calf: The calves from Nos. 1 and 2 will in all probability be as inferior as their dams, consequently they are worth no more than veal prices, especially in the case of the calf from No. 1. With No. 2 assuming that the calf is raised to maturity an expenditure of \$60 is necessary, and it is hardly fair to expect the calf from such a cow as No. 2 to be worth \$20 more than its dam. On the other hand, the calf of No. 3, especially if sired by a good bull, would in all probability be as good a producer as its dam, and would therefore be worth \$100 at time of maturity. Granting that it cost \$60 to raise this calf to this age, it is actually worth \$40 when dropped, and assuming that a cow will produce equally as many bulls as heifers, we have a valuation each year of \$20, with the value of the bull calf for veal thrown in as "good measure."

Value of Manure: In estimating the manurial value

of the feed for each cow, it is assumed that three acres of land will provide sufficient feed for maintaining the cow. Of the three acres of land, one and one-half acres is allotted to pasturage and one and one-half to the growing of silage and hay. On the one and one-half acres for silage and forage crops it is assumed that one acre will produce one ton of cowpea hay and the remaining half acre will produce three tons of corn silage. This amount of feed will contain fertilizing ingredients to the amount of \$15. Assuming that one-half as much fertilizing value will be found in the pasture grasses consumed as is found in the forage and silage crops, we have a total valuation of \$22.50 from feeds necessary for maintenance. At least three-quarters of this should be recovered in the manure, which makes a manurial valuation of \$16.75. To this must be added the manurial value of the concentrates. It has been estimated that 800 pounds of concentrates are required to produce each 2500 pounds of four per cent milk (100 per cent butter fat). This 800 pounds of concentrates has a fertilizing value of two-thirds of a cent per pound, or \$5.25. This, however, is not all recovered in the manure, as the milk itself has a manurial value of \$2.50 which has previously been accredited to the skim milk. Therefore, for each 100 pounds of butter fat produced, \$2.85 must be added to the \$16.75, which gives the total manurial value.

Value of Skim Milk: While a valuation of 35 cents per 100 pounds for skim milk may seem high, experiments would indicate that 100 pounds of skim milk, when fed in connection with corn, will produce about six pounds of pork and also that the fertilizing value itself is approximately 10 cents per 100 pounds. When skim milk is fed to female calves of good dairy breeding, and these calves marketed at maturity, the returns on skim milk has often reached as high a valuation as 60 cents to 70 cents per 100 pounds, so that an estimate of 35 cents per 100 pounds is fairly conservative.

Value of Cow for Beef: The final value of the cow for beef is placed at \$24. Assuming eight years as her period of usefulness, one-eighth of the \$24, or \$3, should be credited her annual receipts.

Cost of Feed: As stated above, three acres of land (valued at \$40 per acre) are allotted to each cow, and these three acres are expected to produce sufficient rufage to meet the usual maintenance requirements. Of this three acres, one and one-half is devoted to growing forage crops, which will cost approxi-

mately \$10 per acre to grow and harvest, or a total of \$15. Add to this \$6.60 for interest and taxes and \$3.40 for fencing, and we have a total cost for maintenance of \$25. Now 800 pounds of concentrates are required to produce each 100 pounds of butter fat, which has a market value of \$10 (\$25 per ton), therefore for each 100 pounds butter fat produced, an additional \$10 must be added to the regular maintenance cost.

All other items of the above table are self-explanatory and emphasis should be brought to bear on the fact that every item of income and expenditure has been considered and the fact is outstanding that a cow producing under 200 pounds of butter fat in a year is an unprofitable cow. In this connection, I would especially call attention to the item of manure, a by-product, the value of which is often overlooked. The proper care of the manure on a dairy farm often means the difference between success and failure, and rigid attention should be given to its proper preservation.

HAVE LABOR SAVING MACHINERY

By ED PETERSON

First, get good cows, then feed good, clean wholesome feed. Be sure to feed them enough, get a balanced ration from some one who knows, if you do not understand rations. Keep your cattle clean, well bedded and have a well lighted barn. Cows must be contented to do their best. Do your feeding and milking as regular as possible.

Keep a good pure bred sire and raise all heifer calves. It is a great help to have barns arranged conveniently, as this saves many hours work doing chores. **I also believe in labor saving machinery, such as the milking machine; tractor for filling silos as well as doing field work, sawing wood, etc.** For milking we use a two-horse-power gasoline engine which pumps water at the same time. We raise all our own alfalfa, silage, oats, corn; do our own grinding shredding and silo filling. It is very necessary for a dairyman to love his cattle. The more he thinks of them the more they will do for him.

GOOD VENTILATION ESSENTIAL

Every farmer realizes that moldy, decayed feed is injurious to cows. But how many realize the serious effects of forcing the cows to breathe impure air? If the air breathed is impure, the results will be just as injurious as feeding moldy, decayed feed.

The effect on the cows will be weakened constitutions, disease, and a reduced flow of milk. To their owner it will mean smaller profits.

The object, then, of ventilation is to bring fresh air into the barn and remove from the barn the air that has been breathed. The system of ventilation used should be one that accomplishes these results without making the barn cold or causing cold draughts.

There is probably plenty of fresh air in

Fig. 1

This illustration shows the outside opening of air intake flue (A) as used in a barn with board walls

a barn that has broken or open windows, or wide, open cracks, but such a barn will be so cold that most of the feed a cow receives will be consumed in furnishing body heat. Warmth is necessary, but it must be warm with pure air.

The King system is one of the good systems of ventilation. In this system two sets of flues are used. One set admits the fresh air and the other set provides an outlet for the foul air. This system can be installed when the barn is built or it may be installed in barns which were not so equipped when built.

The illustrations show two styles of intake flues—one for use in barns where the walls are of wood,

Fig. 2

Cross section of a board wall showing outside opening (A), and inside opening (B) of air intake flues

and the other for use in stone or concrete walled barns. (See Figs. 1, 2, 3, 4.)

Fig. 3
Concrete wall showing air intake
flue outside opening (A)

regulated. This regulation is very necessary in extremely cold weather, or when a cold wind is blowing directly against the outside opening of the flues.

In barns with wooden walls, these flues can be made by simply utilizing the spaces between the studding. The spaces that are to be used as intake flues, however, should be lined with heavy tar felt paper. In stone or concrete walled barns, the flues are made either of vitrified or ordinary clay tile. The vitrified tile are much more durable than the ordinary tile, which do not very well withstand the constant action of the air.

The flues should be located at least every ten feet along both sides of the barn. The outside openings are located near the ground and the delivery openings inside the barn, near the ceiling. In this way the fresh air that is brought into the barn mingles with the warm air near the ceiling and a large part of the chill is taken out of it before it sinks to a level with the cows.

The openings of these flues through which the air is admitted to the barn should be provided with shutters, so that the amount of air admitted can be

Fig. 4
Cross section of concrete wall
showing outside (A) and inside
(B) openings of air intake flue

withstand the constant

A well lighted, well ventilated, sanitary dairy barn.
(Courtesy Portland Cement Ass'n)

Inside view of C. S. Sharp's Dairy Barn, at Auburn, N. Y., showing how an abundance of sunlight is admitted. The special construction of the window frames here provides for the intake of fresh air. The principle is the same as the King system described on the foregoing pages.

The accompanying illustration of a cross section of a barn shows how the foul air flues are installed, (see Fig. 5). These are usually two in number. One is located on each side of the barn

Fig. 5
Cross section of a barn, showing how foul air flues
are installed

midway between the ends of the building. The flues extend from the floor, or near to floor, to the highest point of the building. Bringing the flues close to the floor accomplishes two purposes. First, it removes the foul air from the barn. Second as the cold air is near the floor and the warm near the ceiling, having the flues near the floor removes the cold air instead of the warm. In this way the impure air is disposed of without materially reducing the temperature of the barn.

These flues should be made with as few turns or bends as possible. Galvanized iron or wood may be used in making them; but, if wood is used, the flues should be lined with tar-felt paper.

SUNLIGHT THE GREAT DESTROYER OF DISEASE GERMS

Sunlight is furnished free by nature to preserve the health of all animal life. It is the germ destroyer. It is necessary to admit the sunlight freely to all parts of the stable. For this reason the ridgepole of the barn ought to run north and south to admit the sunlight on the east side of the barn in the forenoon and on the west side in the afternoon.

Big round or square barns with the cows huddled together in masses are bad, so are basement barns in which the sunlight is excluded by the earth on one side or possibly on two.

The barn ought to be long and narrow, not more than two rows of cows being accommodated. These cows may face either toward the center alley or they may face outward.

Of the two methods of arranging the cows, it is difficult to decide which ought to be preferred. Where the cows face in there are no obstructions to the entry of the sunlight which may be allowed to flood the whole floor where the cow stands. If the cows' fasteners and mangers are thrust up toward the windows, they stop the sunlight in great part, and the floors on which the cows stand are kept in perpetual shade.

A Modern Dairy Barn, with Twin Silos

The floor should be of cement, not troweled smooth, but left somewhat rough so that it may not be slippery when wet. Such a floor is somewhat more expensive at first cost than wooden floors, but its permanent character and the fact that it may be easily cleaned and kept free from odors is enough in itself to decide every dairyman in its favor.

THE BABCOCK TEST

The Babcock test has been one of the chief factors in demonstrating the fact that too large a percentage of dairy cows are kept at an actual loss to their owners. With milk scales and the Babcock test, a farmer can learn just what each cow in his

herd is producing. In this way he can easily locate and cull out those cows which do not return a good profit or those which are not paying for their feed. Weighing the milk is not sufficient, as the milk from different cows varies greatly in percentage of butter fat, and it is butter fat that determines the market value of milk. Hence, the Babcock test is of immeasurable value to the man who keeps milch cows. It gives him a simple, reliable means of ascertaining which cows in his herd are producing enough butter fat to make it worth while to keep them. Farmers who do not use this means of finding out what their cows are doing usually make the excuse that it is too much trouble. As a matter of fact, the work of keeping these records is not nearly so great as it may

A Babcock Milk Testing Outfit

seem. Even if it were a great deal more trouble than it is, it would be better to put in time finding the unprofitable cows and getting rid of them than to go on feeding and milking cows that do not produce enough to pay for their feed and care.

HOW TO KEEP A RECORD OF EACH COW'S PRODUCTION

In keeping a record of the milk and butter-fat production of a herd there is needed: a spring balance scale, pint glass jars, test bottles, pipette, acid measure, a bottle of sulphuric acid, preservative tablets, a centrifugal machine, and a sheet for recording the weight and test of each cow's milk. The record sheet, ruled

as shown on page 62, should be placed with the scales in a convenient position in the barn and the milk of each cow weighed at each milking, and the weight recorded on the sheet.

The testing of the milk for butter fat can be done daily, weekly, or monthly. The practice of making the test once a month meets most requirements. The monthly test does not involve so much work as more frequent tests, and is a very good indication of the per cent of butter fat the cow is producing.

In making this test, samples should be taken from each milking for a period of three days and placed in pint glass jars. To prevent the samples from souring, a small corrosive sublimated tablet should be put into the jar. A small dipper (about the size of a shotgun shell) with a long handle proves most satisfactory for taking the sample. Before taking the sample, the milk in the pail should be well stirred with the dipper.

The testing should be done as soon as possible after the samples from six milkings have been taken. The operations of this test are as follows: **First.** The samples should be stirred by pouring into and out of an extra jar several times. In making the Babcock test, 17.6 C. C.

of milk is used and is measured by means of a pipette, which is marked to show when this amount is in it. When using the pipette, place the small point in the milk and with the other end in the mouth suck the air out of the pipette until the milk rises above the 17.6 C. C. mark. Then quickly place the tip of the forefinger over the end of the pipette which has been in the mouth. This will prevent the milk from running out of the pipette. By slightly chang-

Pipette

Showing proper way to hold Pipette and Test Bottle when filling Test Bottle

ing the pressure of the finger on the end of the pipette, the milk can be allowed to run down slowly until the 17.6 C. C. mark is reached. Then press the finger firmly on the end of the pipette to prevent any more of the milk from running out.

Acid Measure

Second. When exactly 17.6 C. C. of milk are contained in the pipette, place the small end of the pipette in the top of the test bottle and gradually reduce the pressure of the finger on the other end. The pipette should not be put straight down into the test bottle; instead, the bottle and pipette should be at a slight angle so that the milk will flow down one side of the neck of the bottle and at the same time leave a space on the other side for the escape of the air which the milk displaces.

Don't allow the milk to run out of the pipette too fast or it will choke the neck of the bottle and overflow. This would require washing the bottle and measuring a new sample of milk with the pipette.

