Forty-fourth annual report of the Wisconsin Dairymen's Association : held at Hillsboro, Wis., December 1, 2, and 3, 1915. Abridged report of the proceedings, addresses and discussions. 1917

Wisconsin Dairymen's Association
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FORTY-FOURTH ANNUAL REPORT

OF THE

WISCONSIN DAIRYMEN'S ASSOCIATION

HELD AT

Hillsboro, Wis., December 1, 2, and 3, 1915

ABRIDGED REPORT OF THE PROCEEDINGS, ADDRESSES AND DISCUSSIONS.

COMPILED JULY, 1917, BY

PAUL C. BURCHARD, *Secretary.*

MRS. A. L. KELLY, *Stenographic Reporter.*

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PROGRAM

WEDNESDAY, DEC. 1, 1915

First Session, 10:30 A. M.

1—Invocation
2—Address of Welcome
3—Responses
4—President's Annual Address
5—The Dairy Cow - - - - - - J. D. CLARK, Whitewater

Second Session, 1:30 P. M.

1—Silo Construction - - - - - - - - - F. M. WHITE
Wisconsin College of Agriculture

2—Value of Winter Dairying - - - C. H. EVERETT, Racine
Editor Wisconsin Agriculturist
3—Feeding the Dairy Cow - - - H. D. GRISWOLD, West Salem

Third Session, 7:30 P. M.

The Island of Guernsey, illustrated with Stereopticon Views -
- - - - - - - - - - - - C. L. HILL, Rosendale

THURSDAY, DEC. 2, 1915

First Session, 10:00 A. M.

1—How to Judge Dairy Cows - - - C. L. HILL, Rosendale
2—The Men's and the Boys' Dairy Cow Judging Contest
3—Awarding of Prizes to Winners in Judging Contest and Discussion

Second Session, 1:30 P. M.

1—Value of Pure-bred Sire - - C. H. ECKLES, Columbia, Mo.
Missouri College of Agriculture
2—Modern Barn Construction - - W. D. JAMES, Fort Atkinson
3—Care of Milk and Cream on the Farm - - - - -
- - - - - - C. E. LEE, Dairy and Food Commission

FRIDAY, DEC. 3, 1915

First Session, 10:00 A. M.

1—The Cow Testing Associations of Wisconsin - H. C. SEARLES
2—The Local Cow Testing Association - LOUIS BOBER, Hillsboro
3—Growing and Feeding Value of Alfalfa MATH. MICHELS, Peebles

Second Session, 1:30 P. M.

1—Soil Fertility and Crop Rotation - - - A. C. MCDOWELL,
U. S. Department of Agriculture
2—How to Run a Farm for Greatest Returns - - D. H. OTIS,
Wisconsin College of Agriculture

TRANSACTIONS

WITH

ACCOMPANYING PAPERS AND DISCUSSIONS

(Abridged)

OF THE

Wisconsin Dairymen's Association

AT THEIR

FORTY-FOURTH ANNUAL CONVENTION

Held in Hillsboro, December 1, 2, 3, 1915.

ADDRESS OF WELCOME

PRESIDENT LINK, of Hillsboro

When I first noticed the bills announcing the Dairymen's Association to be held at Hillsboro, I thought of this great state of Wisconsin, comprising an area of upwards of 56,000 square miles; I also thought of the inaccessibility of the place, our little railroad out here on the spur; I also thought of the hundreds, nay, thousands of larger places in the state, and I wondered what inducement was brought to bear to bring this great State Dairy Association to the village of Hillsboro. At first, I was of the opinion that those who had used their influence along that line must have some superhuman power, and I wanted to give extreme credit to those who had taken this project in hand. But afterwards, when we came to work it out, when I saw the work these men were doing in order to drop the convention down within the limits of this little town, instead of the great city of Milwaukee or in any other of our large cities, I concluded that the idea was to come into a section of the country where dairying is not at its height, where our farmers and dairymen are much in need of the good that is to be derived from the

lectures to be given during this meeting, and I therefore concluded that there was no mistake, that they had picked out the right place.

RESPONSE TO ADDRESS OF WELCOME

C. L. Hill, Rosendale

This association was organized in Watertown in 1872 by something like half a dozen men, pursuant to a call sent out by our beloved Ex-Gov. Hoard. They met there and organized this Wisconsin Dairymen's Association, and I am very glad to say I came along on the scene in time to know not all these men who were interested in those early days, but in time to know personally four or five of them. Beside Mr. Hoard, I knew Uncle Stephen Favill and Hiram Smith and one or two of the others. The devotion of those men is beyond the comprehension of those of us who are living. At that time, Mr. Hoard was sent down East to endeavor to get better freight rates for Wisconsin dairy products to the Atlantic Seaboard. In those days almost every thing in dairying was the butter or cheese made on the farm and Mr. Hoard went East representing these Wisconsin farmers who so badly needed a favorable freight rate in shipping to the seaboard. These men who at that time constituted the Wisconsin Dairymen's Association were men of vision, men who looked into the future, and who believed in the greater things that were coming to Wisconsin, and in this year 1915, we can look back and see that their faith was justified. It is hard work to keep posted on the very latest things in dairying, but we are safe in saying that there are in the state to-day thirty-five condenseries, 1900 cheese factories and 1200 creameries, and that our dairy production now amounts to $100,000,000, and that is surely a great sum as compared with the million dollars claimed in 1872.

We have in Northern Wisconsin probably eight thousand acres of undeveloped agricultural land, and some of it is the best land in Wisconsin, and it is probable that when that has been cleared off that the time will come when that land will be worth the same as an equal amount of land in the southern part of the state. I want to just suggest to you something about the possibilities of that enormous acreage measured by what some lands are doing. You know something about Denmark and their intensive dairy work there, and I want to call your attention to a place where even more intensive agriculture is carried on.

On the Island of Guernsey there are eight thousand acres which would make five hundred farms, but the average of that land does not begin to compare with the average of the land in Northern Wisconsin. There is a good deal of that land occupied by roads, there are 40,000 people living on the Island, probably all supported by agriculture, and if this land in our state was all cultivated as intensively as is that which can be cultivated in the Island of Guernsey it would support 25,000,000 people.

You who have been privileged to read Professor King's book on "China", will realize the possibilities. I want to tell you one fact he brings out, showing how careful they are to save every bit of fertility, every bit of waste. They have a hydraulic sewerage system in all the great cities of China, all the sewage, the waste, including the waste of human beings, is carried on the backs of people in baskets and put into the land. Compare that with the way we are pouring out that wealth into the great Mississippi Valley and other places to be carried out into the ocean.

This Wisconsin Dairymen's Association has prominently stood first, last and all the time for more intensive agriculture in the state of Wisconsin. I do not think anyone will gainsay that it was through the influence of this association and its fathers that we have the Farmers' Institute system of our state, a system which has done so much to advance the improvement of agriculture. From that same influence we have also our dairy school and all the different particular organizations on different lines connected with agriculture; practically everything that we have that is working for the advance of agriculture; with possibly one exception, has been the outgrowth of the work of this association. Some people have thought that with the growth of these other associations and the spreading of the different lines of work, that the usefulness of this association is done, but I assure you that is not true, this association has never carried on more valuable work than it is carrying on to-day in spreading the work of the cow testing associations in this state. That work is possibly beyond our comprehension in what it can accomplish, we only need to carry that out with united, earnest effort on the part of all of us, not only the officers and active members of this association, but you fellows back on the farm.

We had as dairymen a good many things to contend with, especially the outbreak of the foot and mouth disease. We can

consider ourselves very greatly favored in that respect, however. I have just returned from Chicago where we have been having a conference to discuss all the features of this disease, and if you could hear the pitiable conditions left from the ravages of this disease as described by farmers in Illinois, you would realize that we in Wisconsin are blessed. The outbreak was something that no one was looking for, although it has been strictly limited. However, it has had a very bad effect on the consumption of dairy products and on the consumption of meat, that effect we cannot measure adequately because we have no way of knowing.

SILO CONSTRUCTION

PROFESSOR F. M. WHITE, Wisconsin College of Agriculture.

No arguments need be presented regarding the value of a silo. For the past twenty-five years silos have been used so successfully in all parts of the United States that we rarely hear the silo condemned. Wisconsin has been the leader in the introduction of the silo. The word silo can scarcely be mentioned without the name King, for Professor F. H. King was very instrumental in developing silos as well as securing valuable data for use in designing silos. Wisconsin is in the lead in the total number of silos as shown in the following table:—

Estimated number of silos in different states, Jan. 1, 1914.

	No. of silos	Silos built in 1913	Capacity in tons
Ohio	10,560	3,432	51
Michigan	10,812	1,088	93
Indiana	11,500	2,760	105
Illinois	17,340	5,202	101
Wisconsin	41,535	8,236	101
Minnesota	2,414	516	113
Iowa	16,236	3,267	115
Missouri	6,726	2,679	110
Kansas	6,510	1,680	123
Nebraska	3,240	900	132
North Dakota	770	250	100
South Dakota	1,300	455	120
Oklahoma	1,360	460	160
Total	130,283	30,925	

The silo is the best and only practical method of storing a succulent food for cattle. It is a can in which corn and other green crops may be preserved in practically the same manner as the vegetables and fruit are canned for family use. The same requirements necessary for canning fruit apply to the canning of good silage. First, it must be air-tight and have a good lid or be well sealed. Second, the silage should be well tramped at the time of filling, so as to prevent air pockets being formed in the silo and particularly along the sides of the wall. This exclusion of air will be best secured in a silo having straight, smooth, even walls.

Good silage may be produced in any type of construction which embodies the three absolute requirements mentioned; namely—air-tight walls, smooth walls, and proper sealing if the silage is not to be used immediately. No extra precaution need be taken to seal the silo for it would naturally seal itself, except that in so doing from three to four feet of ensilage would spoil. It is a saving, therefore, to place a layer of cornstalks or straw and sow oats on top. The oats will soon sprout and form a mat which will prevent air entering and spoiling silage to any considerable depth.

There are other requirements, which although not absolutely necessary, should be given attention if a satisfactory silo is to be the result.

The shape of the silo should be round for there are no corners in which the silage would not be uniformly packed. A greater capacity can be secured for the same amount of wall space. In the early stages of silo construction the octagonal and 16 sided silo were rather popular types, owing to the ease of construction and the comparatively small corners. At the present time there are a few companies building this style of silo claiming that it is possible to secure a more rigid construction as the lumber can be placed with the wide dimension parallel to the foundation. Also there is very little, if any, shrinkage of the lumber parallel to the grain.

