Fortieth annual report of the Wisconsin Dairymen's Association : held at Beloit, Wis., November, 1911. Report of the proceedings, annual address of the president, and interesting essays and discussion...

Wisconsin Dairymen's Association
Madison, Wisconsin: Democrat Printing Company, State Printer, 1912

https://digital.library.wisc.edu/1711.dl/3LKBEHFMM2PCB9A

W. A. HENRY.

FORTIETH ANNUAL REPORT

OF

WISCONSIN

DAIRYMEN'S ASSOCIATION

HELD AT

Beloit, Wis., November, 1911.

REPORT OF THE PROCEEDINGS, ANNUAL ADDRESS OF THE PRESIDENT, AND INTERESTING ESSAYS AND DISCUSSIONS RELATING TO THE DAIRY INTERESTS.

COMPILED BY

A. J. GLOVER, Secretary.

MADISON
DEMOCRAT PRINTING COMPANY, STATE PRINTER
1912

LETTER OF TRANSMITTAL.

WISCONSIN DAIRYMEN'S ASSOCIATION,

Secretary's Office,

FORT ATKINSON, JULY 30, 1912.

To His Excellency, FRANCIS E. MCGOVERN,

Governor of the State of Wisconsin.

DEAR SIR: I have the honor to submit for publication, as provided by the law, the Fortieth Annual Report of the Wisconsin Dairymen's Association, showing the receipts and disbursements during the past year, also papers relating to the dairy interests read and discussions had at the annual convention held at Beloit.

Very respectfully,

A. J. GLOVER,

Secretary.

OFFICERS

PRESIDENT,
E. C. JACOBS,
ELK MOUND, WIS.

VICE PRESIDENTS,
A. D. DELAND, SHEBOYGAN, SHEBOYGAN COUNTY,
President 1877.
W. A. HENRY, MADISON, DANE COUNTY
President 1890.
W. D. HOARD, FORT ATKINSON, JEFFERSON COUNTY,
President 1891-3.
C. H. EVERETT, RACINE, RACINE COUNTY,
President 1894-5.
G. W. BURCHARD, FORT ATKINSON, JEFFERSON COUNTY,
President 1896-7.
H. C. TAYLOR, ORFORDVILLE, ROCK COUNTY,
President 1898-9.
C. P. GOODRICH, FORT ATKINSON, WIS.,
President 1900-1.
J. Q. EMERY, MADISON, WIS.,
President 1901-3.
CHARLES L. HILL, ROSENDALE, FOND DU LAC COUNTY,
President 1904-5.
W. J. GILLETT, ROSENDALE, FOND DU LAC COUNTY,
President 1906-7.
F. H. SCRIBNER, ROSENDALE, FOND DU LAC COUNTY,
President 1908-9.
H. D. GRISWOLD,
WEST SALEM, LA CROSSE COUNTY.
Presi lent, 1910-11.

SECRETARY,
A. J. GLOVER,
FORT ATKINSON, JEFFERSON COUNTY.

TREASURER,
H. K. LOOMIS,
SHEBOYGAN FALLS, SHEBOYGAN COUNTY.

CHESTER HAZEN, RIPON, FOND DU LAC COUNTY,
President 1872-74. Died 1900.
HIRAM SMITH, SHEBOYGAN COUNTY,
President 1875-76. Died May 15, 1890.
H. F. DOUSMAN, WAUKESHA COUNTY,
President 1878.
Z. G. SIMMONS, KENOSHA COUNTY,
President 1879.
C. R. BEACH, WALWORTH COUNTY,
President 1881-82. Died September 15, 1896.
W. H. MORRISON, WALWORTH COUNTY,
President 1883-86. Died December 15, 1893.
H. C. ADAMS, DANE COUNTY,
President 1887-89. Died July 7, 1906.
STEPHEN FAVILL, DANE COUNTY,
President 1886. Died —, 1906.

TABLE OF CONTENTS.

CONTENTS.

TRANSACTIONS

WITH

ACCOMPANYING PAPERS AND DISCUSSIONS

OF THE

Wisconisn Dairymen's Association

AT THEIR

FORTIETH ANNUAL CONVENTION

Held in Beloit, November, 1911.

ADDRESS OF WELCOME

By Mayor L. B. Cunningham of Beloit.

Members of the Wisconsin Dairymen's Association:

Gentlemen: It is a great pleasure for me, in behalf of the members of your association in this city as well as the citizens in general, to extend a very hearty welcome to you to Beloit. I have watched with great pleasure the ever increasing importance of our state as a dairy center. I have watched the work of the state university reaching out into all the corners of the state with helpful instruction to the dairymen. The work that this association does has a direct bearing on the welfare of all the citizens of the state. Better bred cattle and more sanitary conditions about the stables, mean pure milk and better meats. Your association has accomplished much in the past forty years of its organization and I am sure that this convention will bear a very marked influence on the lines of advancement in dairy farming.

Wisconsin has sent a cow to the capital at Washington. Some day we may send a president there. I thank you.

(The Chairman: We will ask Mr. Goodrich, one of our oldest dairymen, to say a word in response to this address of welcome.)

RESPONSE

By C. P. Goodrich, Fort Atkinson, Wis.