Third. Take the small acid measure and fill to the point marked 17.5 C. C. with sulphuric acid. The sulphuric acid used in making the Babcock test should have a specific gravity of 1.82. This acid can be secured at any drug store or from dealers in dairy supplies. In pouring the acid into the test bottle, into which has been placed 17.6 C. C. of milk, hold the acid measure and test

Whirl the test bottle in a circle to mix the acid and milk

bottles at an angle, just as was done when the milk was being put in. This is important, because there must be room in the neck of the bottle for the air to escape. If there is not the acid will bubble over and spoil the test. When handling sulphuric acid wear old overalls or an apron, as the acid burns clothing. Have a supply of water convenient to wash off any acid that may spill on the hands or clothing.

A small four-bottle Babcock tester

Fourth. As soon as the acid has been poured into the test bottle with the milk it will be noted that the milk and acid lay

in two distinct layers—the acid in the bottom of the bottle and the milk on the top of it. The immediate mixing of these two layers is important. Do this by taking the bottle by the neck and swinging it in a circle until acid and milk are completely mixed. This mixture has a uniform brown color and becomes very hot. On the rough spot on the side of the test bottle write with an ordinary lead pencil the cow's number whose milk is being tested, or write some number that will serve as a means of identifying the bottle.

The reading of the test should be made from A to B, that is between the extreme top and bottom of the fat column

Fifth. After the milk and acid are thoroughly mixed, place the test bottle, together with other test bottles which have been filled in a similar manner with the milk of other cows, into the centrifugal or whirling machine. After making sure that the bottles are so placed in the machine that they balance, turn the crank four or five minutes at the speed indicated in the directions supplied with the machine.

Sixth. After whirling the bottles in the machine four or five minutes, stop turning and allow them to gradually come to a stop. Then take the pipette and add to each bottle, without taking it out of the machine, a small amount of hot soft water. The water put into the bottles should come to the bottom of the neck or a little above it. Then start the machine again, and whirl the bottles for at least two minutes. Next add enough more hot water to bring the fat which has gathered at the bottom of the neck to a point between the top and bottom figures of the scale on the bottle. Whirl for one minute more.

Seventh. Remove the bottle from the centrifugal machine and proceed to read the per cent of fat in the neck of each bottle. It is important that the reading be made while the fat is hot, therefore set the bottles in a dish of water at the temperature of 130 or 140 degrees. The scale on the Babcock test bottle is graduated from 0 to 10 per cent. The scale

First position of the dividers when used for reading the test

Second position of the dividers when used for reading the test

The scale

on the neck between 0 and 10 is divided into 10 spaces, each representing 1 per cent of fat in 100 pounds of milk. Each of these spaces is subdivided into 5 equal parts, each representing .2 of 1 per cent. If the fat found in the neck after the whirling has been completed extends from 0 to 4 it means that the milk tested contains 4 pounds of butter fat for every 100 pounds of milk, or, in other words, the milk tests 4 per cent butter fat. It is not very often that the bottom of the fat column will be formed exactly at the point marked 0, and in most cases it will be somewhat above this point. Hence, the work of reading can be greatly facilitated if a pair of dividers be used. In using the dividers adjust the points to the top and bottom of the fat column and then, without changing the distance between the points, place one point on 0 and read on the scale the percentage of fat which is indicated by the position of the other point.

TESTING SKIM MILK

When testing skim milk, a double-neck skim milk test bottle should be used, as it gives a better reading. About 20 C. C. of acid should be used, as in skim milk there is a larger amount of solids not fat than in whole milk. These must be destroyed before the fat can be freed. Otherwise the operations are the same as for testing whole milk.

TESTING CREAM

The operation of testing cream with the Babcock test is the same as for testing milk, with two exceptions: First, a special cream test bottle should be used. This cream test bottle has a larger neck than the milk test bottle. This is because the amount of fat in cream is much greater than in milk. Second, the 18 grams of cream used in making the test cannot be measured with the pipette, but instead must be weighed. This is due to the fact that the weight of cream varies according to its richness. Furthermore, cream is thick and a considerable part would stick to the inside of the pipette. There is also another objection to measuring the cream with a pipette, and that is that cream, especially fresh separator cream, often contains bubbles. Therefore, to get an accurate test the cream must be weighed. There are scales made especially for this purpose, and these can be secured from dealers in dairy supplies. The remainder of the operation for testing cream is the same as for testing milk. The testing of

cream is much more difficult, however, than the testing of milk and considerably more experience is necessary to make a good cream test.

Milk Test
Bottle

Cream Test
Bottle

Skim Milk Test
Bottle

THE COMPOSITION OF WHOLE MILK

The composition of milk varies greatly, depending upon the breed and individuality of the cow, the season of the year, lactation period, milking, and environment. The average composition, however, which has been determined by 200,000 analyses reported by a well-known dairy authority is as follows:

Water.....	87.17
Fat.....	3.69
Milk Sugar.....	4.88
Casein.....	3.02
Protein, Albumen.....	.53
Ash.....	.71

COMPOSITION OF SKIM MILK

When cream is taken from the milk by a separator or by hand, practically all of the fat is taken out. The skim milk which remains is frequently referred to as "serum," and it contains everything but the fat, as follows:

Water.....	90.68
Fat.....	.02
Milk Sugar.....	5.00
Casein and Albumen.....	3.50
Ash.....	.80

BUTTER ON THE FARM

It is possible for the farmer to make the highest possible grade of butter on the farm, owing to the fact that he has the entire control of the milk from the time it is drawn until it is turned out a finished product ready for the market. Especially is this true where the farmer has a small separator.

With proper ripening before churning, and careful observation of necessary conditions for the production of the best butter, the farmer should be able to economize in the making and insure a distinct saving by feeding the by-products to the pigs and calves.

Cream Separator Saves Time and Money

If the farmer can furnish an even grade and a regular supply of butter the year round, he can with a little effort readily find an excellent market. People living in towns and cities generally prefer to buy butter direct from the farmer, if possible, and are willing to give the farmer his price.

Besides the income derived from butter sales, the by-products fed to pigs and calves are steadily increasing the value of young beef and pork. The buttermilk, if fed directly after churning, is always productive of good results, as the chances of fermentation or contamination are fewer than in the creamery and consequently it gives better results as a feeding ration.

STANDARD FOR JUDGING BUTTER

In judging butter, the different characteristics are given different values according to their relative importance. Below is given a standard used commercially and based upon 100 as perfect:

	Perfect
Flavor.....	45
Body.....	25
Color.....	15
Salt.....	10
Style.....	5
	<hr/>
	100

Flavor. As shown in the score above, flavor is the most important characteristic. Good butter should possess a clean, mild, rich, creamy flavor, and should have a delicate, mild, pleasant aroma. **FLAT** flavor is noticeable in butter made from unripened cream. **RANCID** flavor, describes butter which has a strong flavor. It develops in butter which has been standing a long time. **CHEESY** flavor is common to butter which has little or no salt. **WEEDY** flavors are due to the condition of the milk before churned and are caused by the cows pasturing where weeds are growing, such as wild onions, garlic, etc. **ACID** flavor is due to improper ripening of the cream.

Body. Next in importance to flavor is body. Butter that is greasy, tallowy, spongy, or sticky is undesirable. The body must be firm and uniform.

Color. The color should be bright and even, not streaky or mottled. A light straw color is the color most desired.

Salt. The amount of salt depends upon what the market wants. The principal thing is to have the salt thoroughly dissolved and evenly distributed. Medium salting is most desired.

Style. By style is meant the appearance of the butter and package. It should be clean and neat.

COMPOSITION OF BUTTER

Butter is composed of fat, water, proteids, milk sugar, ash, and salt in the following average proportions, according to a well-known dairy authority:

	From Fresh Cream	From Ripened Cream
Fat.....	83.75	82.97
Water.....	13.03	13.78
Proteids (Curd).....	.64	.84
Milk Sugar.....	.35	.39
Ash.....	.14	.16
Salt.....	2.09	1.86

The quality of butter is more affected by the quality of cream or milk from which it is made and the methods employed in manufacture than by the composition.

The English, German and United States governments endeavor to protect the consumer of butter by recommending 16 per cent of water as a maximum limit. Butter is frequently found which contains more than 16 per cent of water, but this is in violation of the law. The amount of fat in the butter varies with the water—the more water, the less fat there will be. Butter which contains more than 18 per cent of water will appear dead and dull. It will also be leaky.

POINTS ON CLEANLINESS

Clean cows, clean udders, clean hands, clean pails, sterilized utensils and separators, clean and thoroughly ventilated dairies—these are some of the conditions under which milk, cream and butter can be best preserved and utilized for home use and for the market.

Do not stir up unnecessary dust before milking. Each minute particle of dust settling on the milk means that much taint and consequent germination of bacteria. All strainers should be kept scrupulously clean. Sanitary wire gauze strainers are greatly to be preferred to the common cloth strainers so much in vogue. All foreign odors should be abolished from the premises, as milk, cream and butter have a natural tendency to absorb bad smells.

The stable should be provided with brushes readily attached to the milking stools or accompanying them. The milker should

be encouraged to use these brushes before milking, and if such milkers are naturally cleanly, they should also be encouraged to dampen the udders before beginning to milk. If the milkers are not naturally orderly, systematic and cleanly, discharge them and either get clean milkers or quit the business. It is impossible to make a filthy man clean by any set of rules or by any amount of possible supervision.

The milk is received in pails washed in this way: They are first rinsed in tepid water, then washed in water too hot for the hands and containing some cleansing powder or sal soda, the washing being done with brushes rather than cloths. They are then rinsed with boiling water and steamed, if possible; otherwise they are taken from the rinsing water, the loose drops shaken off and allowed to dry without wiping. The milk is then strained through wire strainers or through two or three thicknesses of cheese-cloth, which pieces are washed and scalded or boiled between successive hours of milking.

After straining, the milk is either aerated, cooled and sent to the factory, or it is run through the separator at home.

The cream separator is one of the best milk clarifiers. It removes the finest particles of dirt from the milk which could not be removed by a cloth or wire strainer. Even if the whole milk is to be sold at retail, it should be run through the separator for clarifying purposes.

Cows knee deep in manure and mud. Manure should be hauled out, yard graded to slope from barn, and surface covered with cinders or gravel.

Courtesy University of Illinois.

PROFITABLE DAIRY HERDS FROM UNPROFITABLE STOCK

The Change May be Accomplished at Minimum Expense
Through the Co-operative Breeding Circle

By JAS. R. JOHNSON,
Ontario, Canada

THERE are three big herds of dairy cows in Canada. In the first herd are all of the cows that pay for their feed and labor, and then yield a profit. This is the smallest herd of the three. Then there is a much larger herd, composed of cows that just about break even. Their milk is sold for about the value of their feed, and the farmer receives the calf and manure in payment for his labor. The biggest herd of all, however, is composed of the cows who do not even pay for their feed, and the owner has only their society as a return for feeding, milking, and caring for those cows 365 days in the year.

If the average cow pays only for feed, and in that average are all three of these herds, we can only conclude that there are many thousands of cow owners who must be paying their cows something to board with them.

Better Cows the Remedy

There is only one way out of the situation—better cows. The man with a tidy bank account (needless to say not accumulated from the profits of his herd) can go out and buy better, and this is probably the best way. Most of these poor-cow owners, however, cannot go out and buy good cows. They haven't the money in the savings bank, and the bank wouldn't lend them the money to buy a half a cow, no matter how honest and industrious they might be. The solution usually given to this man is to buy a pure-bred sire and grade up his herd. Even this, however, may be difficult. A good sire would cost \$100, and probably more. Of course, I know that wonderful results are figured for that expenditure of \$100. Figured correctly, too. But I know from experience just what \$100 means to many farmers whose incomes are small and the demands of whose growing families are ever increasing. In dozens of cases it would be hard even through the most rigid economy, to find \$100 for a pure-bred sire.

Governments have recognized this situation and have been active in placing sires of pure breeding in sections not already supplied, but they cannot go far toward meeting the great need

of the country. My suggestion is the organization of co-operative breeding circles among the farmers.

Many Cows, But Poor

The co-operative creamery at Milaca is one of the largest, if not the largest, in the state of Minnesota. In spite of this fact, the great majority of the cows tributary to Milaca are of the most common type, and in many instances the dairymen have not been making as much money as the success of their creamery would lead one to believe. A couple of years ago, Mr. E. L. Westover, then agricultural director of the Milaca High School, started an agitation for the improvement of these common cows by means of the co-operative purchase of pure-bred dairy sires. The idea took immediate hold upon the farmers to whom it was broached, and two successive meetings were called to afford discussion of the matter among all the dairy farmers of the community. As a result, in February, 1913, the Guernsey and Holstein Breeders' Association of Millelacs county was organized.