Temperature

The temperature on the inside of a silo will be, to a certain extent, determined by the material used in the wall construction. During the process of silage fermentation much heat is generated, which will be retained throughout the winter. It is prac-

tically impossible in any type of construction to prevent a certain amount of freezing around the edge of the silo. Freezing does not hurt ensilage but it does make it difficult to handle. Some statements have been made that freezing causes losses of from 40 to 60% of the value of silage. If freezing resulted in a loss of nutriment it would be serious, but practically the only result of freezing is the fact that it makes the ensilage difficult to handle and the cattle probably prefer warm ensilage.

An expression commonly made against silage produced in masonry silos is that it has no LIFE, due to the influence of the cold masonry walls. So far as I am able to learn, no one can state specifically just what that means and there is no foundation for such a statement.

Some statistics have been cited which seem to prove that cold walls influence the quality of ensilage produced. This claim is made against masonry construction of all kinds, the statement being that these walls are cold and prevent the proper fermentation processes occuring in the making of silage. As most silage is made during the warm weather the wall of the silo is not cold enough to have any effect on the fermentation processes which go on in the silo. As a matter of fact there are instances where masonry silo walls are as warm as any type of construction. During the warm weather these walls have absorbed considerable heat and they hold heat as long as the thin walls in wood construction.

Concerning the materials used in silos and their effect on silage the Iowa Experiment Station says: "The results of examination indicate that no importance can be attached to the superiority of any one type of silo over others in regard to the conductivity of the heat through the walls. The results show that no difference which could be attributed to the effect of different types of building materials upon the process of silage formation were noted in the chemical changes of the silage in the three silos. A high temperature is not an essential factor in the production of good silage.

At the Wisconsin Station the results were very similar to those obtained at the Iowa Station. As good a quality of silage can be found at the wall in either of the four types, as at the center.

In order to prevent freezing, which to a large extent, takes place from the top, silos should have a good roof and during the

coldest weather all doors should be kept closed. In very cold weather, it is advisable to cover the silage with blankets or tarpaulin and to keep the silage near the wall lower than at the center. Any frozen ensilage should be thrown to the center where it will receive sufficient heat to thaw it out. So far, therefore, as the effect of coldness due to the type of wall, or to freezing afterwards is concerned, any material suitable for silo building which is air-tight, will be satisfactory for a wall in which good silage can be produced.

In order to withstand the great pressure of silage the silo wall must be strong. The pressure exerted against the wall of a silo is about 11 lbs. per square ft. of depth. For a silo 30′ deep a pressure of 330 lbs. would be exerted on every square foot of wall area at that depth. The materials used in the construction of the silo must resist pressure of silage on the inside, be durable, and able to resist the action of water, wind storms, and the slight deteriorating effect of the silage itself.

The foundation of a silo should extend below the frost line. It should be made of concrete and should be from 10″ to 12″ in thickness. A footing 18 inches in width and six to ten inches thick will be ample in ordinary soils to prevent settling which might cause a failure. The superstructure, regardless of type, should be placed flush with the foundation on the inside. A good floor made of concrete four inches thick will prevent any spoiling of the ensilage at the bottom.

Types of Silos

In constructing a wood silo the best and most durable woods only should be used. They are red wood, cypress, Oregon fir, tamarack, white pine, and long leaf yellow pine in the order named. Regardless of the quality of wood used in a silo it will not be permanent unless proper attention is given to securing it firmly to the foundation. The guy wires must be kept tight at all times, especially when the silo is empty as an assurance against racking and blowing down.

Silos will be made more durable by treating them with a preservative. Several manufacturers are already treating their wood silos. If this is properly done a wood so treated ought to resist decay for 20 or 25 years. Of the woods mentioned as the best woods for silos, the pines, hemlocks, tamarack, and fir are least difficult of treatment. Red wood and cypress need not be

treated, for very little of the treatment would be absorbed. Paint put on in the ordinary manner will be satisfactory for these woods. A good preservative is a good grade of coal tar creosote. It should be applied preferably by the process known as the pressure method of treatment. In this method the wood is placed in a steel cylinder and the oil forced into it under a high pressure. Eight to ten pounds of oil per cu. ft. of lumber is sufficient to be effective.

If impossible to give the pressure treatment the open tank method should be adopted. This consists of placing the lumber in a tank and covering it with the creosote and heating for one to two hours at a temperature of from 180° to 220°. The heating is then discontinued and the hot wood and oil allowed to cool together.

Stave silos should be inspected often to see that they are not shrinking out of shape and that the hooks and anchor wires are tight.

Concrete monolithic or solid wall silos are simple in construction and will last indefinitely. They have been in use for a sufficient length of time and have withstood the action of silage so that this type is now entirely beyond the experimental stage. Like all types of construction there have been failures. These are always due, however, to well-known causes such as lack of the proper amount or proper placing of reinforcement, poor materials, poor mixing, or poor cement. Investigation has always shown the few instances of failures in masonry silos, played up for advertising purposes, to be due to the well-known causes of failure already mentioned. Reinforcement is very cheap and is the best assurance that the silo will withstand pressure of silage and winds. Good clean sand and gravel and good cement should be used in constructing any type of concrete silo.

Solid wall construction, from the standpoint of design, is unquestionably the best construction. It is the strongest. Reinforcement can be placed in the best position for strength. It is a one unit construction and can be made absolutely air-tight, and weather has absolutely no effect on the outside, or silage on good smooth inside wall.

Cement stave silos consist of slabs of concrete 2½″ thick, 8″ wide, and 2′ long, beveled so that they dovetail together, and reinforced by a steel outside hoop. The hoop is not usually pro-

tected and as there is no shrinkage after the first tightening, it needs no further attention. Proper attention should be given to the making of the stave, particularly to see that the edges fit into each other so that when the hoops are tightened but few of the staves will be broken.

Concrete blocks as a silo material, have not been generally successful. Blocks have been made by a dry method process. When so made they are very porous, and not suitable for silo construction. These blocks cannot be plastered on the inside as the plaster will not hold very long, unless perhaps an unwarranted expenditure is made. Only blocks made from a wet mixture should be used for silos. A properly constructed concrete block silo is a very satisfactory and a very neat and pleasing structure from an architectural standpoint.

Vitrified Clay Building Blocks have been successfully used for silos. Where properly constructed and well reinforced, this type of silo gives excellent results. A good block should be dense and of a uniform quality which can be determined by carefully examining the ends of the blocks. If the blocks are fractured or present a grained appearance and do not appear to be dense, they should be rejected. Blocks may be tested by the absorption test as follows: Dry at least three blocks in an oven until they no longer lose in weight; then immerse in water for 24 hours or until they do not take up any more water; then weigh and if the blocks absorb more than 5% of their dry weight of water they should be rejected.

Steel silos are widely advertised as a permanent type of silo. This type of silo would seem to be adapted to localities where freezing is not serious, and to hot, dry seasons where it is practically impossible to keep a wood stave silo in shape. The steel silo should be painted at least once in two years with asphaltum. The first cost of this silo is somewhat expensive.

Brick silos are entirely satisfactory where well reinforced. No attempt should be made to build either a single or double wall brick silo without careful attention being paid to reinforcement. The brick silo is usually a very expensive silo and with the exception of the double wall brick silo is of no more protection against freezing than the solid wall concrete silo.

Many silos are built and used without roofs but this is an unwise practice. A roof strengthens the silo, keeps out rain and snow, prevents freezing in winter, and improves the appearance of the silo.

Doors should not only be conveniently and easily operated but they should fit well and be made air-tight. In very cold weather it is advisable to have all doors closed, hence they should be easily adjusted and removed. It is often advisable, when filling the silo, to tack heavy building paper over the doors or place strips of felt around the joints. This will insure against any possibility of spoiled silage due to air leakage. Plastering the joints and cracks with stiff clay is also a good practice.

Size of Silos

The size of silo to build depends upon the size of the herd you are feeding. One should plan to remove from two to four inches daily in summer and about one-half this amount in winter in order to guard against the spoiling of the surface ensilage. The depth of a silo should also bear a certain relation to the width, that is, the deeper and narrower the silo, the firmer the silage will become packed. Hence, with a small herd it would be advisable to build a small diameter but very deep silo. A larger herd would require a larger diameter silo of the same depth or even deeper. The following table, worked out by Professor King of the Wisconsin Station, gives some valuable information as to the size of silo to build according to the amount fed daily:

Table 2.—*Relation of Size of Silo to Silage to be Used Daily.*

Number of Cows	Silage for 180 days at 30 lbs. per day	Acres of corn at 15 tons per acre	Size of Silo	
			Inside diameter	Depth of Silage
	Tons	Acres	Feet	Feet
14	38	2 to 3	10	26
15	40	3 to 3½	10	28
20	54	3½ to 4	12	26
25	68	4 to 5	14	26
30	81	5 to 6	14	28
35	95	6 to 7	16	26
40	108	7 to 8	16	28
45	122	8 to 9	18	26
50	136	9 to 10	20	26

TABLE 2.—*Relation of Size of Silo to Silage to be Used Daily.*—continued

Number of Cows	Silage for 240 days at 30 lbs. per day	Acres of corn at 15 tons per acre	SIZE OF SILO	
			Inside diameter	Depth of Silage
	Tons	Acres	Feet	Feet
14	50	3 to 3½	10	32
15	54	3½ to 4	10	33
20	72	4½ to 5	12	32
25	90	6	14	31
30	108	7 to 8	14	34
35	126	8 to 9	16	32
40	144	9 to 10	18	29
45	162	10 to 11	18	32
50	180	11 to 12	20	30

TABLE 3—*Capacity of Silos of Various Dimensions*

Depth of Silage	Inside Diameter of Silo in Feet					
	10	12	14	16	18	20
Feet	Tons	Tons	Tons	Tons	Tons	Tons
25	36	52	68	96	122	136
28	40	61	81	108	137	160
30	44	68	90	115	150	180
32	50	72	95	126	162	200
34	53	77	108	142	171	223
36	57	82	114	158	194	230

It is not economy to build larger than 20 feet in diameter, since it necessitates much extra labor to remove the silage for feeding. Table 2, is a guide to the prospective silo builder in determining the size to build. The column to the left has the depth in feet of silage after settling five feet. Therefore, a depth of 25 feet of silage would mean a silo 30 feet high.