Mr. President, Mr. Mayor, Citizens of Beloit: I have been interested in the dairy business for a great many years. When I first commenced, there was just a few dairy cows and a few men who thought they were dairymen. Dairying has made a wonderful improvement, and I tell you the people of Wisconsin do not realize the magnitude of the dairy business in their state. At the last census we had 1,500,000 dairy cows, and taking the young cattle, the heifers, etc., it makes 2,000,000 cows, and they are valued at $100,000,000; dairy products worth $200,000,000 have been shipped out of Wisconsin the past year. Those are big figures, but you can't prove they are not true. The dairy business is bringing us a whole lot of money; it is giving us enough money so that we can educate our children. The next generation will have a chance to do a great deal better than we have done, be more civilized human beings than we were when we were young.

And that is not all; that is not the best thing about it by a great deal. We are building up and conserving for fertility of the soil, which is of the greatest importance. The generations that follow us will have a great heritage,—land where they can get a better living than they can now in many places in many parts of the country, where the soil was naturally a great deal richer than it was here. Lately I have been through the state of Iowa, naturally the best agricultural soil in the country, but I tell you they are wasting their soil a great deal more than we are. We are producing more than they are now, and they used to produce much more than we did. The Dairymen's Association has had a great deal to do with this improvement and the increased wealth of the country.

Mr. Scribner called to the chair.

The Chairman: Friends, it is a great pleasure to me to take the chair for a few moments while we have a word from our president. The dairy interests of the country have changed wonderfully since the good old days Mr. Goodrich talked about. A good many of us thought we were dairymen in those days, but in fact were not very good ones. I remember the first time I heard Mr. Goodrich talk at a meeting. He told us then that he had cows making 300 pounds of butter in a year, and I thought that was wonderful. I went home and commenced

weighing and testing my milk and found I was not getting anywhere near that amount. I kept on weighing and testing and weeding out poor cows and finally got them up to three hundred pounds of butter for the year. Other dairymen are doing these things; Wisconsin is looked up to as a leader, and we want to be sure to keep the lead. This association is looked up to as a leader and it has been for many years. Let us keep this movement working strongly. This is our fortieth meeting and should be our best and most encouraging to the dairymen of the state.

PRESIDENT'S ANNUAL ADDRESS.

H. D. Griswold, West Salem, Wis.

Mr. Chairman; Ladies and Gentlemen, and Members of the Wisconsin Dairymen's Association: We have met to-day for our fortieth annual convention. It seems fitting that we should review briefly what has been done to improve dairy conditions in forty years.

I remember distinctly some of the hardships which we endured in those early days. We never thought of winter cows; they all came fresh in the spring, and were dry all winter. Many times we did not have enough milk in the winter for the family and had to go without. The cows were scrub; no fancy stock in those days and any kind of a straw shed was a stable. Nature took pity on the poor cow and gave her a long coat of hair, otherwise she would have frozen. But in the spring? Oh yes, then we had milk and June butter. The milk was set in pans and crocks in the pantry or cellar and skimmed with a skimmer, often when it was thick, sour.

There must have been a great loss of butter fat by those methods. The cream was hung in the open well to keep it cool.

The old dash churn. How many weary hours the good wife spent over that. She had no definite knowledge of the principles of butter making; just what her mother had told her and her own good sense. There were just about as many different varieties of butter as there were women that made it.

Then there was good marketing and again the good wife solicited among her city friends to find private customers for the surplus butter. Failing in that we had to try and work it off at the grocery store and take trade in exchange. I have been to the city of La Crosse, 12 miles, with butter and had to bring it home again because I could not get an offer for it. Good butter too, I knew that because my wife made it.

Such were the conditions when this association was formed by a little band of men: W. D. Hoard, Stephen Favill, W. S. Green, Chester Hazen, H. F. Dousman, A. D. DeLand and H. C. Drake. These men met at Watertown on the 15th of February, 1872, and organized the Wisconsin Dairymen's Association.

They set to work at once to open a market and to promote the dairy interest in Wisconsin. The object of the association has ever been to help the dairymen of the state and encourage them in better methods thereby producing a better article at a better price. The meetings have been held in different parts of the state to give as much benefit as possible to all interested.

The association has done a great work in the suppression of frauds, such as filled cheese and oleomargarine sales, and many other things of vital interest to the dairymen. The last few years have been devoted largely to the establishing of testing associations, believing that this work would conduce to greater good than any other method.

To W. D. Hoard especially, the dairymen of Wisconsin owe a debt of gratitude which they can never repay. Through all these years he has been untiring in his efforts to promote the best interests of the dairymen and we are glad that he has lived to see the splendid results of his labors. The first improvement in handling milk was the cold setting or the shotgun cans set in cold water. That was good in its day. Then came the creamery and the cream separator.

The separator, thanks to the enterprising agent, spurred on by large profits, has come to almost every farm, and the creamery and cheese factory to almost every community in the state till we have more than any other state in the union. Better stock has come into use and to-day no state or country can make a better showing all along the line than Wisconsin. This is plainly shown at all the large fairs, and the state contest that has been going on for the last two years shows more high producing cows than any like contest that has ever been made. Fine, large comfortable barns and stables are found on most farms. And silos are going up thick and fast.

Prof. Babcock has given us the Babcock test whereby any one of average intelligence can test milk and cream for himself and know what he is producing. Our agricultural schools and colleges are sending out trained men to take up this work of right breeding, right feeding and care. They are sending out to the farmer the results of years of careful experiments so that the dairymen of to-day have no excuse for ignorance; he can know the truth if he will.

Instead of the uncertain markets of the past we have good markets and good prices, the world is open to us. Our cities are growing fast and the consumption of milk and cream is astonishing. Our large

cities reach out over a wide territory for their supplies. The ice cream trade is also growing fast and is no small item. But while all this has been going on the scientist has been busy along other lines and he has found that barnyard manure mixed with milk is not good food, especially for babies. Also that cows effected with tuberculosis do not furnish healthy milk, and that cows kept in dark, unventilated stables are not healthy. So the city man is demanding clean milk and laws and regulations are being passed requiring the dairymen to clean up, but the old fellows are stubborn and the work goes slow.