At the time of organizing, the membership consisted of 35 farmers having about 400 cows. Last year it had increased to 50 farmers with approximately 500 cows. The original idea was to bring in enough pure-bred bulls of one dairy breed to fill the needs of the entire membership; but an early difficulty presented itself, in that the members could not agree upon one breed. So a compromise was effected, and two breeds, Guernsey and Holstein, were introduced into the community. It was decided that one bull should be purchased for approximately 70 cows; and, acting upon the expectation of having about 600 cows in the Association, nine pure-bred bulls were bought. The district was divided up into sections or "blocks" and one bull was placed in each block—five Guernseys and four Holsteins. With this arrangement, no member of the Association, whether he wishes to breed to a Guernsey or a Holstein, is more than one and one-half miles from the sire.

Raising the Funds

The bulls were purchased at well-known breeding centers in Minnesota and Wisconsin, and varied in age from one to four years. The total purchase price was over \$1,300, the Guernseys ranging from \$110 to \$225 and the Holsteins from \$112.50 to \$150. Previous to buying the bulls, it was arranged that each member would buy one share of stock, at a cost of \$2, for each cow he owned. With 400 cows in the Association at the beginning, the

sale of stock amounted to only \$800, and it was necessary to borrow \$700 from the bank to make the purchase and bring the animals to Milaca. Last year, an additional 100 cows increased the sale of stock \$200; and it was then decided to make a further assessment of \$1 per cow on all members of the Association to cover the remaining \$500 of debt. Thus the total cost to the 50 members was \$1,500, or \$30 apiece for the part ownership of nine pure-bred bulls, the service of which, as will be seen, will extend over a period of eight to 10 years. In addition, one dollar service fee is charged.

The block system established is the most interesting feature of this Association. There is a Guernsey circuit and a Holstein circuit, the former comprising five and the latter four blocks. These blocks, of course, overlap; but there is no mixing of breeds. At the end of every two years in both circuits, each bull will be transferred to the next block, number one going to number two, and number two to number three, etc. Thus, each member in the Guernsey circuit will have the use of five bulls over a period of ten years, and the members in the Holstein circuit will have the service of four bulls over a period of eight years. Should any bull prove unsatisfactory, he will be disposed of and a new one procured.

The Board of Directors designates the place in each block for stabling the bull, which must be free from disease and have clean, sanitary surroundings.

As caretaker of the bull, these members are paid \$50 a year, but have no privileges over the other members as to his services. In each block a director is also appointed, who is responsible for the proper stabling and care of the bull in his block. It is his duty to see that the bull is kept in a strong, vigorous and healthy condition, on a suitable ration, with sufficient yardage to afford ample exercise in the open air, and that he is not permitted to run with the herd. Each block director must also inspect the herds in his block at least once in each two months.

I notice that the average farmer in this Association had just 10 cows. His initial expenditure, therefore, was just \$30, and that expenditure brought him the services of a first-class sire, not for two years or at most four, as is ordinarily the case, but for the entire serviceable life of the bulls purchased. Instead of having the feeding of his own sire, the cost is distributed over half a dozen farmers. Does not this system reduce the cost of herd improvement to a minimum?

WHAT PURE BRED SIRES DID FOR ME

A Practical Illustration of Results from Using Pure-Bred Sires

By R. J. WELD,
Sugar Grove, Pennsylvania

SEVERAL years ago I became ambitious to improve and increase the output of my dairy herd and as the animals in the herd were not specific dairy animals and the production of the dairy was to be sold as butter, I chose the Guernsey breed as my improving factor. I choose also to breed up a herd of cows on my own farm, thinking that by raising my own cattle I could have them under my own individual care from birth to maturity and could therefore work into the animals such characteristics and possibilities as I was able to command.

My first step was to purchase a registered Guernsey bull calf, The dam of this calf was an animal that was owned on a farm where the milk was weighed daily and a Babcock test of the milk was made every month, so I was able to get a complete record of the production of the bull's mother. The calf which I bought was a registered animal, so was strongly re-enforced with the qualities of the breed.

Used the Babcock Test

We also commenced the daily weighing of the milk and once a month made a Babcock test of the milk so as to determine the percentage of butterfat. At the end of the first year's work of record keeping we found that our cows had made an average of 4,400 lbs. of milk, while our best one had given us 5,500 lbs. The average butter fat production was 186 lbs., while one cow made 232 lbs.

By discarding the low producers and using the Guernsey bull to breed from, we, in six years raised the average production of milk up to 5,430 lbs. and the butter fat up to 255 lbs. Following along the same line of breeding and selecting for nine years more, having in the meantime purchased a second and then a third Guernsey bull I had the production up to 6,850 lbs. of milk and 315 lbs. of butter fat. With the close of the year 1912 I had the average production up to 7,144 lbs. of milk per cow and 338 lbs. of butter fat per cow. Taking the period covered by my breeding

and weeding work I have gained 2,744 lbs. of milk per cow and 152 lbs. of butter fat.

Through the influence of the Guernsey blood I have made a larger per cent of gain in butter fat than in milk and I have also improved the character of my butter both in texture and color. Furthermore, the grade animals are in demand at good prices.

My expense for bull to breed up my herd has been only \$220, part of this, in fact, nearly all of it has come back from the sale of the bulls after I was through with them. I do not practice in-breeding so I have a mature bull to sell about every three or four years.

BEECHER WYTHE No. 2

A cow that returned \$2.53 worth of butter fat for each \$1.00 worth of feed consumed. She produced 559 pounds of butter fat, 17,652 pounds of milk and made an income of \$112.32 over cost of feed.—Information furnished by C. R. George, Dairy Division, Lafayette, Indiana

A CO-OPERATIVE CREAMERY THAT CO-OPERATES

AN observer would notice nothing unusual as he watched patrons deliver their milk and cream to a secluded little creamery at Iowa Falls, Iowa. The creamery itself would not appeal to one as being anything out of the ordinary, and the equipment within it is not especially modern. The patrons who own the plant do not care for show or style. They are more interested in efficiency and in getting for their dairy products a price which is justly due them. The accomplishment of this for the last eighteen years is one thing which makes the Iowa Falls creamery stand out by itself. The record of which the farmer stockholders are justly proud is a credit to any organization, and the methods of business management might be followed with profit by hundreds of other creameries.

Creamery Organized Twenty Years Ago

When the creamery was organized, nearly twenty years ago, two objects were in view. One was to make butter or cheese at actual cost, and the other was to produce a product of the very best quality, and to sell it at a top notch price. Both of these objects have been accomplished. The cost of manufacture has been kept down to a low figure by efficient management, and the quality of the butter produced has commanded extra fancy prices. Stockholders and patrons are the ones benefited:

Last year the patrons received for their fat five cents a pound more than did the average patron of the eighty-five best creameries within the state. As the average person furnishes approximately 1,000 pounds of fat a year, each was paid about \$50 more than he would have received from the average so-called best creamery. This price was made possible by the relative low cost of making the butter, and the quality of the cream and milk delivered, the latter not only providing raw material for premium butter, but also for the sale of sweet cream to ice cream manufacturers.

The creamery does not aim to be a large one, nor does it try to compete with centralizers or other plants in Hardin and Franklin counties. The management believes it is at the point now where it can get along most economically. To enlarge it would be to add to the expense without resulting in any extra profit, and if it attempted to compete with other plants in the

volume of business done, it is feared the quality of butter or cream might be lowered so that more would be lost than would be gained.

Makes But One Grade of Butter

Only one grade of butter is made. This makes it necessary to refuse all poor or sour cream and milk. The butter-maker, who is an expert, is instructed to turn down everything that does not come up to the creamery's high standard. With this rule enforced, there would be no excuse for having butter of an inferior quality. Poor cream from stockholders or officers is rejected with the same freedom that would be applied to non-stockholders. When cream is turned down at this plant, it is taken to and accepted by a centralizer not far away. The producer receives a proportionately less price per pound for the fat, and he aims therefore, to have only a grade of cream which will be accepted by the Iowa Falls Creamery.

Most of the patrons live within a few miles of the creamery and many of them drive in with their cream. During hot weather the cream must be delivered every day. Twice a week is the limit in the winter. No shipped-in cream is accepted, although many have requested this privilege. This practice would draw the cream from a wider territory, and older cream would have to be used. Under such conditions, the management does not believe so high a grade of butter could be produced as at present.

A Manager Who Manages

The butter-maker keeps in personal touch with his patrons. When anything is wrong with the milk or cream he explains the matter to them, and by using a little tact, his advice is not resented. The aim has been to educate rather than to force. The extra price secured by reason of this policy has encouraged the patrons to take good care of their cream and milk, and to deliver it in an A-1 condition. They know that to do otherwise would be to have to take it to another creamery and accept several cents a pounds less for the fat.

The company was organized in 1897, with a capital stock of \$5,000. Shares were \$100 each, and \$4,200 worth of stock was issued. A few years ago they thought it would be better to have more stockholders, and each share was split up into four. These were disposed of, until now there are 155 stockholders. The most any person holds is four shares, but this amount gives him only the

one vote at any of the elections or business meetings. One share of stock gives the owner the same privileges that a dozen shares would give, and, as the creamery is operated on a no-profit basis, there is no object for one person buying several shares. The only ones who own four shares are those who did not sell part of their stock at the time the shares were divided.

Pays 203 Per Cent On Investment

Although no effort has been made to make the stock pay dividends, the stockholders have received a total of 203 per cent on the money invested since the company was first organized. This does not come from a profit on the butter, but from a cent a pound charged non-stockholders for making the butter. This fee charged to non-stockholders is used in the payment of taxes, insurance and other items not charged directly to the manufacture of the butter. There has been enough to make these payments and also to pay the dividend mentioned. At the same time, it makes the actual cost of manufacturing the butter slightly less than it otherwise would be.

At the end of each month all the receipts from the sale of butter or cream are added together. The expenses incurred, such as salaries, fuel, salt, butter packages, freight, cartage, etc., are added. The manufacturing cost is deducted from the total receipts. Then this sum is divided by the number of pounds of fat that have been delivered to the creamery during the month. Shareholders are paid the price thus obtained, while the non-stockholders get a cent a pound less. In this way the shareholders get their milk handled at actual cost, no private owners having to be paid fat dividends.

Cost Two Cents Pound to Make Butter

The average cost for making the butter during the last five years at the Iowa Falls Creamery has been kept down to two and one-tenth cents a pound. This includes the fuel, salt, tubs, labor, and all direct manufacturing costs, but not the freight nor the cartage. Two men are employed the year around, and three men during the busiest summer months. The total amount of business amounts to about \$90,000 each year. The average price per pound for the last five-year period is thirty-two and one-half cents, and this includes some years during which butter was comparatively cheap. The butter is being sold to a New York firm

at one-half cent a pound above New York extras, and there is no commission deducted for the selling.

The Iowa Falls Creamery is a beautiful example of the value of hiring an expert butter-maker, regardless of his salary. Government records show that the butter-maker at this creamery received the highest salary of any Iowa butter-maker in that class of creameries. One of the officers of the company stated that a few hundred dollars in excess of the average salary paid to butter-makers has resulted in thousands of dollars in increased profits.

MILKING MACHINE SAVES MONEY

**The Milking Machine is Used 730 Times a Year—
Will Increase Profits**

By L. J. VOGT,
Salem, Wisconsin

In my opinion the best machine on the farm is the milking machine. It is very simple and comparatively inexpensive, is best for the cows and produces more milk. The different parts of the machine are easy to wash and can be washed while the machine is going. It takes from two to three minutes to milk one cow. The milk is very clean because the covers of the can are air tight. Each pail holds about four gallons and two of them will fill a 32-quart can. The cows like the machine and anyone can operate it. Some agricultural implements are used once or twice a year, but the milking machine is used 730 times a year. My barn has a good ventilating system, which every dairy farmer ought to have. We have an International engine which runs the milking machine and it is always in good order. We also have an International corn binder and believe they are all right.

WARM DRINKING WATER FOR COWS

By F. W. ROBERTS,
Woodworth, Wisconsin

Good cows, good feed, good methods, good markets, all things done regularly and in order. Coal to warm the drinking water in winter is worth \$20 per ton.

THE DAIRY PROBLEM IN THE SOUTH

Dairying as a Side Line for the General Farmer Most Profitable in South

By M. H. BARTON,
Clemson College, South Carolina

IN THE South there are two phases of dairying, both of which may be made a success, viz.: **1.** Exclusive dairying for milk production; **2.** Dairying as a side line in farming. In this discussion I shall refer exclusively to the latter, as it applies to the general farmer.

Dairying as a side line for the general farmer is probably the most profitable for the South. We have a genial climate and a responsive soil which will furnish; **1.** Succulent feeds the year round, **2.** Cottonseed meal, the cheapest protein food the world affords, **3.** Legumes and other necessary rufage.