Some care should be exercised in filling silos to see that the material is cut in small pieces so that it will pack well. Use plenty of water which will shut out air and preserve the corn. It is also advisable to use what is known as a distributer in the silo so as to avoid having the leaves and lighter material separated and deposited around the edges and the heavier in the center.

Conclusion

The following factors or considerations should be mentioned in the construction of a silo:

1. Durability and the satisfactory preservation of the silage against air, moisture, and freezing, together with cost, should be the determining factors in the choice of a material from which to construct a silo.
2. Walls should be air-tight, perpendicular, and smooth.
3. To get the best results the stave silo should be well-anchored and the masonry silo well-reinforced.
4. A foundation should be heavy, well-made, and extend at least four to six feet below the surface of the ground.
5. A good roof is absolutely essential, especially to guard against weather conditions.

Discussion

Mr. Everett: Please tell us how do you handle frozen silage to avoid loss?

Prof. White: The common practice is to keep the outside lower than the center, and a tarpaulin or sacks or something to throw over the silage at night.

A Member: We have had a silo about four years. We have kept it covered with stack covers, and we have never had it freeze; that is, it never freezes only the very top at night.

Mr. Michels: I have two hollow concrete silos, and we never have any trouble with freezing at all. We do dig it down on the outside, and sometimes we have to go as much as a foot to a foot and a half lower than the center, and if we do that we have no trouble at all.

Another Member: I put some common tar paper on top of my silage, and then I put about four or six inches of straw on top of that, and when we uncovered it, we took off the straw and the tar paper and the silage was nice and bright.

Mr. Michels: This man's experience suggests something to me. We use tar paper at the doors to make the doors tight at the top and bottom. This last year we had two sheets left, and we covered up part of the silage and under that tar paper there was no spoiled silage at all, as far as it went.

Mr. Clark: I sowed oats over the top of the silage one year, and the rats got up there, attracted by the oats, and ate them and then they dug the silage all up.

FEEDING THE DAIRY COW

H. D. Griswold, West Salem

We feed, in the winter time, thirty-five to forty pounds a day of good corn silage. We feed them what clover hay or alfalfa hay they will eat up clean—not quite clean,—we don't expect them to eat up the coarsest of the hay. Then we usually feed shredded corn fodder once a day. Of course we haven't much of that this year. We do not expect the cow to eat much of that, but what is left we use for bedding, and it makes mighty good feeding and bedding both. They have this variety of coarse food, and then we feed up to eleven to twelve pounds of dry feed, according to what she is giving. She always needs a little feed.

Lots of men say, when a cow is dry, that it is enough to give her a little hay and let her go. "She isn't giving anything anyway." Now, I want to say if a cow is poor when she freshens, she is not in shape to do good work and she does not do as well through the whole year. Don't get the idea that a cow has to be skin poor to do good work. That idea is passed by. She wants to be in good shape, not fat, but just about as fat as lots of the stock that goes to the stockyards. They want to be smooth, the hair silky, good flesh on their bones.

We do not feed corn meal when they are dry. We feed bran and perhaps half a pound of corn meal. They won't fatten on that, but they will be in good condition, so that when they are fresh they are right in shape to do their very best.

Now, when your cow freshens do not give her a lot of food the first thing. Remember, you have been giving her a small feed of bran right along. The first thing we do after she is fresh is to give her a big pail of warm water—not cold. Then we do not go to work and milk the cow out the first thing. You know the cure for milk fever is to pump the bag full of air. If the bag is full of milk, that answers the same purpose, and it is not necessary that she be milked the first thing. The calf will take a little and we milk a little, just enough to relieve the bag, and after a couple of days, we milk that bag out—we are in no hurry about it. Then after that gradually work up on the feed. Your cow does not come to her full flow the first thing, and you want to gradually come up on the feed, till you

have come up to that point where she has got just about all she wants.

I have heard folks say, "If you feed your cow that way you will wear her out." It does not wear out a cow or a man to give them what they want if you don't overfeed them.

THE SELECTION OF THE DAIRY SIRE

C. H. Eckles, Professor of Dairy Husbandry, University of Missouri

It has long been an axiom of the breeder that the sire is half the herd, and it is generally accepted as a fit expression of an important rule. The skillful breeder of any kind of stock does not need to have it pointed out to him how important it is that the sire be properly selected. If he is a skillful breeder, it is largely because he realizes the importance of the sire and knows how to select him. While the skilled breeder realizes the importance of this in breeding, the average dairyman does not give the question of the selection of the sire one-tenth the attention the importance of the question demands. Thousands of men make use of a scrub or grade sire on account of mistaken economy in cost, rather than pay a few dollars more for an animal that is almost certain to transmit desirable qualities.

Crossing Breeds

First of all, the bull selected should be a pure-bred of the breed to which the cows belong, or in case grading up is to be done, of the breed selected as best suiting the purpose. Crossing distinct breeds defeats the very object for which breeds have been developed. Breeds have been developed and kept pure in order that certain characters might become fixed so strongly that they will be transmitted regularly. Crossing breaks the chain of inheritance, and makes it impossible to predict what will be the outcome. As a rule, little is gained, and the outcome often is very disastrous. However, it is a very common practice with many. A farmer having perhaps a good grade herd of Jerseys observes the much larger yield of milk secured by his neighbor who breeds Holsteins and decides to make a Holstein cross, thinking he will combine the quality of the Jersey with the quan-

tity of the Holstein. Occasionally this end is partially attained, but just as often the animal inherits the quantity of the Jersey and the quality of the Holstein. The next year the farmer possibly decides his animals are too small, and uses a Shorthorn to increase the size. The result of such practice is to lose the breed characters, and the occasional good animal that appears from such a mixture does not transmit any definite characteristics.

It is easily understood that a bull whose ancestors have been bred for many generations for one purpose is more certain to transmit that character than one whose ancestry is mixed. As already pointed out, the dairy cow of today has been developed until she produces many times the product of her ancestors, and is really abnormal in this respect. This power of producing enormous quantities of milk, being an acquired characteristic, is lost; and in the case of cows many revert to the older type, and are the unprofitable producers that have to be culled constantly from any herd.

Since the producing of large quantities of milk is not natural, but acquired, it is only by constant selection that this characteristic can be retained. Unless selection is made, not only will no progress be made, but the tendency will be backward. To even retain the milking qualities of a good grade herd at a uniform level, it is necessary to use a bull better bred than are the cows. This makes it imperative, in all herds where any attempt is made to advance or even retain a high quality, that the sire be selected with great care, especially regarding the dairy qualities of his nearest female ancestors.

Some Remarkable Variations in the Transmission of Dairy Qualities

Almost any pure-bred bull with good milking ancestry will improve a mixed herd or one of poor dairy quality; but for the highly developed herd it is a much more serious matter to select the proper bull. The breeder of high-class, pure-bred animals recognizes the highly important fact that a bull may not transmit the desirable qualities of his ancestors to the full degree. This class of breeders is always anxious to make use of an animal known to transmit the qualities desired. An animal that transmits characteristics with uniformity to its offspring is said to be prepotent.

The remarkable variation in the transmission of dairy quali-

ties by different bulls is shown by the results from the University of Missouri Jersey herd. In 1884 this institution purchased four registered Jersey cows, and the entire herd on hand at this time are descendants of these cows. Herd bulls were, of course, purchased from other herds, but no females. Since 1892 complete milk and fat records have been kept of every cow. Up to 1901 practically every female was retained in the herd, regardless of her dairy qualities. While the conditions under which the herd was kept were not entirely uniform, still no more variation occurred than would be the case in a private herd. A comparison is made of the records of the daughters of each bull, compared with the production of their dams. In most cases the figures given represent the whole lifetime of both. In case only a limited number of records are available, these are compared with the corresponding ones of the dam. When a lactation period extends beyond a year, only the first twelve months' record is used. The low average production is accounted for by the fact stated that for the greater part of the time all females were retained, and by the records of inferior cows sold while young.

The first bull used was Missouri Rioter, a son of Bachelor of St. Lambert. There is no record indicating the dairy quality of his dam. His sire is the only animal in his pedigree known to be a strong breeder. Below is given a summary of the records of these daughters and their dams:

	Dams	Daughters
Average milk yield, lbs	5,380	4,381
Average per cent fat	4.35	4.93
Average yield of fat, lbs	234	216

The average production of the daughters was 1,009 pounds of milk and 18 pounds of fat per year below that of their dams. In every case the daughter was inferior to the dam. While the number of daughters is too few to make the data conclusive, it is certain this bull did not transmit the qualities wanted. The same results in a herd having thirty of his daughters would mean over 30,000 pounds of milk and 540 pounds of fat per year less than the dams. If each daughter was milked six years, it would mean over 6,000 pounds of milk less for each during her lifetime than her dam produced. In other words, it would take over six years for the daughter to produce as much as the dams would in five years.

The next bull was Hugorotus, a cheap bull without any high class animals in his pedigree. This bull had eleven daughters, with a total of 50 lactation periods from dams with 62 lactation periods on record. The comparison below shows the results:

	Dams	Daughters
Average yield of milk, lbs	4,969	4,576
Average per cent fat	4.66	5.49
Average yield of fat, lbs	231	245

The eleven daughters average 393 pounds of milk below their dams, but on acount of a marked increase in the richness of the milk, gain 14 pounds in fat per year. Six out of the eleven daughters were decidedly inferior to their dams. The general results of using this bull were disastrous. In fact, the poorest animals ever in the herd were his offspring. The averages are made as good as they are only by two full sisters sired by this bull that through some "nick" proved 1st class animals. When the herd was culled on milk records alone, nine out of the eleven daughters were sold. As long as this bull was at the head of the herd the tendency was backward.

The next bull used was Lorne of Meridale. This bull had a splendid record from the standpoint of records of production, and his offspring shows the result. He had twelve daughters in the herd, with a total of 67 lactation periods from dams with 66 lactation periods on record. Below is a summary:

	Dams	Daughters
Average yield of milk, lbs	4,559	5,969
Average per cent fat	4.85	4.81
Average yield of fat, lbs	221	287

His daughters show the remarkable increase of 1,410 pounds of milk and 66 pounds of fat per year over the dams. In only two cases out of the eleven did the daughters fall below the dams, and in one of these only slightly. In five cases the increase was over 2,000 pounds per year. If 30 daughters of this bull had been milked six years, their total milk product would have exceeded that of their dams by over 250,000 pounds, worth $3,750 at $1.50 per hundred weight. An equal number of daughters of Missouri Rioter would have fallen 180,000 pounds behind their dams in the same time. Counting the milk at $1.50 per hundred weight, the income from thirty daughters of Lorne

of Meridale would exceed that from the same number of daughters of Missouri Rioter $6,450 in six years.