With all the improvements we have there is still a great work to be done and I venture to say that if I should go out five miles from any city in Wisconsin I could find just as poor scrub cows and just as poor dairymen as we had forty years ago. I can take you to localities in this state where no attention is paid to breeding, where no milk is produced in the winter months and where the cows are out all day in the coldest weather.

I think I am safe in saying that nine men in ten, taking the state through, are using scrub bulls in their dairy herds. We need first of all, better cows and to that end more attention paid to breeding. We need better feeders for our cows and more attention paid to cleanliness. We need to watch out for tuberculosis, that it is not in our herds, and we need to watch the manufacturers of oleomargarine and other frauds that they do not ruin our business.

In the little country of Denmark they are doing the most progressive work in dairying to-day of any country in the world, and how are they doing it? Simply by working together.

We farmers and dairymen must work together in coöperative breeding, in test associations, in selling and buying. We do not trust each other enough. If we will stand together, shoulder to shoulder and work for the things we want, and if need be fight for them, we will get them."

The Chairman: In view of this admirable paper I think it would be wise to have some comments. I will call upon some of our friends here.

Judge Rosa: Mr. Chairman, Members of the Association: I am very much interested in the progress being made in dairying in this state, but I sometimes wonder how we are ever going to get the mass of dairymen to "move on." Just a couple of weeks ago I was out on my farm at milking time and a neighbor of mine came along and in the course of our conversation he told me he had quit one of the milk companies here in Beloit, because they wanted him to sign a contract giving them, among other things, the right to come out to his place and see how he cleaned his stables, and he wouldn't stand for anybody telling

him how to clean his stables. I know there are a great many iniquities connected with the milk companies as a whole, and sometimes they are a dire enemy of the farmer, but they do a whole lot of good in some ways. I think down in this country, and between here and Chicago, the Borden Milk Company and the local milk companies in the cities have done a great deal toward compelling farmers who are not open to reason or to any enlightening suggestion at all, to produce more sanitary milk. I am glad indeed to say a word at this meeting of the Wisconsin Dairymen's Association. This getting together of a few men interested in these problems is a great thing for the state. I certainly am one of those who appreciate what this association has done for the dairymen of this state. And I think that the work they are at present engaged in, that of forming cow testing associations, is an exceedingly important one, particularly on the financial side of the business. I believe that if the Wisconsin Dairymen's Association never did any other thing than to institute and carry on the formation of these cow testing associations, that it would have well justified its existence. I thank you.

A. J. Glover: Mr. Chairman and Gentlemen: As secretary of this association I am perplexed constantly as to what course should be pursued by this association to be of the greater benefit to the state. When I was made secretary, some three or four years ago, a number of cow testing associations were being organized and run upon what we termed the fifty-cent plan. This plan was worked as follows:

The farmer did his own weighing and sampling of milk, taking samples of milk to the creamery where they were tested by the butter maker. When we began to study this, however, we found that at times, many of the farmers were indifferent to this work. The season when they were rushed with work would come on and it would be neglected, consequently we changed the system to the present one, which we term the dollar-plan. It is not necessary for me to say what that system is, but I will say that we have over five thousand cows at the present time under test and twelve active cow testing associations in our state. Now, you might think that when we go into a place and demonstrate the individual differences of cows, and show how great those differences are, that men would not only be interested, but anxious, for their own sakes, to continue the work, but too often they grow indifferent, and it is only through the efforts of the cow tester, and Mr. Searles, who looks directly after these associations, that they are kept up to the mark and the record of the cows secured. We have had men drop out saying they did not want to know any more about their cows; they were so poor they could not afford to spend any more on them. A good many things creep in, but there is one particular thing I will speak of: A good many breeders of pure bred cattle do not wish to know what their

animals are doing, because they have a little conscience, and if a man comes to buy and says, "Here, you are in the Wisconsin cow testing association, what is the record of that animal over there?" he has to tell it. Sometimes it is so poor he can't make the sale. Therefore he drops out of the association purposely, because he doesn't like to lie about his cows. We have had men in the association who tried to substitute cows, and cheat themselves. What they wanted was a big record to talk about. We have had to drop men on that account. We inaugurated a method of sketching cows in the contest to prevent substitution. Mr. Searles spends his whole time trying to make men pull together, where they seem bound to pull apart. But notwithstanding all this, we are going forward, each year adding to the number of associations, until to-day we have as many as one man can look after.

A great deal of responsibility rests upon the shoulders of the tester. He must not only be capable of weighing and testing milk and making reports of what the cows have done, but there are many suggestions he ought to be able to give in regard to feeding, and the management of cows.

The Chairman: There is much more in this than just the weighing and testing of the milk, indeed that is a small part of it. The cost of producing milk must be taken into consideration. We did not have as much need for doing that in years back as at the present time. When our land was cheap and when our feed was thrown into the river as waste product to get rid of it, it was different.