Having adopted such a logical order of farm practice, we may begin dairying on a scale sufficient to grow into successful dairying as the waste lands are put to permanent pasturage and as the farm increases in fertility and productiveness to support a gradual growth in the industry.

The man who starts on the average poor soils of the South with dairying as the only means of enriching his land, finds it not only a "long way" but a slow and costly way "to Tipperary."

Winter and summer legumes must be the basis for soil **fertility** and soil **ability** with livestock for soil **conservation** and farm **economy**. Humus is our greatest need and nitrogen the next greatest need in economic feed or other production. Legumes in crop rotation, therefore, are imperative; for the cow, if fed on non-legumes of home production alone, is only a soil conserver, but when fed legumes, becomes both a soil conserver and a soil builder, and a part of farm economy.

Selection and Breeding of Herd

Selection of a few dairy type animals to start with, bought on the advice of the Babcock Test and milk sheet record, is the only safe method in buying. Such cows may be bred to a pure bred bull of known heavy producing lineage until his calves show his ability or inability to transmit productiveness at the pail.

When he has proven such ability, a few pure bred heifers of the same breed, with high producing blood behind them, may be purchased as a basis for the future herd.

Feed is Half the Breed

"Feed is half the breed," is an old adage too true in the South where a one-sided, unbalanced ration is so commonly fed and where a "pasture" too often means a poor area fenced in as an exercising ground with little or nothing to graze.

Size and vigor of the animals are essentials in maintaining and developing dairy ability, and are the important results of proper feeding from calfhood to maturity, as shown by actual performance at the pail and in the breeding pen.

For heavy production in the South root crops, silage, Abruzzi rye and citron melons are the greatest winter succulents for inducing the best and most economic results in the digestion and assimilation of other foods. Cottonseed meal is on every Southern farm in abundance as a by-product of the cotton crop and furnishes protein and carbohydrates in the ratio of 1 to 1.2. In recent years corn as a carbohydrate supply has become a certain crop of wonderful possibilities as to large economic yields when preceded by clover or vetch. Vetch and oats make a splendid hay product, yielding often 3 to 4 tons per acre. With such foods, and with Bermuda grass and bur clover mixtures for grazing, the general farmer with intelligent care, kindness and judgment should make the dairy cow almost reach perfection as an economic producer of human food and human prosperity.

Such a dairy industry heretofore has lacked, and yet lacks, in most of the Southern States, a co-operative marketing feature such as is now being successfully worked out in South Carolina by Clemson College in co-operation with the United States Department of Agriculture.

Co-operative Creameries Pay

In South Carolina, creameries are being established with co-operative cream collecting routes. The creameries are established with local capital under a charter giving only one vote to each stockholder regardless of shares held. The annual dividends to stockholders are limited to 8 per cent, the manager is chosen by the College and all products sold under a State brand. The patrons get the benefits of all profits other than actual cost of production and 8 per cent dividends and are protected against exploitation. This

feature assures the permanency and growth of the industry, and South Carolina is rapidly becoming a butter producing state under expert, economic management. I can not too strongly commend this feature as a necessity in successful dairying for the general farmer.

STICK TO ONE BREED

Don't Mix Breeds—Dairyman Must Be a Student— Have Good Accommodations for Farm Help

**By W. H. GARDNER,
Solon Mills, Illinois**

The most important things in making the dairy pay are cows, feed, man and equipment. The cows must be of the dairy type and good producers. A pure-bred herd sire of the same breed and known to be from high producing ancestry must be kept at the head of the herd and all the best heifer calves raised. Stick to the same breed. The dairyman who frequently changes breeds or crosses breeds by putting a bull of a different breed at the head of his herd never gets anywhere but at the tail end. The most important step a dairy farmer can take and the one that will pay the largest interest on the money invested is the purchase of a pure-bred sire. The dairyman with grade cows should belong to a cow-testing association. Those with pure-bred herds should make official records.

The feed must be a balanced ration. I would not try to run a dairy farm without alfalfa and silage. Here is my winter ration for Holsteins giving 50 lbs. of milk per day: 40 lbs. silage, 16 lbs. alfalfa hay, and 12 lbs. mixed feed, consisting of 400 lbs. ground corn and oats, 100 lbs. gluten feed, 100 lbs. bran and 125 lbs. ajax flakes. In summer the cows are on pasture, supplemented with silage and sometimes with alfalfa and grain.

The dairy farmer must be a student and a busy man the year round, working all summer getting feed together, and all winter feeding it out. By having a large per cent of the cows freshen in the fall the labor will be very evenly divided between the seasons. The farm must be especially equipped for dairying with modern barn, silos, milkhouse, water system, tool shed, good machinery and good fences. This will be a source of pleasure and satisfaction to the owner and will go a long way toward holding hired men.

A CALF FOR EVERY BOY

Some people think it is a hard job to milk cows and care for stock. "Down near Bloomington, McLean County, Illinois, one time," said P. G. Holden, of Iowa, "I saw a man walking along briskly, with a spring in his step as though he was going somewhere and had no time to lose."

"Do you know where that fellow grew up?" I said to a friend who was with me.

"No," he answered.

"He grew up in a dairy region," I remarked.

"How do you know that?"

"Look at the way he is going down that field. He is moving along as though he was after a pig in the garden or a calf in the corn—he has energy." Later I was told that this man spent the most of his life on a dairy farm and was then, and is today, a prosperous McLean County farmer.

"The boy who measures his wits against a calf's wits is going to be some man when he grows up."

We should be proud to live on a farm, and bring up our boys there. Three-fourths of the boys who go to town would

have amounted to more if they had stayed on the farm and attended to business. After they get on a starched collar and cuffs, the 'checkered shirt' isn't good enough for them. They get a notion that they are too nice to work. The worst thing in the world to say to the boy is: **'Go and get an education so you won't have to work as your Pa has had to all his life.'** Our boys should be taught to do more of the common, practical things in life. The boy in the country is not unfortunate. He can have just as good an education as the boy who lives in the city. Our schools, in the future, will teach in terms of the lives of people—in terms of the lives of boys. The boy will know quack grass and dodder and alfalfa, and sour soil, and be able to test cow's milk. Give your boy a pig or a calf. Make him a partner in the business and he will love his work on the farm and not try to get away from it.

It is not a hard job to milk cows and care for stock if we take an interest in our work and get our heads in the game. We will find that all work is drudgery unless we like it, put the best we have into it, and use intelligence.

GUARD AGAINST DISEASE

Get Your Head in the Game—Apply Business Methods

By E. R. MOORE,
Area, Illinois

Keep the best cows your circumstances will permit, replacing the poorer ones at earliest opportunities, by raising a few of the most promising calves each year. Give them good care and good feed. Guard against disease, especially contagious abortion, by the greatest watchfulness. This is a strong argument in favor of raising, rather than buying, milking stock. Most important of all, apply business sense and business methods to the production and sale of milk. It is imperative that the producer know to a reasonable degree of certainty the cost of producing milk and the returns therefrom. The business usually reduces to problems of feeding well and cheaply. The most important means to this end is the silo, a close second is alfalfa hay. Having both of these, expensive grain feed need be used only to a limited extent.

BREED FOR MILK PRODUCTION

Survey on 59 Farms in Kansas Show Dairy Breeds Most Profitable

By P. H. ROSS,
County Agent, Leavenworth County, Kansas

Profitable dairying depends upon the intelligent feeding and care of good dairy cows. This consists of the use of good common sense applied to the requirements of the individual cow. Just as a cow's production will never be standardized in quantity or quality, so can the feed never be standardized in amount nor in kind. Brains pay as big a dividend in dairying as in any other business enterprise.

Blood will tell. The greatest producers and the most profitable producing cows always have been and always will be of dairy breeds, bred to produce milk and butter economically. This is strikingly shown in a farm survey conducted by the Leavenworth County Farm Bureau in 1915 in co-operation with the Extension Division of the Agricultural College and United States Department of Agriculture at Tonganoxie, Kansas. Fifty-nine farms included in this survey were dairy farms and the following table shows how the dairy breeds compare with other breeds in producing milk and profits:

Kind of Cows	Number Farms	Dairy Receipts per Farm	Dairy Receipts per Cow	Cows per Farm	Labor Income
Scrub.....	18	\$250.00	\$51.78	5	\$279.40
Dual Purpose..	19	468.00	\$50.76	9	144.70
Dairy Breeds..	22	1,249.00	88.26	15	486.40

Not only did the dairy cows return \$38.00 more per year per cow than the other kinds, but the man who kept the dairy cows received three and a third times as great an income per cow for his labor as the man who cultivated the society of the two-purpose cow. A cow should have but one purpose, and that to make money for her owner.

A good judge of dairy cows is born, not made, **but the scales and tester will make a blind man see the cow who pays her way.** Of these two, the scale is the more important, as one can usually guess much closer to the butter fat percentage of a cow's milk after milking her a year than he can to the total amount of milk the cow produced. Testing the milk twice each

month during the lactation period and weighing each milking is the one best way to get a correct valuation on the individual animal. Because some men succeed without this only emphasizes the profitable nature of dairying and not the advisability of slack business methods.

SET YOUR STANDARD HIGH

**Work by Clock—Milk, Feed and Water Just As Promptly
as You Go to Your Own Meals**

By ARTHUR D. CORNUE,
Hebron, Illinois

Regularity is one of the most important things leading to successful dairying. Work by clock; milk, feed and water just as promptly as you go to your own meals. Get the best cows you can, get a pure-bred bull from the breed you like and raise your cows. Join a cow-testing association, which is the cheapest way

This cow, owned by Mr. Cornue, gave over 14,500 pounds of milk last year.

to locate the poor cows. If you can't join one, get scales and a Babcock tester and go at it yourself. Weigh your milk from each cow and keep her record. Set your standard high and make them come to it as fast as you can.

We can just as well have cows that give eight or ten thousand pounds of milk and 350 or 500 pounds of butterfat, as poor cows, which will eventually put you out of business.

Raise as much of your own feed as possible, put up a silo or two and fill with the very best corn you can raise, then raise clover and alfalfa. Alfalfa is the best, but clover is good.

Buy such feeds as oil meal, gluten, bran or cotton-seed meal. Now in a few words—be regular, clean, gentle, love your work, have good, pure, warm water and a balanced ration of good, wholesome feed. With these you can expect to make money.

CARE, FEED, BREED, WEED

Consider These Points Carefully and Follow Them or You
Will Be a Failure in the Dairy Business

By C. B. COOK,
Owosso, Mich.

PROFITABLE dairying has been reduced to a few principles that bring success. These essentials may be treated briefly under four heads: **Care, Feed, Breed, and Weed.**

All of these points must figure or dairying will be a disappointment. Comfortable, sanitary quarters are indispensable to good dairying and such surroundings are becoming generally so recognized by the keepers of cows. The animals are being better protected from heat, cold, flies and filthy conditions than ever before in the history of dairying.

The ration is a most important factor and must be closely studied by every careful dairyman or he will take a subordinate place in the ranks. Many different types of rations are fed by dairymen in various parts of the dairy field. A ration must be balanced, it must be palatable and it must be economical or it should give way to a better compound. A cow giving some 300 pounds of butter a year ought to receive about 2½ lbs. of protein per day and about six times as many heat and fat-forming units for best results.

Breeding is one of the greatest factors for results in building profitable dairy types. The breeds that represent the pure dairy type are the most reliable stock to raise if profits are the goal. **In the last analysis it costs as much to produce a pound of beef as a pound of butter fat, while the latter brings much more per pound. On this basis the pure dairy type has always won over the dual purpose cow.** Sections of the country that have made enviable reputations in dairying are noted universally for their pure dairy conformation. The record of the sires, dams and grand dams, are the greatest factor in breeding quality into dairy cows. The sire then is more than half of the herd when producing animals are to be furnished from the young stock of the farm. Not only should registered sires alone be used, but only those that spring from a long line of ancestry carrying a fine record of performance. With good feed and modern stables a man may produce but indifferent results if this most important point is overlooked. Cases to prove this point are numerous on all sides. Mr. Cutler, a farmer at Wayland,

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Michigan, with a modest herd of registered dairy cows four years ago bought at an auction a bull calf for \$315, giving his note in payment for the youngster. The stock from which this calf sprang had a record of not less than 30 pounds of butter per week for several generations back. On the strength of this bull's pedigree, Mr. Cutler sold two heifer calves last fall for \$600 and had eleven more equally good ones left to build up his herd. These heifers have completely outclassed their dams and have placed the owner in another class of dairymen.