The next bull was Missouri Rioter 3rd, a son of Missouri Rioter, and was the only valuable offspring the latter left in the herd. His mother was the best cow in the herd up to that time. The results are as follows:

	Dams	Daughters
Average yield of milk, lbs	4,775	8,005
Average per cent fat	4.97	4.80
Average yield of fat, lbs	238	384

The daughters produced on the average 3,230 pounds of milk and 146 pounds of fat per year more than the dams. The number is, of course, rather small to admit general conclusions to be drawn with safety.

The least increase made by his daughters over the dam's records was an average of 1,481 pounds of milk, and all three were of such outstanding quality that it is certain this bull was a remarkable breeder. Had the value of this bull been known, he could have made a fortune and a reputation for any breeder. He was raised on the college farm, and as his value was not recognized until too late, as has been the case with many of the greatest breeding animals, he was disposed of and no record even kept as to what became of him.

Minette's Pedro was the next bull at the head of this herd. He was an animal of fine breeding, with many high producing animals in his ancestry. This animal has had twenty daughters in the herd with a total of 66 lactation periods.

	Dams	Daughters
Average pounds of milk	5,321	5,376
Average per cent fat	5.04	5.04
Average yield of fat, lbs	268	271

Ten daughters fell below their dams, and 10 made some gain. On the whole, the daughters are practically on a par with the dams, gaining only 55 pounds of milk and 4 pounds of fat per lactation period. It should be pointed out that the average of the dams is considerably higher than with the first bulls used, which sets a higher standard for comparison. On the whole, the herd was just holding its own with this bull at the head, and no general improvement was made. Some of the best as well as some of the poorest animals in the herd were daughters of this

bull. Their dairy quality seemed to follow the dams in most cases, while with Missouri Rioter 3rd and Lorne of Meridale the daughters were good regardless of the dams.

The next bull used was Brown Bessie's Registrar. This animal was of splendid breeding. Every female within three generations had a good butter record. Still his daughters are decidedly inferior. In fact, we have found only three or four good enough to keep in the herd at all. The comparison of his daughters with their dams is given below:

	Dams	Daughters
Average pounds of milk	6,029	4,295
Average per cent fat	4.86	5.05
Average yield of fat, lbs	293	217

If a breeder should happen to get two or three such inferior sires one after another, his herd would be entirely ruined. Our herd was deteriorating rapidly as long as he stood at its head. We had been troubled with abortion and since we thought so much of Brown Bessie's Registrar we did not wish to risk infecting him with this disease. For this reason we purchased a rather cheap bull known as Fairy's Lad to breed to cows that had aborted. A comparison of the figures below with those from Brown Bessie's Registrar will show how near our judgment at that time corresponded with the real value of the bull. The daughters of Fairy's Lad are still young but they now include the best cows in our herd, while we have sold all but three of the daughters of Brown Bessie's Registrar on account of their inferior qualities. The following is a record of the daughters of Fairy's Lad:

	Dams	Daughters
Average pounds of milk	5,738	6,073
Average per cent fat	4.98	5.29
Average yield of fat, lbs	287	322

Of course, under the circumstances it was easy to make the mistake we did in selling Fairy's Lad after a year or two and keeping Brown Bessie's Registrar. When the daughters of the two began to come into milk we would have gladly given all the daughters of Brown Bessie's Registrar to have had Fairy's Lad back again.

These results show the immense difference in the way dairy qualities are transmitted, even where both sire and dam are

pure-bred animals, and how serious a problem is the selection of a herd bull for the man who is trying to further improve a herd of pure-bred animals already well-developed.

Cause of Variation in Transmission of Dairy Qualities

One of the chief difficulties in regard to selecting the bull is that practically nothing can be predicted from the looks of the animal as to how he will transmit dairy qualities. The man who will discover some means of so selecting the bull will confer a greater benefit on breeders than can scarcely be estimated. I am free to confess that I do not know how to tell much about the value of a bull by his looks. I can make a pretty close guess as to which one will get the ribbon in the show ring but I have little confidence that show ring judging means anything as far as the value of a bull is concerned. It is for this reason that I have persistently refused to judge dairy cattle in the show ring the last few years.

There has been a remarkable advance within recent years in the knowledge of the laws of heredity. However, as yet but little application has been made to practical breeding operations of the wonderful facts that scientific investigators have brought to light. To me, the discoveries of Johannson of Denmark have the most important application to our breeding of dairy cattle. The facts he brought out explain some of the most mysterious results of breeding which are often observed. They indicate clearly the proper basis on which selection of breeding animals should be made. His experiments were made with ordinary beans. Basing his observations upon weight he found, in short, that there were a large number of pure strains or families all within the same variety. Within the strain the size of the bean varied, but the smallest seed in the strain produced as large a proportion of large beans as did the largest bean in the strain. Selecting beans by size within the strain made no difference in the yield. The characteristics of the strain to which it belonged were transmitted regularly. In selecting beans to plant, the important thing was to know if the large beans selected were the larger individuals in a family of small beans, or medium or small ones in a family of large beans. That is, selecting beans on size alone is only a little better than not selecting at all. In improving beans the important thing is to separate out a family that average high in size and, most important of all,

that transmit this characteristic. Evidence that the same holds good for poultry is given by some remarkable results at the Maine Experiment Station published in recent bulletins. They found as the result of ten years' records that hens selected by egg records alone did not transmit this characteristic to their daughters to any greater extent than did the hens from the general flock with lower egg records.

This would be a parallel case to selecting a bull upon the record of his dam alone regardless of the other animals in his pedigree. However, when the Maine Experiment Station selected out hens and roosters from strains known to have the power to transmit high producing characteristics they got progeny with a higher average production than that from the general flock. These results emphasize two points especially. The first is that it is more important to get a sire with a number of generations of good producers behind him than it is to get one because he is the son of a cow with a great record but with few other good animals behind him. That is, we want to know the strain to which he belongs. The other is that the most important thing of all to know about a bull is what characteristics he transmits. The old rule that "like produces like" still holds good if we extend the limits to include the strain rather than the individual. We must keep in mind that by culling out constantly, the cows in our herds are not generally the average of their strain but far above it. It is inevitable then that many of the heifers we raise will fall below the standard of our herds.

The leading breeders already see that the only safe plan of selecting a bull is to get one that has sired daughters of merit and shown himself to be the exceptional bull wanted by every breeder. Even if the breeder feels confident in his own mind that a certain bull will transmit the qualities he wants, if he is wise he will not risk the animal in a valuable herd, but will loan or lease him to the owner of some grade herd until the results of his breeding can be ascertained.

Johannson's theory also makes it clear why so often the daughter of a phenomenal cow is of ordinary ability. In this case the heavy producing animal represents the extreme development within the strain to which she belongs. Her line of inheritance, however, is much lower and consequently her daughter is almost certain to be inferior to the dam. We must always expect to find inferior animals appearing frequently in all herds.

No breeder can prevent it; but no good breeder fails to reject the inferior ones promptly when discovered. The higher developed we get our cows, the more difficulty we must expect in keeping them all up to the standard.

Methods of Selecting a Bull

There are two courses open in selecting a herd bull. One is to buy a young bull on the strength of the records of his ancestors, and trust to luck to a certain extent that he will be one that will transmit the desirable characteristics of his ancestors to a high degree. As a rule, such a bull will do fairly well at least in transmitting these characteristics. For the owner of grade cattle or herds of low dairy capacity, this method of selection is reasonably satisfactory.

In selecting a young bull, the pedigree including the records of ancestors is of more importance than the individuality of the animal. The things to be looked for in the pedigree are first of all records of production by the female ancestors, especially the dam of the animal, and indications that the ancestors have transmitted the characteristics wanted.

There is a general belief among breeders that the characteristics of the dam of the sire are transmitted stronger to his daughters than are the characteristics of any other female ancestor. This view has not been demonstrated by conclusive evidence. Next in importance to the dam's record come the records of the sire's daughters. If this bull has sired many high-testing daughters, the chances are his sons will also transmit these characters.

Each animal inherits 50 per cent of its blood from its parents, 25 per cent from its grandparents, and 12½ per cent from the third generation back. The relative value of the ancestors should be ranked according, and the common mistake avoided of attaching too much importance to an ancestor found in the third or fourth generation.

In studying records of production in the pedigree of a dairy animal, care should be taken to make certain what the records really mean. Official records mean more than private records, especially if the latter be churn records of butter produced. If butter records are given based upon a Babcock fat test, it should be noted what factor is used to make such estimate. The standard method of estimating butter from butter fat is by the addi-

tion of one-sixth to the fat to represent the "overrun," that is the curd, salt, and water found with the fat in commercial butter. In some cases the butter production is expressed by adding one-fourth to the fat, which gives a figure which is really too high. The most satisfactory method is to give pounds of milk and of fat. Records covering an entire year should receive much more attention than those covering only seven days. When the record covers only seven days and the fat test is abnormally high for the breed it is not safe to assume that this is a fair index to the richness of normal milk from the cow in question.

In buying a bull of any age, it should be required that he have a good conformation, strong vitality and constitution, and good breed characteristics. In buying a young bull the choice should fall upon one from a cow medium to large for the breed. She should be a regular breeder and a cow of strong constitution and vitality. She should have a well-developed, symmetrical udder and teats, and a large year's milk and butter test, preferably official.

The Tested Sire

The only entirely safe course for the owner of a highly developed herd is to select a mature sire that has daughters in milk so it is possible to judge of the character he transmits.

I believe that by following the plan of using only tested bulls we can advance more in ten years in the quality of our herds than has been done in fifty years by ordinary selection. A study of the methods of the great breeders will show that they have followed this course of judging a bull more by his offspring than by his ancestors and it has been one of the main reasons for their success. Whenever possible, it is always advisable to retain a bull until the results of his breeding can be ascertained. Then, if not satisfactory, the sooner he is gone the better, but there is always a chance of finding a bull like Missouri Rioter 3rd, previously mentioned.

The wonderful prepotency of Stoke Pogis 3rd was not recognized until after he had been sold for beef. Hengerveld DeKol, a well-known Holstein bull on the other hand, was retained until it was discovered he was one of the great bulls of the breed.