Mr. C. H. Everett: I want to say a word on the subject of "Bovine Tuberculosis" which has been mentioned. We all ought to be interested in this subject. It can be found everywhere, and as an officer of an association that has in charge the work of tuberculin testing, I know something about it. It is a disease that can be eradicated and driven from the boundries of this state but it will require united effort on the part of our farmers. There have been feelings of antagonism and of bitterness among our farmers because they were compelled to test before they could sell a cow. That law has been amended and that part eliminated, but in that law there is a clause which says that after 1913 the state will not pay farmers for the loss for cattle condemned. I want to urge upon the farmers the importance of getting together upon that proposition and testing their cattle, getting rid of those diseased, and in that way drive out this disease from our state. After 1913, every animal on your farm that is condemned by the state veterinarian or the State Live Stock Sanitary Board will be your loss. The total loss will fall upon your shoulders.

The convention adjourned to meet at 1.30 P. M.

The convention met at 1.30 P. M. President Griswold in the chair.

SILAGE.

By Prof. C. F. Norgord, Madison.

One hundred and fifty thousand silos to-day furnish succulent feed to the herds the United States; 95% of these serving the dairy cow, giving her, throughout the entire year, the rich, tender, appetizing, milk-producing diet which came to her ancestors only during the balmy days of May and June. A fuller knowledge of making, handling and feeding silage is rapidly driving away old prejudices. No longer do we find any large number of persons holding to the old ideas of fires, tuberculosis and loss of teeth resulting from the use of silage.

When Professor Fraser recently submitted a choice between milk produced with a daily ration of forty pounds of silage and milk without silage, 372 persons out of 620 or 60% of them chose the milk produced by silage. By such tests and the introduction of sanitary methods of handling silage even the condenseries, the last and greatest enemies of silage, are rapidly surrendering the last vestige of prejudice against it.

The silo is the boon particularly to the northern farmer. It permits of the safe and profitable production and the perfect utilization of corn in the great northern grass and clover areas of our state where corn formerly was thought unprofitable. Wherever you go in Wisconsin to-day, you will find that the number of silos have doubled and trebled in the past two years.

Crops for the Silo.

As a class, legumes have proved somewhat disappointing for the silo. Red clover has been used with some success but often it has a rank odor and is not relished. Alfalfa has given better success. Often newly cut alfalfa has been saved from destruction through rain by siloing. Cowpeas and soybeans fortunately appear favorably as silage plants. For increasing the protein content of corn silage these are of value. The soybean seems best adapted to Wisconsin conditions. When thus employed it is usually best to grow the beans separate from the corn and feed the two together in the silage cutter. All plants with hollow stems admit too much air into the silage to permit good keeping. Pea vines, sugar beet pulp and leaves, the latter often mixed with dry corn stalks are excellent sources of silage whose virtues are little known and which our farmers are as yet using all too scantily. Pre-

eminently above them all stands our Indian corn. Its succulent stems and rich ears when cut in short lengths pack solidly, keep well and form the silage eaten with the greatest relish.

Growing the Crop.

In growing corn for silage the distance apart of rows and plants bears a direct relation to the tonnage and feeding value of the crop. When planted too far apart too much crude fibre and too large ears and cobs result, thus making silage digested with difficulty. On the other hand, too close planting results in light colored plants, low in protein, lacking in substance and thus subject to great shrinking in the silo. The fertility of the soil likewise effects the crop, hence, the poorer the soil the farther apart the rows and plants should be placed. For the average Wisconsin conditions, rows 3½ feet apart and one stalk every nine to twelve inches with drilled corn or four stalks every 3½ feet if checked, produces silage corn of maximum yield and quality. Farmers are coming to see that four stalks per hill checked gives as many stalks per row as drilled corn with a stalk every nine to twelve inches apart. If the four stalks in each hill were distributed evenly on the 42 inches between hills in checked corn, each stalk would be 10½ inches apart. It will thus be seen that checking corn as stated above gives as large a number of stalks per row as drilling and in addition provides better grain and requires much less expense of cultivation. A larger or smaller number of stalks per row than indicated above is detrimental to the crop, hence planting corn of questionable germination will usually lead to a loss in the crop whether it be planted at the proper rate or thicker to make up for kernels failing to germinate.

The result of using poor seed is illustrated in the work done by the Department of Agronomy on the Demonstration Farms with seed corn throughout Wisconsin the past two years. The yield of corn in Wisconsin during these two years averaged not over 33 bushels per acre. Why? Partly because, as these experiments proved, the average stand was only 53% and the average germination of the seed corn through which it was produced was only 66%. A further study of the results shows that a good stand and germination was secured by those farmers who carefully fire dried their corn. An ear of corn contains 800 kernels. If, therefore, one ear used for seed fails to germinate, 800 ears or eight bushels of corn and 800 stalks are lost in the crop. Silver King corn dried by a farmer at Oshkosh under the eaves of a pumphouse yielded 44 bushels less per acre than the same variety kiln-dried.

It, therefore, pays to cure corn by kiln-drying and to test the seed for germination in order to eliminate ears that do not germinate.

Varieties.

Many good silage varieties are found in the state. The old Murdock corn grown extensively in the southern part of the state is good. Here and there you find strains of Reed's Yellow Dent, Leaming, Iowa Silver Mine that have been acclimated. For the northern part of the state Golden Glow and Wisconsin No. 8 are proving valuable and larger yielders than the flint varieties formerly grown. Flints give a large proportion of leaves to stalk but the total production is so small compared with dent varieties that no farmer can afford to use them for silage. Wisconsin No. 7 or Silver King is the variety which has been bred by the Station for leafiness. Because of this breeding, this variety is outyielding all other varieties in the state in the production of silage grain. Seed of this can be purchased through seed dealers in the state or from members of the State Experiment Association through orders sent to the Station at Madison.

Time for Cutting Corn for Silage—Losses From Using Too Late Maturing Varieties.