For the best efficiency measures, the question of weeding is also vital to success. The dairy function is one most highly specialized and abnormal. Some animals will fall below their class and must be eliminated from the herd for best results. The weeding process enables the progressive breeder to save his young stock only from the best cows, thus insuring rapid movement toward a superior line of stock, that always moves quickly at a long price when there is a little stock to spare.

Pasture Rolling Lands

DETERMINATION TO SUCCEED WILL BRING SUCCESS

Valuable Experience of a Maine Dairyman —How He Put Brains Into His Work and Made Good

By ROY HAMOR,
Bar Harbor, Me.

PERHAPS in giving my experience in the dairy business a short outline of the conditions here would not be out of place. Our farm is situated on the Island of Mt. Desert, three miles from Bar Harbor, which is one of the finest summer resorts on the coast of Maine, if not in the world. Mt. Desert is a small island, seventeen miles long and twelve miles wide, connected to the main land by a toll bridge of three quarters of a mile in length.

The farms are all small, in fact, 100 acres are considered quite a tract. Freight rates make feed very high and the growing season is short, so the dairy business here consists of the production of sanitary milk and cream principally. We came in possession of this farm in 1904 and it had at that time eighteen head of cattle and one bull of unknown origin.

Cows Did Not Pay For Their Feed

We found by weighing and testing our milk that they were hardly paying for the feed consumed. After six months we had sold, or to put it better, almost given away all but three of these and replaced them with high grade Jerseys. We found this a very expensive way to improve our herd, so we purchased a registered bull and since that time have raised from three to five head of young stock a year to keep up to the size and standard of 6,000 pounds of 5 per cent milk for Jerseys and 9,000 pounds of 4 per cent milk for Holsteins as a minimum production.

Of our farm there is approximately 50 acres of cleared land and the balance of pasture and wood lot. Last year we raised 50 tons of hay, 50 tons of ensilage, 400 bushels of mangle beets, 250 bushels potatoes, 40 barrels apples, and soiling crops for 30 head of cattle. For soiling crops we plant in the fall, winter wheat or rye, and clover for the next spring. Early in the spring we sow barley and mammoth red clover. Next comes Canada peas and oats, Japanese barnyard millet, corn to feed in September, barley for late fall feed, and barley and clover for the next spring.

Rotate the Crops

Our rotation is: First year, potatoes and phosphate on green sod; second year, corn with 20 loads of barnyard dressing and 800 pounds of phosphate; third year, oats and peas with barnyard dressing; fourth year, winter wheat and clover on high ground and timothy and clover on low meadows. We also apply lime and raw rock phosphate as needed to correct the soil.

One of the things most needed in the dairy business is a determination to succeed. At the start I found many disappointments, especially in the raising of young stock. If you raise a heifer and she is not up to the standard, look for some good reason, and if not found, send her to the butcher and forget what she cost, but remember what she will cost if you had kept her to eat the profit off the good ones. House and feed your stock well, but not with extravagance. Buy all the machinery you need to make your farm a place where the least manual labor is used. I do hardly anything by hand except milking and am thinking of putting in a milking machine this year. Choose the kind of stock you fancy. If you have a sale for any special breed of stock, or kind of milk, look well and see if it will pay. If so, buy or raise that stock. As you can see, I started with Jerseys, but found I had a call for Holstein milk. By supplying this it helped my Jersey business to a very large extent.

Above all, use a registered sire, the very best you can afford, and remember that a bull is at least half of your herd, and a good one is cheap at any price. In conclusion will say that my farm has paid since the second year. Last year I sold surplus young calves at figures that would surprise those who do not know the demand for good stock, once you have a reputation for square dealing.

Dairy Herd of Herman Schultz, Downers Grove, Illinois.

THE NO-PURPOSE COW

Cull Out the Scrub Cow or You Will Go Out of Business. How to Feed for Profit--Some Common Mistakes Made By Dairymen

By C. E. BROWN,
Elk River, Minnesota

THE GREAT cry of the dairyman is for better cows, and generally the cheapest and most efficient means of bringing about improvements are along the lines of breeding and selection. We hear a great deal about the dual purpose cow and when good ones can be obtained they are all right. **However, the great menace to the dairy industry is the no-purpose cow.**

In common farm herds we are very apt to find three classes of cows in the same herd. **We find those which use their feed for the production of milk, those that use their feed for the production of beef and still others which produce neither beef nor milk at a profit.** These unprofitable cows should be eliminated from the dairy herd if the dairy is to be a paying investment, because poor cows cut down the profits returned by the good cows. Only by careful selection and culling out and by breeding along dairy lines can the herd be built up cheaply.

Feed for Profit

There are a great many cows throughout the country that are not making as large returns as they should simply because farmers will not give them a chance. This is due to the fact that many farmers do not understand the fundamental principles of feeding.

Many farmers feed the same amount of grain to each cow regardless of her size and record of production. They should keep a daily record of the amount of milk given by each cow, have the milk tested from time to time and then feed enough of a balanced ration to maintain the production, or to increase it if possible.

A large cow generally uses more feed for maintenance than a small cow and this should be taken into considera-

tion. I believe that every farmer should obtain a table of feeding standards such as are put out by reliable authorities. T. L. Haecker of the Minnesota Experiment Station has compiled a set of feeding standards which are very complete and reliable. These are sent out in bulletin form and may be had by any farmer if he sends for one. The bulletin is No. 130, "Feeding Dairy Cows."

Feed According to Need

I have known of instances where the cows were fed beyond their requirement, but more often it is the other way, and the best cows are not given a chance to do their best. I knew a farmer who bought a cow from a neighbor who was selling her because she was such a big eater. He said that she would eat her own feed and then rob the cows on either side of her. She was a large cow, weighing three or four hundred pounds more than any other cow in his herd, but she was capable of producing ten thousand pounds of milk per year. He did not take this into consideration, and he fed them all the same amount. This cow proved to be a hundred point cow. She paid a big profit on her feed and care.

There are too many farmers who are afraid to buy feed to balance up the ration. They will often feed any feed they happen to have regardless of the amount of nutriment it contains.

Some farmers balance the grain ration very well, but provide poor and unsuitable rufage. Too many farmers think that if they feed a suitable grain mixture they can neglect the rufage question and give the cows anything to fill them up. **Rufage should not only contain nutriment, but should be relished by the cows.** While rufage is ordinarily a cheap feed, it is possible for it to become an expensive one if the cows refuse to eat it, and in this way unbalance their ration. Rufage should be taken into consideration when balancing the ration.

Another mistake which is made by many farmers is lack of feed and care of the cow before freshening, especially cows that freshen in the spring. A cow that is wintered poorly with nothing but rufage will be thin in flesh in the spring and when turned out on pasture, the first thing she will do is to put on flesh instead of giving a big flow of milk. That is only complying with nature's law. By the time the cow has built her body tissue and is ready to give milk it is fly season, and this is followed by short fall feed and the cow has been under a handicap the whole season. **The**

cow that freshens in the fall has a great many advantages over the cow freshening in the spring because she has been on pasture all summer and is in better condition. However, after she has been dried up she should not be neglected. It is the busy fall season and the farmer is apt to neglect the dry cows and let them run down. This is at the time when they are changing from pasture grass to hay and they should receive care and attention. I believe that I have mentioned some of the common mistakes made by farmers, and have in a general way given a few facts which may be beneficial to dairymen.

GROW INTO THE DAIRY BUSINESS

By M. F. BUNDY,
Genoa Junction, Wisconsin

MY EXPERIENCE, to make a success of the dairy business, is that one must start with such a herd as he can obtain and grow up with it. He must purchase the best sire that he can afford. A man can put as much money into a sire as he has left after buying his herd. With a grade herd it is necessary

A Grade Which Gives 70 Pounds Daily
She has freshened within the last month
and is now giving nearly 70 pounds daily
after a severe case of milk fever

to have an exceptional individual to offset the bad qualities of the grade cow. By raising the heifer calves from his best cows (which he will find by the use of the scales and tester), he can increase the flow of milk and butter fat from the individual. But this is not the only phase of the game. Without the proper feed the best individual would be no better than a

scrub. Feed a balanced ration which is palatable and not too expensive or the profits will be reduced. Alfalfa is the best of rufage and the cheapest form of protein. Corn silage made from mature corn is the best succulent feed outside of grass—nature's own feed. The ground feed will depend on the locality. Care is also very essential. One must cater to the animal's wants if he would make her the most profitable.

GOOD HEALTH, CLEAR JUDGMENT, ENERGY

Keep Everlastingly at it—Grow Your Own Feed—
Have Good Cows and a Good Bull and
You Can't Lose

By SAM. B. WOODS,
Crown Point, Ind.

TO BEGIN with, the man who conducts a dairy farm must be bred and fed right. He must have good clear judgment, good health and plenty of energy. He should have a good wife who is not afraid to work. The dairy business is on the

Dairy Herd on the Farm of S. B. Woods.

higher order of farming and it is the nearest thing to perpetual motion ever discovered. Long hours and everlastingly at it are necessary for the best results. One of the most important things is that the farm will grow corn, oats, clover, alfalfa, etc. If it is not well drained, tile drain it. There is 50 percent to 100 percent in money well invested in tile drainage. The buildings need not necessarily be very expensive but must be warm, have good floors, plenty of sunlight and ventilation, plenty of silage and storage room for hay, grain and corn. Get the best cows you can afford, and have nothing but a good bull. This is important. The man

who buys a good bull, raises good heifer calves and sells off the poorer cows, will soon develop a good business, and that is what he must have if he is to make money in the dairy business.

Feed an abundance of corn silage, winter and summer. Grow alfalfa, soy beans and cowpeas for hay. Don't have too much in pasture, but sow oats and Canada field peas for early soiling crops, and corn to fill the silos. **Keep the cows full of good feed—keep them busy working up good feed into a money product. A cow that is bellowing over the fence for something to eat is wasting her time and will probably waste yours in getting her out of the corn field and fixing fences.**

The next important thing is to take some of this money the good cows have made you and build a good home for your wife, boys and girls. Make them think the dairy farm is the best place on earth. Don't buy more land to keep more cows and lose your boys and girls.

THE MAN AND THE COW

Success in Dairying Depends Upon the Man Behind the Cow

By RAY MEEKER,
Muncie, Indiana

I consider the most important points in the dairy business as follows:

1st: The Man. He must like and take an interest in his work; he must be thoroughly versed with feeds and feeding; know how to mate his animals successfully and care for his calves.

2nd: The Bull. A good prepotent bull always insures high production in the young herd. Some bulls have been known to increase the producing capacity of heifers from 100 to 150 pounds of butter fat more than their dams. A good pure-bred sire is always cheapest in the end.

3rd: Environment. Cattle, in order to do good, must be kept in a comfortable stable, where there is plenty of light and ventilation through the winter, and in summer must have plenty of shade and air. Cattle must always have plenty of fresh water.

4th: Cow Testing. The cow has been likened to a machine, and some machines are better than others. By testing you are able to distinguish the good ones from the poor ones.

FEEDING CALVES ON SKIM MILK

Good Advice in the Feeding of Calves--Under-Feeding Better Than Over-Feeding.

By E. F. BURTON,
Wyoming State Dairy Division, Laramie, Wyoming

THE CAUSE of failure in feeding calves on skim milk is due to over feeding, dirty feeding buckets and an improper ration. Usually over feeding of milk in dirty pails is the seat of most of the serious troubles.

One must keep in mind the fact that the young calf has a small stomach which cannot hold more than two or three quarts of milk, depending upon the size of the calf. And if more than this amount is fed the calf gorges itself so that some of the milk is forced through the stomach into the intestines before the proper digestive processes have taken place. This causes indigestion, colic and scours. For this reason underfeeding is less objectionable than overfeeding. If there is a surplus of milk throw it away rather than overfeed the calves with a view of saving the milk. To feed it to the calf may save the milk, but cause the loss of the calf.

The amount of milk to be fed when the supply is plentiful should depend entirely upon the size of the calf. The following is a good guide to follow:

For 1st 100 lbs. in weight feed 10 lbs. of milk per day.

For 2nd 100 lbs. in weight feed 5 lbs. of milk per day.

For 3rd 100 lbs. in weight feed 2.5 lbs. of milk per day.

Whole milk should be fed for the first week, when skim milk may be added in small amounts at first and gradually increased by about 1 pound per day until at the end of 15 days the whole milk may be discontinued entirely. It is usually well to let the calf nurse its mother for the first two or three days. The longer the calf stays with its mother the harder will it be to get it started to drink. If there is any trouble experienced in this respect let the calf go until real hungry, when it may be induced to suck one's finger. This accomplished, little further trouble should be had.