The breeder who uses a young bull should keep him until his daughters come into milk. This can be done by loaning or leasing the animal to the owner of some other herd. If the daugh-

ters of the bull prove to be what is wanted he can be used for the remainder of his life. In this way the exceptional bulls that transmit the qualities desired will be found before it is too late. On the other hand, a valuable herd will not be damaged so much by the use of an inferior sire.

We are not following this plan with the University of Missouri herd. We aim to buy only mature tested bulls but if we cannot get one to suit us we buy a young one on his ancestry. Then, after using him, lease him to some nearby farmer so we can get him back if we want to do so.

There is a great deal said about the value of the mature bull as compared with the young. I do not see much to this view if we consider only the fact that one is mature and the other young. I do not believe the age of the animal has any influence upon the way he transmits dairy qualities. We are, however, justified in emphasizing strongly the value of the mature bull since it makes it possible for us to see the result of his breeding. It is an unnecessary financial sacrifice to dispose of the mature bull. The average dairyman buys a young bull, uses him two years and offers him for sale without waiting to learn the qualities of his daughters. His neighbors, instead of buying the old bull, buy a young one, and the older one that may be worth a fortune to the community is sold for beef while the neighbor is experimenting with the young one.

Discussion

Mr. Everett: Can you account in any way for the shrinkage in the milk for the daughters of Brown Bessie's Registrar, showing the decrease in the milk and the increase in fat?

Prof. Eckles: No, for some reason we had a combination that didn't work out and we can't say why. He was bred in this state. He was the son of Recorder and a daughter of old Diploma, supposed to be of good breed, but he had a wrong combination of heredity and simply would not transmit the right characteristics. We don't know why.

A Member: What are the good and bad points of inbreeding and what experience have you had with it?

Prof. Eckles: We have not carried out any experiments with cattle at all on inbreeding. I think the main danger from inbreeding myself is the lack of fecundity of the animal after a while. We carried out some experiments a few years ago on

the inbreeding of small animals, rabbits and rats and various small animals, breeding within the litter all the time, and we got some results after a while that showed something interesting. In the beginning the litters were seven and eight. After a while, the litters began to get smaller, I couldn't say how many generations it took, but after quite a number of generations they got to the point where the litter was only two or three instead of seven and eight, and the animals did not have much vitality. Most of them were born dead or weak. In fact, some of the animals we could hardly get to reproduce themselves.

There have been some experiments published recently where they haven't got such results. Personally, I am fearful that the fecundity or breeding power of the animal is going to be impaired, sooner or later. Of course, I am perfectly well aware that the early improvers of all of the breeds, for example, the Shorthorn breed, practiced inbreeding as a way of combining the good qualities of the breed to get immediate results.

Whether you are doing the best for the future welfare of the breed I think is a question. I believe what is generally called line-breeding would be better, that would be breeding together distant relatives, animals that go back to the same line, but still are not closely related. We have formulated no definite plan for proceeding along these lines. Our plans are primarily to depend upon the sire that has proven his ability to transmit high dairy qualities.

COW TESTING IN WISCONSIN

H. C. Searles, Fond du Lac

During the past nine years, it has been the chief aim of the Wisconsin Dairymen's Association to interest as many farmers as possible in the organizing of cow testing associations, and its efforts have been very successful. At the present time forty-five cow testing associations are in operation, these associations consisting of about twelve hundred farmers and twenty-five thousand cows. The following table gives in statistical form the work accomplished by theWisconsin Dairymen's Association in promoting and extending this valuable work:

Year	Associations	Members	Cows
1909-10	10	260	3,840
1910-11	13	338	4,320
1911-12	10	275	4,200
1912-13	12	322	4,550
1913-14	17	476	7,480
1914	28	784	13,920
1915	45	1,200	25,000

The progress made, especially in the past three years, is sufficient evidence to indicate the value of cow testing associations. Wisconsin stands at the head of all the states in the Union in the number of cow testing associations, as she does also in the number of dairy cows and in the production of butter and cheese.

The highest average production has been secured by the Sheboygan County Cow Testing Association, a summary of whose work is as follows:

SHEBOYGAN COUNTY COW TESTING ASSOCIATION

	Milk lbs.	Fat lbs.	Value of fat	Cost of feed	Profit	Returns for $1 in feed
Average of 391 cows	8,279	297.7	$103.54	$47.75	$55.79	$2.17
Highest herd (9 cows), ave. per cow	16,480	564.0	209.50	91.20	118.31	2.30
Highest cow	20,681	751.2	265.27	115.54	149.73	2.30
Lowest herd (10 cows), ave. per cow	5,763	203.1	68.63	39.20	29.43	1.76
Lowest cow	4,391	149.0	52.67	39.20	13.47	1.34

In the Sheboygan association 89 cows were sold during the year and there is no record of their production. If the actual production of these 89 poor cows were added to the production of the 391 cows whose records are given, it would decrease the average production materially. However, all the other associations are treated in a like manner. The percentage of "culls" or unprofitable cows in this association is practically the same as in other associations in this state.

The high percentage of cows eliminated from our various testing associations, as being unprofitable, is not due entirely to

poor cows, but in many instances to poor dairymen. Cow testing associations make better dairymen, and better dairymen feed and care for their cows in a more judicious manner.

The following records of the nine-cow herd of Harry Keach would indicate that other dairymen of our state could well afford to study the manner in which this herd was fed and cared for:

Cow	Milk lbs.	Fat lbs.	Value of fat	Cost of feed	Profit	Returns for $1 in feed
1	17,343	588	$223.41	$94.74	$128.67	$2.36
2	14,752	499	186.76	86.27	100.48	2.16
3	14,465	478	188.97	92.10	96.87	2.05
4	18,053	618	226.90	82.92	143.98	2.74
5	20,681	751	265.27	115.54	149.73	2.30
6	15,987	527	200.92	82.92	118.00	2.42
7	13,974	447	174.12	88.22	85.90	1.97
8	17,446	614	218.92	86.27	132.65	2.54
9	15,622	554	200.26	91.75	108.51	2.18
Ave.	16,480	564	209.50	91.20	118.31	2.30

Concerning this herd, Mr. Keach writes me as follows:

"My cows are all pure-bred and of an average weight of about 1,400 pounds. I have used a pure-bred sire for the past twelve years. During the fall and winter while the cows are stabled, I make a practice of turning them out for exercise for about one hour daily, excepting on stormy days. I have water buckets in my barn and only a small supply tank, hence they have fresh water pumped each day.

"During fall and winter months I feed 20 to 25 lbs. of silage daily, 10 to 12 lbs. alfalfa hay, and 5 to 8 lbs. clover hay. For concentrates I feed one pound of the following mixture to each four pounds of milk produced: 100 lbs. oat meal, 100 lbs. corn or barley meal, 100 lbs. bran, 100 lbs. Ajax, 100 lbs. gluten, 50 lbs. oil meal, and 2.5 lbs. salt. During very cold weather I increase the ground feed to one pound for every three pounds of milk.

"I do not turn my cows to pasture until the grass is good, usually about the middle of May. During the pasture season I feed from 8 to 12 lbs. of a mixture made up of equal parts corn, bran, Ajax and what good hay they will eat. I do not feed ensilage during the pasture months.

"I have been testing and keeping records for six years, but

the one year I have been in the cow testing association has been more beneficial than the past five years."

Some farmers might say that it is impossible to get this large net return per cow, while others who are higher up in the dairy business would know that it is possible.

MANAGING THE DAIRY FARM FOR PROFIT

By D. H. Otis, Wisconsin College of Agriculture.

In order to encourage farmers to carefully study their business the Wisconsin Farm Contest was started. It is to the credit of the farmers enlisting in the movement that they come in, not because they expected to win a prize but because they want to learn all they can about their business and compare their results with the average of their county and with the best in the state.

During the first year (1913) there were 150 farmers connected with the work. The following year this was increased to 440 farmers and for the ensuing year (1915) there are over 650 farmers who have signed statements that they will keep records of their business transactions and hand them in to study for demonstration purposes.

The Wisconsin Farm Contest has emphasized the necessity of some simple yet accurate method of keeping accounts. Farmer after farmer has asked for assistance along this line. The work of keeping financial records has been greatly reduced by utilizing the machinery offered by the banks.

All receipts can be recorded in the bank book by the banker, if the farmer will make out a suitable deposit slip indicating the source of the income. Cash as well as checks can be handled in this way.

DEPOSIT SLIP.

Deposited by.....A. B.....Farmer

in the

Bank of.....

Post Office..... August 17, 1915.

Cash	A. J. Anderson, calf.....	$10.00
Cash	Enterprise Grocery, eggs.....	1.18
Check	B. S. Royce, hay.....	45.32
Check	Model Creamery Co., cream.....	115.32
	Total.....	$172.33

By depositing all income in this manner the farmer will have a record of all his receipts in his bank book.

All expenses should be paid with check. The check will always serve as a receipt and the stub as a record of the transaction. When it is desired to have a little change for incidental expense a check can be drawn for $5.00 and charged to miscellaneous, incidental or personal expenses.

The farm account book should contain the farm inventory, the credit accounts, and space for distributing the receipts and expenses. This book should be as simple as possible and so arranged as to require the minimum of labor in adding, posting and summarizing. We are pleased to state that such books are in existence, and farmers are using them.

The Hoard's Dairyman prizes have been increased from $300 to $500 with the understanding that considerable emphasis will be placed upon the home life of the farm, or the part played by the farmer's wife. It was deemed unwise to separate the farm home from the farm and offer separate prizes. The prizes are awarded therefore to the farmer and his wife. The Wisconsin Agriculturist has materially encouraged movement by offering prizes for the best work in each county. The farmer and his wife whose farm ranks first in the county are given a cash prize of $10.00, to be awarded at the State Meeting. Twenty-one prizes for twenty-one counties will be awarded at this meeting.

Some of the Results

In making the comparison the counties have been divided into three groups representing different stages of agricultural development as follows:

Group I. Upper Wisconsin—Early stage of development.
Group II. Central Wisconsin—Moderate development.
Group III. Southern Wisconsin—Well developed.

AVERAGE LABOR INCOME PER FARM—439 FARMS IN 21 COUNTIES.