Experiments show that corn has an exceedingly high percentage of water during its early growth and even up to the milk stage. During the glazing stage the percentage of water decreases rapidly and the dry matter increases to a corresponding rate. In corn producing 13 tons green material per acre there is approximately two tons more dry matter than when in milk. If cut at the milk stage this amount of dry matter is therefore lost. The time to cut corn for silage to get the largest amount of food material is therefore at the glazing or ripe stage. Where southern corn is used it must of necessity be cut before it is sufficiently mature and the farmer therefore suffers the above mentioned loss. Jordan of New York found that only 65% of silage from southern corn was digestible as against 73% of northern corn.

During the early stages of the growth of corn a large part of the material which later becomes starch is in the form of sugar. When the green corn is placed in the silo, fermentation and chemical changes take place in this sugar as a result of which it is changed to alcohol, acid and carbon dioxide. The result is a large loss of the sugar so far as feed value is concerned, and further, the production of sour, unpalatable, bad smelling, unhealthful silage. Results of such work can be noticed in passing silos along the road where the bad odor can

often be noticed a half mile on each side of the silo. It is well, therefore, to delay cutting until the corn is nearly ripe when the dry matter is all deposited and the sugars are changed to starch.

Filling the Silo.

Legumes can be siloed without cutting but better success follows cutting. Corn should be cut into short pieces or shredded. The latter method is more favorable than the former. The smaller the pieces the better it will pack in the silo. Too much emphasis cannot be placed on the importance of thorough tramping, especially around the outside. Water sufficient to fill the spaces should be added. No danger attends the addition of large quantities. Silage is preserved on the same principle that rhubarb is kept in water in Mason jars. The acid coming from the material to be preserved destroys the bacteria that entered with the material and the water. The air-tight mass prevents the entrance of other bacteria. And since, therefore, no living bacteria are present, no decay takes place and the silage keeps. It will be noticed, therefore, that bacteria must be kept out. This requires, as stated before, thorough packing, the filling of the air spaces with water and an air-tight containing wall. Losses occur in the silo due to fire fanging and rotting. This is, of course, greatest at the top of the silo. Filling the top with water and seeding grain has proved the best means of protecting the top. Usually when the silo is filled the pastures are short and it is expedient to begin feeding silage at once after filling. When this is done there is no loss from this source. A reduction in the dry matter due to oxidation occurs and some of the proteid substances are changed to amide forms; a condition in which the proteid is less digestible. King found that the total loss need not be greater than 10%.

Comparing the losses from siloing corn with fodder, the experiments of four stations show the following results:

Losses of Silage vs. Losses of Fodder.

	Dry matter.	Crude Protein
Silage	15.7	11.1
Fodder	20.0	16.2
Difference favoring Silage	4.3	5.1

Silage vs. Fodder for Milk Production.

A much greater difference in the value of silage over that of fodder corn is indicated by the milk production from the two than the chemi-

cal composition would indicate. Tests of this matter as shown below made as Vermont and Wisconsin.

Milk Production.

	From Silage.		From Fodder.	
	Milk.	Fat.	Milk.	Fat.
Wisconsin,	7416 lbs.	340.4	7330	318.2
Vermont	8528 lbs.		7688	

As shown by this table silage produced 828 lbs. or 11% more milk at Vermont and 377 lbs. or 5% more milk at Wisconsin. In addition at Wisconsin the silage produced 22 lbs. or 7% more butter fat than the fodder corn.

Silage With and Without Ears of Corn.

Some persons are loth to see the ears go into the silo and therefore advocate snapping off the ears and making silage from the stalks alone. Hilles of the Vermont station conducted an experiment wherein equal areas of corn were siloed with and without the ears. In feeding the silage having no grain, the ears snapped from this area were fed as ground feed in connection with the silage. On the completion of this experiment, it was found that one acre of silage with ears was worth for milk production 1.26 acres where the ears were snapped off and fed as ground feed.

It will thus be seen that the best use is made of corn when put up as silage. The silo is, therefore, the most efficient tool on the farm for saving, storing and utilizing the crops on the farm.

Frosted Corn for Silage.

The chief changes taking place in corn during freezing is a bursting of the cell walls and a consequent loss of the cell moisture by evaporation. As a result of this, after a frost we see the corn rapidly drying up. When water is applied to this corn in the silo the moisture is returned to the cells and the silage formed becomes nearly normal and practically as good as silage from unfrozen corn. Silage from frozen corn does not heat so much as that from unfrozen corn. This is due largely to the fact that the respiratory processes going on within the normal cell were stopped when the cells were killed by the frost.

The possible losses from the use of frozen corn for silage lie in the

loss of leaves from breaking off from the stalks. This loss is reduced to a minimum when the corn is put into the silo immediately after the frost.

The possibility of using frozen corn for silage is a great boon to the dairy sections of upper Wisconsin. It makes corn practically a sure crop in this section. Upper Wisconsin with its splendid production of clovers, grains and grasses can, therefore, together with the rest of our great agricultural state, make sure of that wonderful boon to dairying "corn silage," the dairy feed that makes possible delicious, succulent, milk-producing feed for the dairy cow every month in the year.

DISCUSSION.

Mr. Everett: The Professor made a remark on the over-abundance of water. Many of our farmers are anxious to know the difference in feeding value between dry corn fodder run through the cutter and silage. Why do you think silage is better than dry fodder, and what is the water in the silage worth?