Fix stanchions so that the calves may be tied up while being fed milk. The calves should remain tied after feeding until they have ceased to try to suck each other's ears. The habit calves form of sucking each other's ears is extremely bad for the calf,

causing colic and scours many times. Don't guess at the amount of milk to be fed—measure it. A calf whose appetite is satisfied is overfed.

Care should be exercised in feeding milk rich in fat. One reason that Jersey and Guernsey calves are so badly troubled with scours is due to the milk being too rich in fat. Best results are found when milk tests about 3 per cent. More fat than this is not needed and is often harmful. The milk must be warm and sweet to get good results. Let the calf miss a meal rather than feed sour milk. Be regular in feeding. This is important.

Two pounds of grain in the calf's ration is equal to 1 pound of butter fat. This being true, grain should be fed with skim milk. The most satisfactory amounts to feed will be: For the first three months, feed 1 pound of grain for each 10 pounds of milk, and for the next three months, feed 1 pound of grain for each 5 pounds of skim milk.

Bran is best for getting the calf started to eating grain, and can be fed on top of the milk to start with, or a small amount may be put in the calf's mouth after it has had its milk. The calf will soon acquire a taste for the bran and will then readily take any grain ration. Calves can be induced to eat grain at 2 to 3 weeks of age. Always feed grain dry after the milk.

Corn is the best grain to feed. Feed it as meal until the calf is 4 weeks old when whole corn may be substituted. Barley is about equal to corn but should be ground. Oats are good. Wheat bran may be combined with any of the grains to advantage, especially with barley.

Alfalfa or other kinds of hay should always be fed liberally to calves as soon as they will eat it. As soon as pasture is available give the calves access to it. Silage is excellent for calves. Salt should be supplied. Good clear water must always be available even though calves do get milk.

Clean yards and stables are important, since scours are often contagious. Many treatments are advocated for scours. Dried blood may be used at the rate of one teaspoonful to the feed. Most likely the best thing to use is formalin. Mix 1 ounce, or 2 tablespoonsful, in $15\frac{1}{2}$ ounces of water and add 1 teaspoonful of this to each pound of milk fed. Seldom ever will it be necessary to use more than two treatments. As soon as scours appear cut down the feed—one meal may be missed. After the calf has missed a meal be careful that too much is not fed at the next

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time. Prevention is better than the cure—remove all possible causes of trouble.

At Nebraska it was found that a calf could be raised properly to 6 months of age on the following amounts of feed:

Feed	Amount	Price	Value
Whole milk.....	175 lbs.	\$1.50 per cwt.	\$ 2.63
Skim milk.....	2700 lbs.	.25 per cwt.	6.75
Grain milk.....	125 lbs.	1.00 per cwt.	1.25
Hay.....	450 lbs.	.50 per cwt.	2.25
		Total....	\$12.88

COST OF PRODUCING 100 POUNDS OF MILK

**Results of Tests Made Under State Supervision by 10
Different Experiment Stations, Give \$1.97 as Average
Cost to Produce 100 Pounds of Milk**

Lynderboro, New Hampshire, Cow Test Ass'n.....	\$1.93
Massachusetts Experiment Station.....	2.42
Storrs Agrl. Experiment Station, Connecticut.....	2.12
New Jersey Experiment Station.....	1.94
Delaware County, New York, 1912.....	2.35
Delaware County, New York, 1913.....	2.03
Kent County, Michigan, 1914.....	1.67
Kent County, Michigan, 1915.....	1.58
Livingston County, Michigan, March 1916.....	1.83
Livingston County, Michigan, April, 1916.....	1.85

Average cost of producing 100 pounds of milk, ten experiments.....\$1.97½

PRODUCE MILK WHEN MILK IS HIGH

By A. WILLBRANDT,
Algonquin, Illinois

Give good cows good care. Feed well on a good balanced ration. Have them come fresh in the fall so as to get the most milk when the price is the highest.

PROPERLY FEED AND CARE FOR YOUR COWS

KEEP CLEAN AND HEALTHY

Rules Published by the Ohio State Dairy and
Food Department

Health—Cows must be in good health and free from disease. Cows known to be afflicted with tuberculosis and those having any other contagious disease must be removed from the herd. Milk from such cows and from those having a swollen jaw, inflamed udder, ulcerated teat or running sore shall not be used.

Comfort—Clean bedding only can be used. Dusty or moldy hay or horse manure shall not be used for bedding.

Food—Decaying silage, fermenting brewers' grains, fermenting malt, distillery waste or moldy feed shall not be fed.

Water—Drinking water must be clean and fresh. Wells and devices used to furnish same must be free from foreign matter and contamination.

Cleanliness—Cows must be reasonably clean while milking. When cows have dust on backs, particles of manure on sides or udders or other foreign matter on their bodies which might gain access to the milk pail, they are not clean.

Have Light, Well Ventilated Stables

Location—Stables must be free from contaminating surroundings. Location must be well drained. Piggens, chicken coops, stagnant water, mud holes, manure piles or privies within 100 feet are contamination. If horses are kept in the same barn with cows a tight partition must separate them, unless they are separated by an open air space of at least 12 feet. Dust in the stable while milking is a contamination. Stables must be provided with a tight, sound floor with sufficient incline to drain readily. Walls and ceilings must be tight.

Light—Two square feet of glass to each cow must be provided.

Ventilation—Ventilation means the removal of impure air and the supplying of fresh air without drafts on the animal, and in such a way as to conserve as much as possible of the animal heat of the cows in cold weather. This must be provided for either by an automatic system or adjustable windows. At least 300 cubic feet of air space for each cow must be provided.

Cleanliness—Manure must be removed daily from the stable to a distance of not less than 400 feet to preclude the chance of odors getting back, unless sufficient straw, shavings or absorbents are used.

Floors—Floors must be kept clean by careful sweeping and washing. An earth floor must not be used.

Walls—Walls must be kept free from manure. Walls and ceilings must be whitewashed or made clean and sanitary or disinfected in any other manner equally effective.

Utensils—Utensils must be of smooth, non-absorbent material as tin or tinned copper, the seams of which are flushed smooth with solder. They must be clean to superficial inspection. After being washed they must be scalded with boiling water or steam and inverted in pure air to drain.

The water supply for washing utensils must be free from contamination.

Milking must be done in clean suits with clean dry hands and udders of the cows must be clean before being milked.

Milk as soon as drawn shall be immediately removed from the stable to a room or house used exclusively for the straining, cooling, bottling or canning of milk or for the washing or storing of cans or other utensils and appurtenances.

The Milk House—The milk room or house shall be located on well drained land whose surroundings are free from contamination. The milk house or room must be well screened or otherwise protected from the intrusion of flies, fowls and animals. If attached to stables it shall have an independent outside entrance. However, if attached by doorway, there shall be a ventilated passageway with self-closing doors at each end, only one of which can be open at a time. The walls and ceilings shall be tight and either oiled, painted or white washed so that same be kept clean. Light and ventilation shall be provided. Floor shall be of impermeable material, sloping so as to give good drainage.

Milk shall be cooled to a temperature of at least 60° F. before it leaves the premises, unless, in case of immediate delivery at wholesale where receiver is prepared to receive it properly.

If cream is produced, skimming or creaming shall be done in the milk room or house, and shall be stored in the same manner prescribed for milk. If to be sold or delivered, it shall not be kept longer than three days in summer or four days in winter.

TEST, WEIGH, CULL

The Best Cows Will Fail Without Good Feed and Care

By M. JESNESS,
St. Paul, Minnesota

The selection of dairy cows for profitable milk and butter production goes hand in hand with the testing and weighing of the milk. The type and conformation of a cow, although indicating to some extent the dairy tendencies of that individual, are by no means reliable in selecting good cows. The only reliable method of selecting the good animals from the herd and weeding out the poor ones, is that of weighing and testing the milk from each cow separately at periodic times throughout the year. The cow-testing association is still rather new to most farmers and comparatively few have started this line of work. The milk is weighed and tested once a month, and record is kept of milk, butterfat, value of product, feed consumed and profit above the cost of feed. It has been estimated by the United States Agricultural Department that carefully conducted tests taken once a month will come within 2 per cent of the actual production, which would be accurate enough for all practical purposes. These associations also create interest in dairying in their particular communities. The dairyman seeks better methods of feeding and gives more attention to the care of his cows.

Don't Be Careless With Cows

The sire is another factor of vital importance in getting a good herd of dairy cows. The average farmer lays very little stress on this. With an average grade sire the chances of improving the herd is very slight, while the rise of pure bred sires from producing families is almost certain to bring good results, giving higher production and more valuable offspring.

The care and feeding of cows is perhaps as important as anything else, for without proper care and feeding, the best of cows are at a decided disadvantage. **The majority of farmers are careless when it comes to caring for the cows. Many turn them out in winter during the coldest weather for perhaps three or four hours at a time. This is a sure way to cut the milk flow to a minimum. The feeding of bundle corn outside in winter is poor practice for it keeps the cows out too long. Some farmers feed only rufage to their**

cows; **this is entirely justifiable if a good part of their ration is made of good quality clover or alfalfa hay.** However, milk flow cannot be kept up on corn silage and timothy or wild hay. It is advisable to add some concentrate high in protein to a feed of that kind. Whether it is profitable to feed grain to dairy cows, depends on the cows and the price of grain and the price received for milk or butterfat. With good average cows at ordinary prices for feed and butterfat, there are undoubtedly good profits in feeding grain. The common rule for feeding cows is 1 lb. of grain to 3 lbs. of milk. The grain ration should be made so that with the rufage a balanced ration will be formed. The essentials of feeding and care of cows may be put down as, **balanced rations—succulent and palatable, with moderate temperature, comfortable surroundings, reasonable exercise, and regularity in feeding and milking.**

GROW ALFALFA—HAVE SILOS

Do Not Have Pastures Where Land is High Priced

By ARTHUR CATLOW,
Barrington, Illinois

This is my 18th year in the dairy business. When I first started **I bought cows of cattle dealers, I bought in the fall and sold what I thought poor cows in the spring. I did this three years and found myself getting poorer every year.** The next fall I decided to buy no more cattle from cattle dealers, so I looked around among the farmers and bought ten head of 2 and 3 year-old heifers bred to a pure-bred bull. The man I bought the heifers from advised me to buy a pure-bred bull, which I did.

To make money from cows, you must have good cows and a good farm which any man can have if he uses his brains. I feed a balanced ration, weigh my milk and test it. Keeping the cows clean is one of the best paying things I do. **I used to raise timothy, but no more—alfalfa for mine.** I use one ton of limestone an acre a year on alfalfa; that is, every year sow five acres and put five tons of limestone to the acre before I sow and in this way I plow five acres and sow five acres every year. For the last seven years I have had no pasture, as it is the highest priced land any man can have. The silos are cheaper and better.

RAISE YOUR OWN STOCK

Don't Buy Feed That You Can Produce at Home— Cut Out the "No-Purpose Cow"

By JOSEPH CREER,
Orland, Illinois

To make a success in the dairy business a dairyman should first procure cattle that are adapted for dairy purposes. A large percentage of the smaller dairy farmers keep a class of scrub cattle. Some of these cattle will produce a good flow of milk for a certain period after freshening, but, as a rule, they soon commence to dry up and lay on flesh and the farmer sells them to the butcher or cattle dealer, rather than hold them over till they freshen again. I am sure there is quite a percentage of this class of scrub cattle that would not pay their board under any conditions. The cows that are bred for dairy purposes, naturally turn the feed that they consume into milk, instead of laying on flesh.

The dairy farmer should produce most of the feed for his cattle on the farm, in place of having to buy considerable milk-producing feed on the market. Every dairy farmer should have a silo. If he can have two silos so much the better, the small one for summer use and the

The Feed Lot on many farms. The manure pile on the water's edge contaminates the water supply; the fertility is rapidly leaching out of the manure, and the surroundings are unsanitary and unfit for stock of any kind.

larger one for winter. If these are filled with good feed in the fall he doesn't need to worry about what he is going to feed his cows when the dry weather comes and the grass stops growing. Plenty of clover or alfalfa should be grown on the farm to be fed in connection with silage. Good corn fodder from corn that has been thickly drilled in rows, also makes a splendid feed for a change. Cows like a variety, but they must have feeds that are rich in protein in order to produce a large amount of milk.

Cattle should be kept in well lighted barns where there is plenty of ventilation. They should be fed at regular intervals and have access to plenty of water. A tank heater should be used in the water in winter to take the chill off, and they should have plenty of salt, either placed in their feed or in a box in the cow yard, where they can get it at will, and they must have good care.

KNOW HOW TO PRODUCE AND MARKET

Big Problem in Dairy Business is How to Dispose of Products at a Profit

By W. A. WATERMAN,
Auburn, Maine

The success that a dairyman achieves depends largely upon his ability, situation, and kind and adaptability of dairy cattle.