Group	All farms		Farms above average		Farms below average	
	No. of farms	Average	No. of farms	Labor income	No. of farms	Labor income
I. Upper Wisconsin	79	$211	45	$446.00	34	$150.00
II. Central Wisconsin	134	623	61	1,314.00	73	62.00
III. Southern Wisconsin	226	1,195	101	2,278.00	123	316.00
Average.....	.....	$844	.....	$1,577.00	.....	$160.00

The labor income includes receipts from outside sources, as men and teams working on the road or in the woods, etc. The farms in the counties representing the early stages of development average $169 of outside income per farm, or an amount equal to 11.4 per cent of the total receipts; those in counties of moderate development, $113 per farm or an amount equal to 4.7 per cent of the total receipts; those in well developed counties, $118 per farm or an amount equal to 2.7 per cent of the total receipts.

It will be noticed that there is an increase in the labor income as you go from the less developed to the more developed counties. This is particularly striking in the farms above average where Group II exceeds Group I by $868 per farm, and Group III exceeds Group II by $964 per farm.

With this variation in the labor income it will be interesting to see how these different series and groups of farms rank with reference to some of the more important factors that make for success in farming.

Total Investments

The total investment includes investment in land, buildings, machinery, and equipment, live stock, etc.

TOTAL INVESTMENT PER FARM ON 439 FARMS IN 21 COUNTIES.

Group	All farms		Farms above average	Farms below average
	Acres per farm	Total investment per farm	Total investment per farm	Total investment per farm
I. Upper Wisconsin	116	$9,218	$9,372	$9,014
II. Central Wisconsin ...	139	15,994	16,857	14,925
III. Southern Wisconsin...	147	25,571	28,433	23,621
Average.....	.....	$19,617	$20,878	$18,744

The acres per farm gradually increase as we go from the less developed to the more developed regions, although farms of various sizes are contained in each series. In a similar manner there is a marked increase in the total investment. The difference between the farms "above average" and those "below average", is not large in the counties representing the early stage of development, but the average difference becomes more marked in the well-developed regions. It is interesting to note, however, that in some counties in all three groups the farm "below average" may have a larger total investment than the farm "above average". The average total investment for the 439 farms is $19,617.

Operating Capital: By operating capital is meant the investment in machinery, live stock, and cash or bank balance. It is sometimes spoken of as working or movable capital. The variation in operating capital is shown as follows:

AMOUNT AND PER CENT OF OPERATING CAPITAL PER FARM ON 439 FARMS IN 21 COUNTIES.

Group	Operating capital per farm		Farms above average labor income		Farms below average labor income	
	Amount	%	Operating capital		Operating capital	
			Amount	%	Amount	%
I. Upper Wisconsin	$1,960	21.2	$1,967	20.9	$1,956	21.7
II. Central Wisconsin	3,417	21.3	3,821	22.6	3,082	20.6
III. Southern Wisconsin	6,064	23.7	7,507	33.8	4,102	17.3
Average.....	$4,493	22.9	$5,216	24.9	$3,466	18.4

While there is considerable fluctuation in operating capital, the average for upper Wisconsin is $1,960 per farm, or 21.2 per cent. There is but little difference in either the amount or per cent of operating capital in this series between the farms "above average" and those "below average". The amount of operating capital increases rapidly in the more highly developed counties, amounting to $3,417 per farm or 21.3 per cent for Group II, and $6,064 per farm or 23.7 per cent for Group III. The average operating capital for the 439 farms is $4,493 per farm or 22.9 per cent.

The per cent of operating capital is greater with those farms "above average" except in Group I. It should be noted that the farms "above average" in Group III have 33.8 per cent of operating capital while the farms "below average" in the same group have only 17.3 per cent. Averaging all the farms in the three groups those "above average" have 24.9 per cent of operating capital while those "below average" have 18.4 per cent. Evidently the operating capital plays relatively a more important role in the southern or well-developed counties than in the new sections of the state.

Number of Cows: Since Wisconsin is largely a dairy state it is to be expected that the number of cows per farm has an important bearing on the success of the farm. The statistics for 1914 are as follows:

NUMBER OF COWS PER FARM ON 439 FARMS IN 21 COUNTIES.

Group	No. of cows per farm	Farms above average labor income	Farms below average labor income
		No. of cows per farm	No. of cows per farm
I. Upper Wisconsin	8.9	9.5	8.7
II. Central Wisconsin	13.1	14.7	11.8
III. Southern Wisconsin	20.3	23.9	17.5
Average.....	16	18.1	14.4

It is interesting and important to note that the number of cows per farm increase as the counties become more developed. Group I averages 8.9 cows per farm; Group II, 13.1 cows per farm; and Group III, 20.3 cows per farm. The average of the

439 farms is 16 cows per farm. In like manner the farms "above average" average a larger number of cows than those "below average". The larger the number of cows, provided they are good ones, the larger the volume of business and consequently the larger net profit.

Total Receipts per Cow: The number of cows per farm is one factor; the receipts per cow is an equally important one. On Wisconsin dairy farms cows are usually kept for two purposes: (1) the production of breeding stock, and (2) the production of dairy products. While some farms emphasize one phase and some another most every farm is interested in the sum of these two items.

TOTAL RECEIPTS PER COW ON 429 FARMS IN 21 COUNTIES.

Group	Total receipts per cow	Farms above average labor income	Farms below average labor income
		Receipts	Receipts
I. Upper Wisconsin	$89	$93	$89
II. Central Wisconsin	111	145	89
III. Southern Wisconsin	124	151	105
Average.....	$114	$137	$97

The income per cow varies considerable in each series. The average income per cow for the counties in the early stages of development is $89; for the counties with moderate development $111; and for the well-developed counties $124.

It is significant that in nearly every county the farms "above average" have a marked increase in income per cow over those "below average". The difference between the two groups is small in the northern counties. The difference in the more developed counties is approximately $50 per cow. These results indicate that the quality of cows is better on those farms "above average". This, combined with the increased number of cows, contributes much to the net results of the farm.

One of the gratifying things we are finding is that as a man gets better cows, he is getting more income from the sale of live stock, and at the same time he is getting more income from the sale of live stock products. We want to be constantly im-

proving our herds. That does not necessarily mean that we want to get a pure-bred herd, but it does mean that we want to get a pure-bred sire and gradually improve our herds. We are finding out that we have got to handle improved stock.

Total Receipts per Farm: The net result (labor income) on the farm probably corresponds more closely to total receipts than most any other factor. Total receipts represents the volume of business and includes the income from all sources.

TOTAL RECEIPTS PER FARM ON 439 FARMS IN 21 COUNTIES.

Group	Total receipts per farm	Farms above average labor income	Farms below average labor income
		Receipts	Receipts
I. Upper Wisconsin	$1,481	$1,656	$1,248
II. Central Wisconsin	2,496	3,225	1,773
III. Southern Wisconsin	4,242	5,896	3,020
Average.....	$3,196	$4,187	$2,360

The above table is particularly interesting and valuable in showing a marked increase in the total receipts per farm as we pass from Group I to the well-developed farms in Group III. In every county except one the total receipts per farm is higher in the group "above average" than in the group "below average." The difference between these two groups increases materially in passing from the less developed to the more developed counties. This table indicates strongly that successful farms must have large total receipts.

The man who is making a success on the farm is the man who is ready to spend money for productive returns. I do not mean that you should spend money for luxuries, but I do believe that there are many farmers who can well afford to go in debt for productive profit, because that principle is going to bring results.

The Banner County for Largest Average Net Profits

Green county, Wisconsin, had 44 farms entered in our farm management demonstration work in 1914. The average labor

income was $1,889 per farm, or $1,045 per farm above the average of the state. Some of the factors contributing to this result are as follows:

	Green County average of 44 farms	The State average of 440 farms
Labor income (net profits)	$1,889	$844
Size of Business		
Total investment	$31,220	$19,651
Operating capital	$7,458	$4,555
Per cent operating capital	23.9	23.2
Total acres	192	147
Acres in crops	101	90
Number of cows	26.8	16.0
Total receipts	$4,975	$3,171
Total expenses	$1,380	$1,340
Diversity of Business		
Receipts from crops	$524	$469
Per cent	10.6	14.7
Receipts from live stock	$2,170	$1,220
Per cent	43.5	38.2
Receipts from live stock products	$2,188	$1,327
Per cent	44	41.5
Miscellaneous receipts	$93	$180
Per cent	1.9	5.6
Quality of Business		
Barley—acres	11	11
Yield per acre, bus.	27	29
Corn for grain—acres	23	15
Yield per acre, bus.	51	49
Oats—acres	19	19
Yield per acre, bus.	33	28
Alfalfa—acres	22	10
Yield per acre, tons	2.9	3.2
Other hay—acres	26	24
Yield per acre, tons	1.7	2
Receipts per cow—live stock	$34	$44
Receipts per cow—milk and cream	$75	$70

It will be noticed that under size of business that the Green county farmers average more total investment per farm, more operating capital per farm, more acres, both total and cultivated, per farm, more cows per farm and more total receipts per farm. In every respect the size or volume of business shows much larger for Green county.

Under diversity of business it will be noticed that the receipts from crops is slightly higher than the average of the state, although it constitutes a smaller percentage of the total income. The main sources of income is from live stock and live stock prod-

ucts, and it will be noticed that there is about as much from one source as from the other. It will also be noticed that both sources average much higher in Green county than in the state. The miscellaneous receipts are small.

Under quality of business it will be noticed that the acreage and yields of barley and oats are approximately the same in Green county as in the average for the state. The corn and alfalfa acreages average larger for Green county although there is not much difference in yield. It is particularly striking to find that Green county averages 22 acres of alfalfa per farm.

The receipts per cow for live stock is less for Green county than the state and the receipts for milk and cream does not vary over $5 per cow.

All these figures indicate that Green county is getting ahead because of the large volume of business per farm. The county still has great possibilities for improvement by increasing the quality of business.

SOIL MANAGEMENT

J. C. McDowell, U. S. Department of Agriculture

A short time ago, while visiting with that leading agricultural editor and successful dairyman, Ex-Governor Hoard, he expressed himself about in these words: "We hear everywhere the word practical. Farmers pride themselves upon being very practical. I often wonder just what they mean by the practical in agriculture. Lately I have been trying to explain that term and have finally worked out this definition: The practical in agriculture is anything profitably put into practice." A little later the governor continued: "The farmer of today is progressive. The trouble with him is that he is passively progressive when he should be actively progressive. He knows what to do, but he does not do it."

Since that day I have often thought of these two ideas in connection with my research work and in relation to the management of my small herd of pure-bred Holstein cattle. As owners and breeders of pure-bred live stock and as farmers in any line, how it is with each of us? Is our work practical, and are we actively progressive? With all of our careful study and high ideals are we actually living up to the best we know?