Prof. Norgord: A large number of experiments have been conducted comparing the feeding value of dry corn stalks,—that is, corn stover including the grain,—with silage including the grain, and every experiment showed that silage gives the largest production of milk. Perhaps I would be right in saying that the average difference in milk production in favor of silage over and against corn would be something like 10 to 12 or 15%. I have one experiment in mind where some 2800 pounds of corn were cut and put into the silo, and an equal amount was cut and shocked and made into corn stover with the grain. The corn stover with the grain was fed to cows, as was also the silage, and an equal amount of grain fed with both. In that case the milk produced on the silage, over and above that produced on the stover, was just 11% and the per cent of fat produced with the silage over and above that with the stover was 7½%. That experiment was made with corn stover well cured and taken in right after it was dried and in good shape. Does the average farmer to-day have as good corn stover as that used in that experiment? Not by any means. Look at your corn stover to-day, standing out in the shock. I venture to say that in many cases two-thirds, yes, three-quarters of the feeding value is gone. I would not be far out of the way in saying that nearly every year one-half of the feeding value of the cornstalk is gone before it is ever fed to the cows. So you see when you make an actual experiment, the silage proves 10 to 15% better, and then when you take into consideration the average loss that comes to corn

stover you will find the silage way ahead. Now, as to the function of water in silage, there is a difference apparently, between the juice which is put in with the green corn and the water put onto the silage from the well. That is due probably to the fact that the water you put in with the silage contains a large amount of sugar. It is a good thing to put water on the silage because you must fill up the space, and in that way you avoid fire-fang and getting wrong acids in your silage, because it prevents the development of bacteria. Where there are no bacteria there can be no decay.

Mr. Everett: Most practical men agree with you that silage is fine feed, and that it utilizes the corn without waste. Taking all these things into consideration is not a silo one of the most economical things that a farmer can have on his farm?

Prof. Norgord: It certainly is. The question is often asked, "Is it not wasteful to put corn ears into the silo?" I believe it is the most profitable means of taking care of the corn. Experiments have been conducted where stalks without ears were put into a silo, and stalks with ears into another. When the silage without corn was fed they also fed corn in the shape of corn meal. In the other case there was no corn fed except that in the silage, so it was an actual test. They found that one acre of corn, grain and stalks put in as silage, was just as good as one and a quarter acres of corn stalk silage with the corn from it fed as meal. That shows you that the silo is the most economical way of using cornstalks and the corn as well, and therefore I believe that the silo is the most economical building that we can have on the farm. There is not a farmer in the state of Wisconsin who under any consideration can afford to be without one, that is, a farmer who is producing milk, and I believe it is almost true of other stock as well.

Mr. Everett: Can you tell how many silos were built in Wisconsin during the last year?

Prof. Norgord: I could not tell the exact number, but traveling over the state, I believe you will conclude that they have increased at least one-half.

Mr. Scribner: The gentleman said that those who had waited two or three weeks in cutting corn had practically the best silage. We tried to put our corn in the silo when it was glazed over. If I should wait two or three weeks after that, I don't think I would get any better results. With us, too, we find where the stalk is sufficiently green we don't need to put on any water.

Prof Norgord: I don't want you to get the impression that you will get the best silage if you wait until your corn is ripe, because that means an increase in the crude fibre, and that is less digestible,

and therefore the best time to pack your silage is not before it is ripe, nor after it is ripe but just when it is right. The first silo in America was built in 1876; the second one in 1877. I saw that silo and saw the silage from it. Way back in the early days of the silo there were men who said that putting corn into the silo at the right time actually added to the feeding value of the corn, and some of us sneered at that proposition. We said, very naturally, it isn't possible to take out more than you put in. Chemists had analysed it and found it had lost in feeding value. I am willing to say, and go on record as saying, that future generations may know what I think about it, that it does add to the feeding value of corn to put it into the silo. It does lose in dry matter, in protein and in carbohydrates, and the professors will say I am wrong. I know a good many farmers that have fed silage during the summer, and every time when they commenced to feed fresh corn that was in just the right stage to put in the silo, their cows dropped off in milk.

How do we get more out of the silo than we put into it? I answer, it has gone through a process that is something like digestion. It is more easily masticated and assimilated, and the animal makes better use of it.

I shall be gone some of these days, but some time or other people will say "Goodrich was right." It takes some nerve to say these things and I have hesitated about saying them nearly ten years.

THE WISCONSIN COW COMPETITION.

PROF. F. W. WOLL, MADISON.

Before we leave this other proposition I think it is only right to say we need not wait until Mr. Goodrich is gone to agree with him. I am sure many in this association agree with him now. The fact that the number of silos in this state has trebled in the last two or three years is proof that a good many people agree with him.

THE WISCONSIN DAIRY COW COMPETITION.

BY PROF. F. W. WOLL, OF WIS. AGRICULTURAL EXPERIMENT STATION.

The Wisconsin Dairy Cow Competition was planned to show the production of the cows under ordinary normal dairy conditions. This object was not and could not in the nature of things be fully secured,

for where the spirit of rivalry enters, as is unavoidable in a competition of this kind, each breeder will be likely to push his cows just as far as he considers safe and will give the cows entered in the competition the very best care that the conditions under which he is working will permit. This is human nature and no special fault can be found with breeders whose ambition leads them to surround the cows on the competition with the most favorable conditions for the largest dairy production of which they were capable. In one respect, however, we insisted from the start that there should be no letting down of bars; cows on the competition were required to be bred regularly and not later than five months from the last date of calving. In this way a fair regularity of breeding was insured and all records that will be considered in the award of prizes in the competition have, therefore, been obtained without sacrificing the future usefulness of the cows as members of the herd. It is known to most of you that this is a decided step in advance, for nearly all the earlier large records of production were made by cows that were not bred until toward the end of the testing year, or not at all, with the result that they never came in calf again. The records thus made were, therefore, of no practical value to ordinary dairy farmers, for these must secure a regular flow of milk from their cows from year to year, and that can only be done by breeding them regularly and having them drop a calf about once a year so long as they are profitable members of the herd. The large majority of the breeders entering their cows in the competition succeeded in breeding their cows within the time limit stated. Of the 271 cows whose records have been completed at the time this was written, all but 49, or 18 per cent, were safely bred within five months from the date of last calving. The records of the 18 per cent will not under the rules governing the competition be considered in the award of the prizes.