First: He must understand his business, not only how to get good yields from his cows but how to dispose of the dairy products and surplus stocks to the best advantage. There is much to be said about the care and management of dairy cattle, **but to my mind more attention should be paid to the selling of the dairy products and the surplus stock.**

The creameries make a first class dumping place for dairy men to dispose of their products, but the man that is in the dairy business for the last dollar cannot afford to dispose of his products in this way if situated near a good market for milk, cream or butter. Any dairyman producing a clean, wholesome product can usually find a ready market for same at a much better price than the average creamery is willing to pay.

Cut Out the Scrub Cows

The matter of disposing of the surplus dairy stock to the best

advantage is worth a little thought and consideration. Too many dairymen are content with scrub or grade cows, when pure-breds would pay them a much larger profit. It costs just as much to maintain a scrub cow as a good one—calves from scrub cows are not worth much—good calves will add to the standard of the herd. If more dairymen would dispose of their worthless scrub bulls, and buy a pure-bred sire of whatever breed they like best, or is best adapted to their locality, they would see a marked change.

The dairyman who studies his animals and knows which cows are paying a profit, is careful about the way he feeds, careful about marketing his best pure bred stock, tests for official records and then lets the public know what he has in surplus stock, is sure to find dairying a pleasure as well as a profitable business.

GROW ALFALFA—ROTATE CROPS

By CHAS. CONLEY,
Huntley, Illinois

Keep good cows and give them good care. Balance the feeds for milk. Raise your own cows. Keep pure bred sires. Select your best calves from your best cows. Sow clover everywhere you can on a dairy farm. Establish alfalfa. Rotate your crops. Keep good horses and few of them. Keep no hogs except for your own use. Make your own butter and feed the skim milk to the calves. Have a small cream separator for this use. Keep the most modern farm machinery and take good care of it. Keep your dairy barn in a good, clean condition, having it well ventilated and well lighted.

COWS—FEEDS—MARKETS

If You Market Milk, Have Milk Producers; If You Sell Butter Fat, Have Butter Producers

By CURTIS C. TAYLOR,
Kennebunk, Maine

I think the question of making the dairy business a paying proposition can be divided into three distinct heads: Cows, Feeds, and Market.

1st. The Cows: If the dairyman is to sell milk, he should select that breed of cows which will give him the greatest amount of milk and should pay strict attention to their breeding and development, so as to gradually and continually increase the amount of milk per cow. He will find the scales an important factor in this line. If he makes butter or sells cream he will find it to his advantage to select another breed. In this event he will require scales and Babcock tester in his work of grading up and increasing the butter fat contents of the milk produced by his herd.

2nd. The Question of Feed: There are two distinct phases of feeding proposition—**adaptability** and **cost**. He must feed for milk production, body condition and general health. Under the cost of feed belongs the balance sheet; whether it is a profit or a loss he should not choose cheap feeds simply because they are cheap in cost but rather from their degree of adaptability and digestiveness.

Eastern farmers buy too much grain. We get good prices for our product but turn around and pay it out for grain. If we would raise it on our own farms we would be far ahead at the end of the year. We can raise grain for less than it costs to buy it, get better grain and to my way of thinking that is what we must do in order to make a success of the dairy business.

3rd. The Market: We have little difficulty in finding a market for first-class dairy products, as the demand exceeds the supply practically all the time.

My own personal experience of 10 or 12 years bears out these things which I have written. I retailed milk for over seven years and am at present making butter. I weigh all my grain at feeding and weigh my milk each day. Work with your hands and head and you will succeed.

SELL BUTTER FAT—FEED SKIM MILK

By W. D. STEIL,
Prairie View, Illinois

I remodeled my barn last year, putting in up-to-date barn equipment and have plenty of big windows. An important thing is to have a good sire and raise all the heifer calves, which I am doing. The next is to have a good milkhouse. I have a pressed brick milkhouse with a 14-inch hollow wall and a big cement cooling trough in it. I milk 19 cows at present. **I think if a farmer would get a power separator and separate his milk and raise hogs and calves on the skim milk he would make more money than by selling his milk.** I have an International "Famous" 3-horse engine, which we use for pumping water, sawing wood and cutting stalks. I intend to get a small mill next winter. I have also a McCormick Grain Binder which made the 24th year last year, and it is still in good condition. I have also a Clover Leaf Manure Spreader which is a handy tool, if I could not get another one, I would not sell mine for any amount of money. I raise some hogs, but not very many, since we don't get anything back from the creamery for them.

Cows in a sanitary dairy barn. Note the cement floor and bedding under the cows.—Courtesy Portland Cement Ass'n.

GOOD DAIRY ADVICE

Don't Allow Dogs to Chase Cows—How To Keep Milk

By GEO. BARTLETT,
Geneva, Illinois

Some essentials to profitable dairying are pure bred, large type, well fed cows. Raise calves from best cows, raise your own feed. Have cows freshen in fall of year, they will milk well through winter and do well when grass comes. Provide regular feeding and watering by steady help. Don't allow bull to run with cows, especially young heifers, which should be bred when they are about 14 to 18 months old.

Don't allow dogs or horses to chase cattle, as it may cause trouble at calving time. Cows should be placed in box stalls several days before calving and fed bran and clover hay. No heated feed such as would cause a fevered condition should be given them. Rub a little salt on calf as soon as dropped. The cow will taste salt and lick calf off well. Don't allow calf to have much of first milk. Don't milk cow out perfectly clean first milking. Cows should be kept in well-ventilated barns. Have each cow in same stanchion every day. Swinging stanchions are advisable, as cows rest easier. Have partitions between all cows and allow at least 3 feet 4 inches to 3 feet 6 inches for each cow, thus preventing them from stepping on their teats. Clean cows before milking, strain milk in can; when full place in water and cool to 55 degrees. Don't mix warm and cold milk together. Stir milk while cooling to get even temperature.

HAVE COWS FRESHEN IN FALL

It Pays to Feed Dry Cows—Have Cows In Good Flesh When They Freshen

By A. W. ABBOTT,
Downers Grove, Illinois

Keep no cows that will produce less than 6,500 lbs. of milk a year. Use a pure bred sire from high producing ancestors. Raise the best heifers and see to it that the heifers are well fed. Have the cows freshen in the fall, September or October, preferably. Raise enough alfalfa to feed daily for at least 300 days. Put up enough silage to feed the year around. Feed grain in proportion of 1 lb. grain to $\frac{3}{4}$ lb. milk. Weigh the milk and weigh the grain. Keep the cows in the barn all the time, or as

much as possible, especially in bad weather. Water at least twice a day. **Feed a dry cow well, it pays big. Have cows in good flesh when they freshen.** As to grain rations: Feed home grown feeds (ground) as far as possible. Corn and oats are the best. The **addition of $\frac{1}{3}$ wheat bran** makes ration bulkier and adds to palatability. A pound of oil meal a day will keep the cow in splendid shape, keeps her bowels loose and her hair slick. If there is trouble on account of cows scouring, the substitution of cottonseed meal in part or whole will help check this condition. Do not waste any money on stock tonics or foods. With a herd of cows giving 8,000 lbs. milk annually and 6 tons silage, 3 tons alfalfa and 2,500 lbs. grain, to each cow, a man cannot help but make money, unless he spends it all for keep, and then he will have to keep lots of it at that.

GOOD CARE WILL SAVE FEED

By OTTO OSBRAND,
Peotone, Illinois

To make the dairy pay: First of all, **good care.** **Good, warm water in winter** will save a lot of feed. Also good, clean straw to lie down on will save a lot of feed. Feed all they want. For summer a good clover and blue grass pasture is the best green feed with silage corn when the grass becomes short in July and August months. A dairy farmer should always keep the best cows, as they are the most profitable.

SHORT COURSE TRAINING FOR DAIRYMEN

By FRANK J. BENDER,
Hobart, Indiana

An important and essential factor in successful dairying is the selection of a breed of cattle which is suited to the locality. Another factor is keeping of individual records of each cow in order to find out which ones are returning the greatest amount of profit. You can select the choicest heifer calves. After the herd is selected comes the great question of feeding which we believe can never be too thoroughly taken care of and to which we think many farmers give too little time and care. It is our firm belief that every dairy cow should be fed a balanced ration at all times, both during her lactation period and during her rest, which for a good producing cow should be from three to six weeks.

With our experience, we have found that every calf being raised should be kept growing and never allowed to stand still or get thin. Breeding of the Holstein cattle should be put off so as not to let the heifers come fresh before they are 2½ to 3 years of age, when they attain full growth. The herd should never be allowed to run with bull.

Every farmer should keep in touch with the advancement of the best herds in the country.

I think it a great advantage for all the farmers that can possibly do it to take a short course in dairying at some college. I have had the privilege of so doing and I can truthfully say that I find it of great help.

FIT THE COW TO THE BUSINESS

If You Wish to Sell Cream or Make Butter, Have Butterfat Producers—If You Sell Products to Cheese Factory, Have Milk Producers

By CHAS. W. PETERSON,
Darlington, Wisconsin

If you are going to sell milk to the cheese factory and want to produce more milk testing the lowest in butterfat, get that kind of cow. If you wish to sell cream or make butter, get the cows that have rich testing milk, as you do not have to handle nearly so much milk or be as long separating to get the same amount of cream. Feeding and milking should be done at the

same time each day, as changing makes a difference in the flow of milk. Handle all cattle quietly and do not abuse them. It is best to have the same man to milk the same cows each day. The care of the milk is very important. It should be cooled very quickly if you wish to keep it good. The cows should be kept clean and dry and not allowed to run out in bad weather.

APPLY BUSINESS METHODS

By CHAS. KUEBKER, JR.,
Grayslake, Illinois

I consider good cows, proper equipment, and a good business man the three great essentials of successful dairying. In running a dairy, keep account of the various deals and records of different departments, for without a set of books, losses and gains cannot be computed.

Good cows come next, and while I haven't anything but a mixed herd, it is a herd from which the boarders are being eliminated. I have no pure bred sire, but the one I have is the best that I could get, as I consider performance from a cow to be better than registration papers.

Keep cows in sanitary quarters, well bedded and plenty of light, have adequate machinery to carry on the business in 100 per cent efficiency, both in field and in the dairy. Preserve the fertility of the soil to the best advantage, growing heavy producing crops and returning them to the field in the form of manure.

HIGH POINTS IN SUCCESSFUL DAIRYING

By LOUIS P. ZIMMERMAN,
Waseca, Minnesota

Try to make each individual cow stand on her feet. To do this:

1st. Raise good cows—they cannot be bought.

- (a) Use the best sire you can get.
- (b) Pick out the best cows by yearly records of butterfat.
- (c) Cull the yearlings and heifers closely.

2nd. To make good cows pay, have fall-fresh cows (September to December) because:

- (a) Butterfat is highest in winter.
- (b) Better feed and no flies to bother.
- (c) More time to give to cows and calves.

3rd. Plenty of good feed in balanced ration:

35 pounds silage.

15 pounds clover hay.

3 pounds bran.

3 pounds wheat middlings.

A little gluten or cotton-seed to best cows; corn fodder in fall instead of silage, and for young stock all winter.

A good barn, warm and well ventilated, plenty of light, water cups inside and convenient for men to handle hay and manure.

Keep enough hogs to use skim milk economically at all times.

Use a milking machine to reduce labor.

PRODUCE PAIL FILLERS

By H. I. COON,
Maplehurst Farm, Walworth, Wisconsin

Select good cows of high grade or full blood stock of some good milk producing breed and stay by that breed. Select a pure blood sire from the best milk strain. Raise your own stock by careful breeding and feeding to produce pail fillers with which to replenish your herd. Feed the cows a good balanced ration. Give them plenty of good water and salt; milk at regular hours—as far as possible by the same hands. Keep the cows clean and well bedded, giving them plenty of fresh air and light. Keep them free from excitement, test every cow, sell the poor ones and keep only the best of your herd.

WARM THE WATER FOR COWS

Raise Own Feed—If You Buy Feed There Is Nothing in the Dairy Business

By ALBERT YAGER,
Blue Island, Illinois

The most important thing to make the dairy business pay is to build silos large enough to feed in winter with a little grain and in summer alongside of pasture. If you have a long term lease, or if you own your own farm, build silos of your own. Also have about 30 acres alfalfa on good soil that would make about 75 to 90 tons of hay. In our neighborhood get a good herd of pure bred Holstein cows, that would produce 6,000 pounds of milk per year, and a registered sire. Have the stable up to date and well lighted and ventilated; pump water by mill or engine and use a tank heater in winter to take the chill from the water. If you have to buy feed, that is, mill feed or brewers' grains and hire help, there is nothing in the dairy business.