When the larvae of the codling moth destroy our apples, when tuberculosis decreases the profits of our dairy herds, and when clover fails because our soils are sour, we have only ourselves to blame. Usually we know what to do, but we do not do it. We should awake from inactivity, throw off our Rip Van Winkleism, become actively progressive, and so far as possible eliminate all losses regardless of their size or cause.

We find by computation that only 10 per cent of the total area of the United States is reasonably well cultivated and that but 3 per cent yields maximum net returns. This does not indicate a very high level of efficiency in farming. A considerable percentage of our unprofitable land, doubtless, never can be brought under successful cultivation by any methods now known. It is also true that the sudden advancement of all our arable land to a point where each farm would become 100 per cent efficient might seriously affect the business side of farming by lowering the prices of agricultural products. Yet as population increases all classes will undoubtedly be benefited if the rapidly rising prices of farm products can be met at least in part by setting idle acres to work and by making unprofitable acres yield a satisfactory income.

What constitutes good soil management? Hopkins says that we must maintain and improve the chemical composition of soils, and that we must guard especially against the loss of phosphates. Whitney and Cameron have advanced the idea that each crop poisons the soil against itself and that this is the chief reason why rotation of crops gives such striking results. King emphasizes the physical condition of soils, Cates the destruction of weeds, Campbell the conservation of moisture, and Bolley the tremendous losses, due to plant diseases, that are transmitted through infected soil. Alkali soils are common in the west, acid soils are of frequent occurrence in the Central and Eastern states, and the maintenance of humus is a great problem everywhere.

The average Wisconsin soils are sour. Some time ago the farmers in one of our western alfalfa growing states told me that the West has a monopoly of the alfalfa business and that Wisconsin and other states farther east can never compete with them in the growing of this crop. In reply I asserted that it is my opinion the day is at hand when Wisconsin can easily compete with, and perhaps can exceed, any western state in the

growing of alfalfa. Continuing , I said to them: "Your alfalfa crop is limited by your lack of rain, something over which you have no control. In Wisconsin our alfalfa crop is limited only by our sour soil, something over which we have absolute control. We are rapidly learning to lime our land for all kinds of legumes and when we do, we will compete with anybody, anywhere in the production of this class of crops."

For sweetening sour soil 100 pounds of air slaked lime, marl, or ground limestone, are equivalent to 74 pounds of water slaked lime or 56 pounds of burned lime. So far as we know a ton of magnesian limestone is equivalent to a ton of limestone that contains no magnesium. An ordinary application of ground limestone consists of about two tons per acre. Deep plowing, a clean and compact seed bed, lime, manure, inoculation, and good seed will insure a good stand of alfalfa on the average Wisconsin soil in any ordinary year. According to Wing "We have solved all the problems connected with alfalfa growing except one: we do not yet know how to harvest the crop successfully when it rains 32 days in June."

The maintenance of organic matter in the soil is our greatest soil problem everywhere. A number of years ago a North Dakota wheat farmer, whose exclusive grain growing had put him deep in debt, desired the loan of a thousand dollars from his bank. Except the horses, there was no live stock, not a cow, a pig, nor even a chicken, on the place. The banker, a very shrewd business man, was able to analyze the problem and to discover the cause of the farmer's financial difficulties; and he agreed to make the loan only on the condition that the borrower change his system of farming. The system outlined by the banker required that a portion of the loan should be used to purchase two cows, a half dozen pigs, and a small flock of poultry. It also provided for a fair-sized vegetable garden. Grain farming was to be continued as before. The banker figured that the live stock and the garden would, in poor as well as in good seasons, fully support the farmer's table. He figured that in poor years the farmer would be able to play even, and that in the good, and even in the average year, the farm would produce enough to gradually wipe out the debt. The farmer reluctantly agreed to the banker's terms, received the loan and met the conditions. In five years he was out of debt and rated as a substantial and prosperous farmer and business man.

It has been said that there are three types of farming: intensive, extensive, and pretensive. Pretensive farming helps to distribute the wealth of many men who merely play at farming. It occupies their leisure time and keeps them out of mischief. There is a common belief that the intensive farming of the old world has made the European acre much more efficient than ours. Some time ago an article appeared in one of our leading agricultural journals to the effect that the acre in Bavaria is seven times as efficient as the acre in Iowa, but that the Iowa farmer is six times as efficient as the Bavarian farmer. This is quite misleading because only partly true. When comparing the United States with other countries I usually find that we do not need to exaggerate, that the truth is good enough. At my request, Mr. Goldenweiser, of our office, investigated the records and reported the facts.

A comparison of all the leading crops showed that the Iowa farmer, with his larger farm and better equipment, is four times as efficient as the Bavarian. The most remarkable fact disclosed by this investigation concerned the comparative efficiency of land. To my surprise it was actually found that the Iowa acre is 22 per cent more efficient than the Bavarian acre. High yield per acre is very desirable, but we are much more interested in large income per man. In this the United States leads the world.

Such expressions as "a little farm well tilled", "a little land a living", " ten acres enough", "five acres too much", may appeal to our imagination, but hardly to our best business judgment. The forty acre general farm always required much hand labor, because large farm machinery and powerful teams cannot be employed efficiently on farms of that size. European and American statistics show that small farms ordinarily mean low labor income, few home comforts, and a life of heavy toil and drudgery, not for the farmer alone but more especially for his wife and children. "The Man With the Hoe", Does not represent the American farmer. I believe in the ingenuity and ability of the American farmer. I firmly believe that he is able and willing to make this old earth produce enough to support his family in comfort and to supply them with many of the luxuries of life. It is not easy to do this on the small farm. May that day be far distant when the small farm without machinery will require that our farm women work in the fields,

lose their high ideals, and become broken down physical wrecks before they have lived half their years.

I sincerely believe that the dairymen of Wisconsin are engaged in a business of which they may well feel proud. It is financially profitable, intensely interesting, and better than all else it is lifting agriculture to a higher level. He who thinks only of the financial side of the business has fallen far short of the highest ideals. We all love wealth in some form. A few take theirs in honors and win fame on many battlefields. Some seek theirs more quietly by adding pages to the world's best literature. Many there are who prefer their wealth in houses, lands and gold; but there are a few men with us yet who are willing to pass by all these ordinary forms of wealth and seek theirs in the satisfaction that comes from a life well spent in the service of their fellow men. May this idea of service be the aim, ambition and ideal, not only of all who are present here today, but of every dairyman in the great State of Wisconsin.

GROWING ALFALFA AND ITS FEED VALUE

M. MICHELS, Peebles

Alfalfa, often called the "Queen" of all clovers and other grass plants, yields the largest, most nutritious, and most palatable of hay crops. It also furnishes an excellent soiling crop and is the most efficient soil enricher we can grow. No dairy ration is complete without this hay of highest protein content.

The first alfalfa I ever saw grown came to my notice in 1893, while working on a dairy farm in the state of Nevada. It was on this farm, where they had nearly 300 acres in alfalfa, that I first fell in love with this plant. I noticed its rapid and luxuriant growth, how much the cows, the calves, and the horses relished this hay, and also how sleek and healthy all of the stock appeared even though there was no grain of any kind fed to any of the stock.

In Fond du Lac county, Wis., especially in the eastern half of the county, it is an easy matter to grow alfalfa and grow a large crop without any special attention. We have a variety of soils, most of which are well-supplied with lime and the alfalfa

does well on any of them. We also had the good fortune (but we used to term it misfortune) many years ago to get our lands inoculated with sweet clover, which is of help to us now in the raising of alfalfa.

I believe that every farm in the state of Wisconsin can grow and will sooner or later grow alfalfa. This can not be accomplished in a year or two, but by continuous efforts on the part of the farmer to get his land in fit condition, it is plain to me that in the next ten years this may be accomplished. Today we can find within our own state many farms growing alfalfa successfully that would not do so ten years ago. This in most cases was brought about by sowing 2 to 3 pounds of alfalfa seed with all clovers and other grasses. In this way the land has been fitted up, or, in other words, has been inoculated with the proper kind of bacteria to form the nodules on the roots of the alfalfa plant that have the power to draw nitrogen from the air. If this can be done on some farms it can be done on most of the farms in this state. Where the sprinkling of alfalfa seed will not bring about this change, we know sweet clover will, as this plant seems to have the power to grow and do well anywhere and everywhere.

The past two years I have raised a little sweet clover and hulled the same for seed. I have found this plant to do well anywhere where alsike will grow. It also grows up to the edge of the water along a live creek running through my farm. It grows to a height of 5 to 6 feet on the sand banks along the lake, on rough hills, stone piles, or along the roadsides. In fact anywhere where cattle can not get at it.

In answer to the question "how to grow alfalfa," the late Joseph E. Wing replied: "It is as easy as it is to keep a sweetheart or a wife in love with you, and depends on the same principle exactly—that is, do the little things, just the little things, and the right things in the right time and the right way. You do not need to fall off the courthouse, or do any ridiculous thing to keep your wife in love with you. It is the easiest thing in the world to make a good woman think you are a good man."

The words of Mr. Wing seemed to me right to the point, for in the past altogether too much mystery and uncertainty has been injected into the growing of alfalfa. With us alfalfa is year after year the most certain crop to grow.

Now to do the little things and the right things in the right way in growing alfalfa seems very simple and I wish to enumerate some of them as follows:

1. Use home or western grown seed, with a germination test of 95% or better.
2. Select any soil that will grow corn.
3. Fall plowing is preferable.
4. Thorough but shallow cultivation in the spring.
5. Sow fifteen pounds of alfalfa seed and 1 bushel of barley per acre.
6. If a drill with seeding attachment is used, drop seed ahead of discs or shoes. No harrowing necessary after seeding. If the barley is sown first and the alfalfa seed put on by a hand seeder, follow with light harrowing.
7. If barley should happen to lodge, cut for hay; if it stands up, allow it to ripen. In either case get it off the field as soon as possible after cutting.
8. Do not cut again nor pasture the first year; the heavier the growth in the fall the better. This applies to old as well as new fields. No danger of smothering itself even if knee high.
9. Cut as soon as new sprouts grow out from the crown; this is usually at the time the first blossoms appear.
10. Alfalfa should be cut high. Tilt cutting bar a notch or two higher than you would for the other grasses so as not to injure the new sprouts, thereby getting a quick start and more hay at the next cutting.
11. Alfalfa must be cut three times and only three times to keep it in the best of health.
12. If alfalfa fields should appear a little thin, cultivate as soon as dry in the spring, using a spring-tooth harrow or hoe seeder the same as you would a strawberry bed.
13. If possible give your alfalfa a light dressing of stable manure during fall or winter. It will show results every time.
14. Do not overdo the curing in the field. Alfalfa can be put up easier and quicker than clover and still cure out well in the mow. Do not pile up high in the mow in order to keep each cutting separate, but spread out as much as possible.
15. Remember as a weed destroyer the growing of alfalfa has no equal.
16. If you have alfalfa hay for sale, get in touch with feeders and sell direct.