The total number of cows entered in the competition was 506, of which number 448 were pure bred cows and 58 grades. The different breeds were represented as follows: Guernseys, 193 cows; Jerseys, 102; and Holsteins, 211. These cows were owned by 56 different breeders, 21 Guernsey breeders having entered cows in the competition, 13 Jersey and 22 Holstein breeders. The participation in the competition was, therefore, limited to our three main dairy breeds and mostly to pure breds among these breeds. Much to our regret there is only a small representation of grade cows, and no native cow or cows were entered. The reasons for the failure of a large majority of our dairy farmers who own only native or grade cows to take advantage of the inducements offered in the competition were considered in my address before your association last February. They were very likely the

following, (1) the amount of labor required to keep daily records of the cows entered for yearly records, (2) the expense connected with the monthly testing of the cows, (3) the fear that the production of their cows would not show up favorably in comparison with the many cows with exceptional production entered in the competition, and finally, we fear, a lack of appreciation among the rank and file of our farmers of the wide variations in the value of different cows and of the importance of keeping an account of the production of individual cows in order to ascertain which of them produce milk at a profit and which, if any, do so at a loss. The fact that there is an appreciable proportion of the cows on the dairy farms in this and other states that do not produce enough milk to pay for the feed they eat and the labor spent on them, has not yet been sufficiently impressed on the minds of many farmers to make them test their cows. This work of cow testing, as you may know, is carried on in this state under the auspices of your association in the cow testing associations and is being conducted very successfully, but on a much too limited scale. Instead of a dozen cow testing associations within our state, we ought to have hundreds of them and would have them too, if our farmers in general appreciated the importance of this work and its value to them, to a similar extent as do European dairy farmers.

The first yearly records in the competition were completed in October, 1910, and since then a bunch of cows have finished yearly records every month, until we now have 275 records of production of milk, milk solids and fat, by 271 different cows. By the time the results for the production of the cows during the last month are in, this number will have swelled to over 400. Of the yearly records now completed 113 are of Guernsey cows, 58 of Jersey, and 100 of Holstein cows.

The average production of these 271 cows for the year was as follows: 10687 pounds of milk, 1387 pounds of solids and 445.9 pounds of butter fat. The highest record was that of the Holstein cow, Caroline Paul Parthenea, 77784, bred by Henry Schaefer and owned by R. J. Schaefer, Appleton, Wis., viz., 888.2 pounds of butter fat from nearly 22000 pounds of milk containing 2800 pounds of milk solids, for the year ending September 19, 1911. This cow is now seven years old, she dropped a calf September 26, 1910, and again October 16, 1911, about one week too early, two dead twin bull calves. She freshened twice, therefore, within about a year and still made the remarkable production of milk solids and fat stated. The feed of the cow eaten during the year was as follows, according to the statements furnished by the breeder each month: 2083 pounds wheat bran, 2084 pounds Ajax flakes, 1878 pounds gluten feed, 850 pounds hominy feed, 248 pounds ground barley, 367 pounds corn meal, 10726 pounds silage, 1200 pounds green corn, 600

pounds green peas and oats, 578 pounds clover hay, and 722 pounds mixed hay. Estimating the cost of the feed at ordinary market prices and pasture at $5 for the season, we find the total cost of the feed for the year $129.40. If we only consider the value of her dairy production we may figure this in various ways: (1) if her milk was retailed at five cents a quart it would bring $512.00, or (2) delivered at the factory at $1 a hundred it would bring 219.73, or (3) if the butter fat in her milk is valued at 28 cents a pound, the average price we received the last two years for the production of our University dairy herd, 888.2 pounds would be worth $248.68, adding to this the value of the skim milk at the rate of 20 cents a hundred, we would get 21972.9X.80 X.020 or $35.16, and this would give us $283.84 as the value of her year's production.

The last method of figuring is doubtless the most satisfactory and practical method and shows a net return of $154.44, if we consider that the labor of caring for the cow is largely, at least, offset by the value of the manure. In this figure for net returns the value of the calf she dropped last year is not considered, as stated, and we find nevertheless that the cow produced as much net profit as three ordinary *good* dairy cows, with emphasis on good, and about as much as eight or nine ordinary cows, such as are found on most of the farms in our state which supply the milk used for direct consumption or in the manufacture of butter, cheese or condensed milk.