RAISE YOUR OWN FEED

By A. W. MARQUARDT,
Elmhurst, Illinois

When a man has a silo on the farm, and his own machine to fill it and fills it in season with home grown feed and feeds it right, and raises his own herd, he will make money—you can't stop him. I do not believe in buying too much feed. Get your own farm in condition, so it will raise enough feed to supply your dairy. This cannot be done unless you have machines with which to do it. Do not feed or keep a dairy cow in the barn that will not pay.

THE DAIRY BUSINESS IN A NUTSHELL

By WEAR BROTHERS,
Elgin, Illinois, R. 5

To make the dairy business pay the best, raise all the heifer calves from good cows and keep pure-bred sires. Have good silos and put all corn raised in the silo. Have plenty of alfalfa and clover hay. Cows must be well housed and given plenty of water to get best results.

FEED ALFALFA TO DAIRY COWS

By W. F. FRANZEN,
Bensenville, Illinois

Get a dairy herd. Keep record of each individual separate. Weigh their milk every tenth day. Test the milk for butter fat every month, and improve the herd by culling out the poorest and keep the best producers regardless of what may be offered for them. Rely on a record which can be traced back to the fourth generation only, as many others fall back frequently.

Feed a balanced ration, and give cows producing more than 20 lbs. of milk per day some concentrates. Alfalfa is an ideal feed for milk cows, especially in summer when pasture runs short.

BREED BEST MILKERS—RAISE CALVES

By E. J. GISS,
Prairie View, Illinois

Purchase a pure-bred sire and breed your best milkers to him, raising the heifer calves. Weigh and test the milk for butter fat and get rid of all boarders. Raise your own feed to make a balanced ration as nearly as possible. Do not keep any more cows than you can profitably take care of. By grading up your herd or keeping pure-breds you can dispose of surplus stock at a profit. Build a silo, as you pay for one, whether you build one or not. Raise a lot of clover and alfalfa, not only for more milk but to make your land produce more.

GIVE HEIFERS CHANCE TO GROW

By WM. H. PETERS,
Huntley, Illinois

Have your cows freshen at about 3 years. It gives the heifer a chance to grow and she is a good sized cow when she comes in if she has had good care. I do not **buy** many cows as the price of **good** ones is too high and the **poor** ones are only **boarders**. When raising calves pick from the best cows and keep the best bred bull that you can buy to keep cows as comfortable as you can. Keep them clean.

THE CONCRETE WATER TANK. Concrete water tank on farm of H. C. Mitchell, near Hughesville, Missouri. The tank is 16 feet square and has a concrete approach or platform ten feet wide so that the stock will not have to stand in mud while drinking. This arrangement also prevents stock from undermining the tank walls in muddy conditions which usually develop in bad weather. This tank supplies the stock in two feed lots, the water being pumped by engine from a drilled well.

HAVE PURE WATER. A concrete curb about a spring in a cow pasture, which insures a supply of pure and uncontaminated water. Stock, and especially dairy cows, must have good water.

MILK HOUSE. This shows a small milk house, which perhaps is a very clean little house, but you will note that the owner has left the screen door open, allowing the flies to come in. This screen was evidently put on for a purpose and should be kept closed. You cannot be too careful with a milk house.

MILK HOUSE ON MOOSE-HART FARM, ILL. Concrete block milk house properly provided with cooling tanks, screen doors and windows.

INTERIOR OF A WELL ARRANGED MILK HOUSE. Notice the neat appearance of this milk house, Everything is in its place. It has a concrete floor, and all other sanitary equipment to make it clean, convenient, and healthful.

WILL NOT PAY FOR FEED AND CARE. The net profit on this one cow for a whole year was \$2.77. She is one of the poor cows in the Minnesota Dairy Test Association. She required just as much feed and care and must be milked just as often to produce the \$2.77 profit as the good cows in the same herd which gave the owner returns more than twenty times greater.

With the great demand for dairy products, there is no more important question to be considered than that of the “scrub cow.” Why should dairymen milk and feed scrub cows? It is worse than a waste of time.

HAVE A SUMMER SILO

By **W. A. BORESS,**
Marengo, Illinois

To start right, select the breed you like. Get the best grade of that breed that you can find. Then get a pure-bred bull, being very careful in the selection. Get good milking cows and don't let a few dollars stand in the way. When heifers come to milk, weigh and test each one and keep a record. Discard the poor ones and keep the best. At the end of three or four years buy another bull of the same breed. Take time and use judgment in selecting him and keep this up until you have a dairy that will pay you well.

Grow alfalfa hay, have enough silos so that you can feed silage all summer as well as winter. A few acres of thick corn to feed from the shock in the winter in addition to the other feed will pay. This is the most profitable way to run a dairy that I know.

COWS NEED REST

**Don't Bother Them When They Are Lying Down—
Keep Them Clean**

By **CHRIS JENSEN,**
Area, Illinois

Keep big, strong, healthy cows. If good producers, raise the heifer calves from them, if not, feed them good for about four weeks and sell them. Never buy a cow from a dealer. Remember that some one had this cow before and found that she was not paying. Do not feed cows all day long, let them rest. Do not allow any one in your barn from 9 A. M. to 3:30 P. M., as every cow is lying down. A cow does not make milk by being on her feet every hour to eat. We will receive more milk by keeping our cows clean and free from lice and feeding 5 lbs. of grain, than by keeping them dirty, with filthy drinking water and giving them 10 lbs. of grain. Treat your cows carefully, remember they have feelings.

REGULARITY IN FEEDING IMPORTANT

By HERMAN SCHULTZ,
Downers Grove, Illinois

One of the most important things in the dairy business is to always feed the cows as near as possible at the same time each day, also let them out to drink and exercise the same length of time each day, except in real cold weather. Then it is best to put them back in the barn as soon as possible. Milking time is one of the most important things. The stable should be well cleaned each day, plenty of ventilation; the cows should be well bedded with straw or other bedding and have clean, pure feed to eat. Feed grain according to amount milk the cow gives, and all the fodder she will eat.

MUST LIKE THE BUSINESS

Interest in Your Work a Big Factor in Favor of Success

By J. E. SHEEHAN,
Lake Villa, Illinois

In the first place I think a man must like the business to make it successful. We pick out the best cows and raise the calves from the best. We aim to keep no boarders. You should take good care of a cow. Do not shout at, whip, or dog them. I would not keep more stock than I could feed. Cows should have plenty of feed, salt and pure, fresh drinking water. Keep them free from flies and other insects. Have a regular time for feeding and milking them. Keep them in a clean, well lighted stable. Keep the barn well whitewashed.

WORK HARD

**Don't Spend Your Money for Something You Can
Get Along Without**

By A. H. KRAHN,
Dundee, Illinois

Good land and not so much of it to take care of. Take good care of your cows. Keep good cows; poor ones are an expense. Feed the right amount of feed and balance the ration. Take an interest in each individual cow and find out under what treatment she will do her best. Put all manure back on the land as soon as possible, and cut your crops at the right time. Work hard and don't spend your money for something you can get along without.

GET UP EARLY—WORK**Have Good Cows—Feed Well—Cows Should Not****Test Below 3.6%****By JAS. C. TOWNER,
Area, Illinois**

Select the breed you want and devote your attention to them. A good cow should not test below 3.6. Sell all poor cows. Raise the heifers from good cows. Water them at least twice a day. Feed them clean feed. Do not feed dusty hay. This is ruination to the herd. I believe every farmer should have a registered sire, even though he does not have a pure-bred sire. To make the dairy business pay, a farmer must get up in the morning. A good farmer will not abuse any of his animals.

I believe in having good horses and tools for the help to work with. The dairy business is the most healthful of all work.

ALFALFA A MILK PRODUCER**By ALBERT LANDMEIER,
Arlington Heights, Illinois**

I believe the most important thing is to get good cows—the breed you like and stick to that. Raise your own cows from good stock, and have a pure-bred bull. Have silage the year round and plenty of alfalfa. Feed a balanced ration. Milk on time and feed regularly. Add some ground limestone and have plenty of clover and alfalfa sod to turn under. I have found clover sod turned under to do more good than a coat of manure.

Milk at the same hour and by the same men. When I fed alfalfa the flow of milk went up. Clover hay is good, too, better than corn stover. Silage cut up fine will keep better and feed better than if cut up long.

**WORLD'S CHAMPION
MILK PRODUCING COW
—1914 (Holstein), Tillie
Alcartra — Woodland, Cal.
Milk production, 30,453
pounds. Butter fat, 951
pounds.**

**ANCHENBRAIN BIVION
KATE 4th (Ayrshire).** Percival Roberts, Narberth, Pa. Milk produced, one year, 23,022 pounds, butter fat, 918 pounds.

**M U R N E COWAN, A
GUERNSEY.** Champion Butter Producing Cow, Barberton, Ohio. Milk record, 24,008 pounds. Butter fat 1,098 pounds.

**FINDERNE HOLINGEN
FAYNE,** Somerset Holstein Breeders' Co., Somerset, N.J. Milk produced, one year, 24,612 pounds, butter fat, 1,116 pounds.

SOPHIE 19TH, JERSEY, of Hood Farm, Lowell, Mass., Champion of the breed. Milk production, 17,557 pounds. Butter fat, 999 pounds.

COLLEGE BRAVURA 2ND (Brown Swiss). Michigan Agricultural College, East Lansing, Mich. Milk produced, one year, 19,460 pounds, butter fat, 798 pounds.

EIGHT POINTS IN DAIRYING

By L. EGBERT,
Waukegan, Illinois

1. Get the land in the best possible condition for corn and alfalfa.
2. Build a silo.
3. Buy the best cows you can afford.
4. Buy the best registered sire you can afford.
5. Raise all heifer calves.
6. Feed intelligently.
7. Don't let your cows grow old on your hands.
8. Join a cow-testing association.

POINTS FOR THE DAIRYMAN

1. Strict regularity in feeding and milking.
2. Good permanent pastures. The most prosperous dairy-men everywhere owe their success largely to good pastures.
3. One silo for winter feeding and one with a smaller capacity for summer feeding.
4. Cows that give not less than 6,000 pounds of milk, or 300 pounds of butter in a year.
5. The improvement in the future of the dairy herd must come largely from the sire, and for this reason no more economical investment can be made by a dairyman than to spend time and money in obtaining the best sire possible.

6. "Dairy cows should have access to only pure water. High producing cows must have large quantities of water. It is cheaper to warm ice cold water with a tank heater than to allow the cows to warm it with 50-cent corn. The water tank should be in a cozy, sheltered sunny place."

7. The barn and milking quarters should be clean and well ventilated. Dark, damp, steamy, poorly-ventilated barns are places for the development and spread of tuberculosis. Remedy: 1. Test the cows with the tuberculin test. 2. Cut new windows and let in an abundance of sunlight. 3. Provide proper ventilation.

8. Quietness and kindness in handling dairy cows increases the milk flow. Loud taking, swearing, and rough handling are not permitted in a well managed dairy.

9. Dogs should not be used to drive cows to and from pastures.

DON'T SUPPORT YOUR COWS—MAKE THEM SUPPORT YOU

1. Anybody can milk cows, but it takes a man with brains to milk the right sized profit out of them.

2. No man knows all there is to be known about farming—let us all get together and learn from each other.

3. The amount of brains you put into your work determines the amount of pleasure and profit you will get out of it.

4. Agricultural progress has been made by men who were not satisfied with what was good enough for their grandfathers.

5. Don't keep three cows to produce 12,000 pounds of milk when two better cows will do it with the same amount of feed.

6. There is no branch of agriculture that takes as little fertility from the soil and at the same time returns as good profit for the farmer as dairy farming.

7. The man who learns to get two pounds of butter from the same amount of feed that before produced only one, is going to get from under the mortgage quick.

8. Wherever the farm products have been turned into butter for a number of years, there has been a steady increase in the crop producing capacity of the soil.

9. The successful man in any business is the one who can and will make use of the experience of others—who has the courage to discard his own errors and adopt the truths discovered by others.

A PARTIAL LIST OF DAIRY LITERATURE

Read the Dairy bulletins published by your State Agricultural College and your State Board of Agriculture. In addition, secure some of the following:

Dairy Farming—John Michaels, B. S. A., M. S., Milwaukee, Wis.

Farm Dairy—Gurler. Published by Breeders' Gazette, Chicago.

Milk and Its Products—Wing. The MacMillan Company, New York.

Cow Demonstration, by Hugh G. Van Pelt, published by Kimball's Dairy Farmer, Waterloo, Iowa.

The North Iowa Dairy Improvement Association. Iowa State Dairy Association Bulletin No. 1, 1912, Waterloo.

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Co-operative Creameries. Minnesota Agricultural Experiment Station Bulletin No. 35, 1896, St. Paul, Minnesota.

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