17. In selling alfalfa remember that the standard is set so high on the grade called "choice" that it is impossible for us to bale a car to meet the requirement of this grade.

Feeding Value of Alfalfa

The value of different feeds is ever a live question with the dairyman and the feed value of alfalfa is one of particular interest. For the practical dairyman, the man who is feeding for milk and butter fat production, alfalfa must be had to make his rations complete.

For the past 5 years I have sold from 8 to 19 carloads of alfalfa each year and nearly all of this hay has been fed to herds where they feed for Advanced Registry records. Advanced Registry feeders after getting used to alfalfa can find no other feed to take its place.

For the past three years we have been feeding for Advanced Registry records. Today, if I could not have alfalfa I would at once stop this work, not only because of the expense connected with the best of other feeds, but also because of the health and breeding difficulties resulting from high feeding of concentrates.

From last spring until October, during which time we had June grass and alfalfa pasture, we fed practically nothing in the barn but alfalfa hay and silage. In fact our cows would not eat concentrates of any kind unless no alfalfa hay was given for a day or two. It was surprising to note how they would pick out and eat the alfalfa leaves from ground oats, barley, Ajax, oil meal, and beet pulp that was left in their mangers.

In our Advanced Registry work we do not aim to make world records, as we are milking only twice a day and have them drop a calf every year. Our records, however, show up well, ranging from a little better than 300 pounds of fat for two-year-olds up to nearly 500 pounds of fat for 5 years of age. These records, considering the cheapness of feed fed and that no special labor or care was given, go to show the remarkable feed value produced in the shape of alfalfa.

Our calves, pure-bred Guernseys, are raised entirely on alfalfa, silage, and skim milk. We have never lost but one, neither have we ever had one with scours or that was sick in any other

way. The one we lost two years ago, a two-months-old heifer, caught cold and died of pneumonia.

Some calves will nibble alfalfa when only a few days old and most of them will eat it at the end of a week. We feed them alfalfa from the day they are born and always more than they will eat. For hogs there is nothing that will equal alfalfa for pasture and in winter we feed our brood sows mostly on select alfalfa hay and skim milk.

As a horse feed there is nothing that will approach alfalfa when properly fed, and no other hay is relished so much as is alfalfa. We put most of our hay through the cows' mangers before feeding it to the horses, as the cows prefer the leaves as much as the horses do the stems. For the last 4 years we have had no other hay but alfalfa, neither have we fed any oats or other grain to our horses. We have 6 horses ranging from 4 to 22 years of age; all of these for the last 4 years have been fed on practically nothing but alfalfa hay and about 8 to 10 lbs. silage per day—we never pasture our horses. I also wish to add that up to this time we have not paid out a single dollar for doctoring or medicine of any kind either for horses or cattle.

From what I have said some may take it that I have never tried other methods of feeding. I will answer that I have and that there is no book (not even the Good Book) I have ever studied harder than Professor Henry's "Feeds and Feeding" from the time of the issue of its first edition.

Discussion

A Member: Do you sow just the common variety of alfalfa?

Mr. Michels: We sow all kinds. We used to look for the Montana seed, but as I understand, even if you call for it, you are liable to get Nebraska seed, so I have lately been buying Nebraska and Dakota and Kansas seed, and I can't see the difference.

A Member: I have read that late cutting will cause it to winterkill.

Mr. Michels: It is heaved out of the ground. When your alfalfa fields are thinner, you don't find that condition.

A Member: Where you leave a heavy crop growing in the fall, wouldn't you have even to rake up that field before the new alfalfa begins to come?

Mr. MICHELS: You never notice it the next year with alfalfa. You would, with clover.

A Member: Do you think cultivating alfalfa after it starts is a good thing, cultivating with a cultivator or disk?

Mr. MICHELS: I never tried a disk. I think it is a good thing to stir it up, it seems to do the ground good.

A Member: How long do you leave your alfalfa fields stand before you plow them up?

Mr. MICHELS: The last field I plowed up was in alfalfa for eleven years, and there is where I had to put five horses on one plow. I will not leave them as long again as that.

PROF. MCDOWELL: From the standpoint of nourishing food for your live stock, about how many acres of corn do you need to plant to balance up so many acres of alfalfa, how many of each, say, for the dairy cow?

Mr. MICHELS: I don't know exactly. We had fifty acres of corn this year and sixty acres of alfalfa, but, of course, we have more alfalfa hay by far than we can use, and twenty acres of that corn went to the pigs. I think nearly thirty acres went into the silo.

PROF. MCDOWELL: For the dairy cow, do you think you would be very far out if you balanced the two?

Mr. MICHELS: I don't think so: perhaps that would be pretty nearly right. I rather think if you had thirty acres of each, it would balance up pretty well.

A Member: You spoke about not curing alfalfa too much in the field. We have been in the habit of cocking ours right up.

Mr. MICHELS: I believe that is the best way to handle the alfalfa crop, to cock it up.

A Member: We have a hay loader and we like that way of handling it pretty well.

Mr. MICHELS: We use a hay loader. It is all right to put it into the barn and get it there before you lose too much of your leaves. We use a side-delivery rack and then go over it with a hay loader.

A Member: Would it pay to put alfalfa in the silo?

Mr. MICHELS: What I have seen of alfalfa and clover silage has been very far from satisfactory, although the cows seem to eat it. It is very strong smelling stuff, and in both the cases that I spoke of, where the milk was refused at the creamery, I think it was due to that strong smell.

A Member: I tried putting the third crop in the silo. The cows ate it all right, but it smelled awfully.

A Member: I put in the third cutting in the silo. I didn't mix it with the corn, I ran it separately. It keeps all right, but the objection I have is that when it comes out it doesn't come out loosely like corn, it comes in chunks, it packs, and the cows didn't seem to like it, and as these other gentlemen have said, it smells badly.

Mr. MICHELS: You would prefer to have your alfalfa in hay, wouldn't you? I would, I am sure. We have tried everything to put in the silo, and alfalfa makes a feed in a way, but nothing that is satisfactory.

A Member: Is there any danger in any particular cutting in feeding to horses?

Mr. MICHELS: Not that I know of. We feed all cuttings. We put it up on the green order, with the hay loader, and we spread it over the big barn every cutting by itself. That gives it a chance to cure out better than if we piled it up high.

A Member: What success have you had, or have you ever tried to seed it about the middle of the summer?

Mr. MICHELS: Not very good. With us, the weeds seem to destroy it; you have to go in and cut the weeds and that comes generally at a time when we are liable to have dry spells and the plant grows up very spindling and small. If you have the right kind of weather, you may have the finest crop you ever saw. But you are liable to get into this dry spell and four times out of five, the crop is partly spoiled.

A Member: Doesn't your hay sweat considerably the way you handle it?

Mr. MICHELS: Yes; it gets so that we don't want to walk over it very long, we don't care for that. If we had red clover in that condition, we should have spoiled hay, but alfalfa doesn't mould; it may be steaming out over the top, and it looks as if it were spoiled on you, but it will come out all right.

A Member: If we put the clover in the hay now and spread it out in the same way you speak of, it might not result so badly.

Mr. MICHELS: We have tried that. We have put in red clover the same way we do alfalfa, and we had a badly spoiled lot of hay in the barn.

A Member: Won't pasturing alfalfa thin it out?

Mr. MICHELS: I think it has a tendency to thin it out. Alfalfa seems to be a little different from most other crops. When it gets to a certain stage, it wants to be cut, and I believe it has got to be cut three times and only three times to keep it in the best health. I had a neighbor who had a field he was using for soiling—it makes an excellent soiling crop, but it certainly has a tendency to thin out. Where it is cut regardless of the growth stage of the plant, it will thin out on you.

A Member: Do you think cattle take as readily to the first crop of alfalfa hay as they do to the second and third cutting?

Mr. MICHELS: Why, no, I don't think they do, quite. I think if you cut your first crop of hay quite early, as early as you possibly can, I think you won't see much difference. But with us, we cut it a little late and it got a little coarse and the cattle don't like coarse hay as well. The horses like it better.

A Member: What crop do you raise the year before you are going to plant alfalfa?

Mr. MICHELS: It doesn't make any difference. If I had a piece I wanted to put in alfalfa, I would plow it in the fall, cultivate it thoroughly but shallow in the spring, and put in the seed. We have no trouble getting started at all.

RESOLUTIONS ADOPTED

RESOLVED: That the Wisconsin Dairymen's Association in meeting assembled indorse the work of the National Dairy Council in its work for the uniting of all the different branches of the dairy industry to advance the interest of the dairy cow and in its endeavor to carry on a campaign of education to increase the consumption of dairy products.

WHEREAS, Some of the states west of us are ruling against shipments of dairy cattle because they have had some lots of cattle going from Wisconsin with a tuberculin test certificate, prove tubercular upon retest after arrival, be it

RESOLVED: That we pledge our support of the Wisconsin Live Stock Sanitary Board in an effort to devise means to see that only reputable test certificates are issued in this state and only clean cattle be shipped from the state.

WHEREAS, There are certain oleomargarine manufacturers and dealers and other interests closely allied with oleomargarine, planning to repeal the present federal oleomargarine law at the next session of congress and since this law is the only national instrument which protects our butter from oleomargarine fraud and forces it to sell upon its own merit, therefore be it

RESOLVED: That we pledge our support to the National Dairy Union in their work in suppressing the fraud in oleomargarine and be it further

RESOLVED: That we believe the present oleomargarine law should be retained upon the statute books until a better and more comprehensive law can be secured.

WHEREAS, The Internal Revenue Commissioner, Mr. Osborne, has effectively enforced the oleomargarine law and thereby protected the dairy interests from much fraud and imposition from oleomargarine, therefor be it

RESOLVED: That we, the Wisconsin Dairymen's Association in our 44th Annual Convention extend to him our sincere appreciation of this splendid service.