Can these cows, or any appreciable number of them, be made to produce some eight or nine hundred pounds of butter fat a year? Hardly, and if not, why not? Is it the quantity or the quality of the feed the cow received that is responsible for her wonderful production and the large net profit she yielded? We have seen about what she ate and fail to find in the list of feeds anything that is not within easy reach of most dairy farmers and as a matter fact now used by many of them: the quantity eaten (about 20 lbs. of grain feed per day, on the average) is not excessive either, considering the fact that she is a large cow, weighing perhaps 1400 pounds and produced nearly as much as three ordinary good dairy cows. Most cows would not be able to eat as much grain feed as she did, and keep up a healthy appetite day after day and month after month, and there is where the skill of the feeder came in, but back of that is the skill of the breeder and of those that bred her ancestors so that she could reach the dairy production she did. We have hundreds of good dairy herds in the state, many of them averaging over 300 pounds of butter fat a year and a few even over 400 a year, and some of the breeders at least know their business quite as well as Mr. Schaefer does and are as skilled feeders as he is, but it is only in very exceptional cases of cows bred for generations

along strictly dairy lines that results are obtained like those of Caroline Paul Parthenea.

The best you can do if you are a dairy farmer is to take advantage of the possibilities for a large dairy production that have been bred into individuals of the great families of dairy cows and buy the best bull you can afford. You will get ahead faster in the dairy business that way, whether you are a dairy farmer or a breeder of dairy cattle, than by any other practical method. Only by taking advantage of what others have built up in the direction of capacity for dairy production, and by breeding to the best and then giving the cows the best care and feeding them liberally can success be reached in the management of the dairy herd.

I have spoken at some length of Caroline Paul Parthenea's record of production in the Wisconsin Dairy Cow Competition, but "there are others," as the saying goes. Of the 275 yearly records now completed, only 20 came below 300 pounds of butter fat, 77 came between 300 and 400 pounds, 101 between 400 and 500 pounds, 50 between 500 and 600 pounds, 18 between 600 and 700 pounds, 5 between 700 and 800 pounds and one over 800 pounds, the average production of butter fat being, as already stated, nearly 450 pounds, equivalent to over 520 pounds of commercial butter, or about 1½ pounds for every day in the year.

The next to the largest credit for production of butter fat for the year, so far obtained, is that of the grade Guernsey Bessie, owned by R. W. Rowlands of Waukesha. Her production was as follows: 12195 pounds of milk, 1755 pounds of milk solids and 659.3 pounds of butter fat. As a junior three-year-old she is allowed a handicap of 18% under the rules governing the competition and she therefore received credit for a production of 777.9 pounds of butter fat, equivalent to over 900 pounds of ordinary butter. The feed eaten by the cow during the year was as follows: 1521 pounds wheat bran, 380 pounds Ajax flakes, 201 pounds gluten feed, 479 pounds middlings, 210 pounds ground oats; 229 pounds corn meal, 205 pounds oil meal, 118 pounds Victor feed, 7723 pounds silage, 310 pounds green corn, 1398 pounds alfalfa hay and 661 pounds clover hay, all of which is worth, according to average market prices, $75.32. Her production of butter fat, on the other hand, was worth $184.60, and the skim milk available for feeding of young stock, $19.51, or a total of $204.11, leaving a net return of $128.79, if we figure that the manure paid for the care of the cow. Here again, as with the Holstein record cow, we note that the heavy producing cow was also a most economical producer, contrary to the opinion of some farmers who do not take the trouble to look carefully into the

question of relative values of the feed and the production obtained from such cows.

During each month of the two years just passed, a prize of $25 offered by the Hoard Publishing Company was awarded to the owner of the cow producing or receiving credit for the largest production of butter fat. Under the rules no cow could win this prize more than once for her owner.

The 24 cows which received credit for the highest production of butter fat during the respective months of the competition produced, on the average, 72329 pounds of butter fat. It is safe to say that never in the history of dairying has there been, in this country or abroad, a constellation of excellent dairy producers such as those included in this list. It is true that the records given are for one month only, but the same cows will also be found among the largest producers for the year as well. At the present writing the yearly records of only 14 of these cows have been figured out, and the production of these 14 ranged between 455.2 and 888.2 pounds of butter fat, the average of all coming at very nearly 580 pounds of butter fat equivalent to about 680 pounds of butter, more than three times as much as the average production of the dairy cows on Wisconsin farms.

As before suggested, we cannot all have cows like these. They are among the best cows in the respective herds and the owners would not want to sell them, but by caring for and feeding the cows we do have in a similar manner as these were handled we can doubtless very materially increase their production and the net returns they will yield us. The first requisite is, however, that we know what our cows are doing and that can only be found out by weighing and testing the milk at regular intervals, or if you do not have the time or facilites for doing this, by joining a cow-testing association, or by having official or yearly tests conducted of cows in year herd. Have you looked into the work that is being done in this direction in our state by this association, or by the Agricultural College? If you have not, why not post yourself in regard to your business and find out how much or how little money your cows are making for you and how to increase the profits from the herd. The state employs a staff of experts who are at your service and who will enjoy nothing better than to help you improve your conditions if you give them a chance. Why not take advantage of your opportunities and for a beginning send a card to the Experiment Station at Madison for a copy of bulletin No. 200, Selection of Feeds for Dairy Cows, and other publications issued by the Station relating to the management of dairy herds?

A full account of the Wisconsin Dairy Cow Competition will be published in the near future by the Experiment Station, and in this

will be given all records made by the cows entered in the competition, the feed they ate, and the prizes awarded. The results obtained will also be discussed in such a way as to be of most value to all cow owners. It seems best to defer further discussions of these results until all the records have been compiled and verified, and I shall, therefore, not claim your attention at this time further than to express the hope that you will carefully study the bulletin on the competition referred to when it is published, so that you may profit from the lessons which this teaches. There are embodied in this competition the results of the labors of many of the best dairymen and breeders of dairy cattle in the state and the methods of management of their dairy herds, and the results obtained by them are well worthy of being closely studied. It will be an inspiration to any dairy farmer and an incentive to all to go and do likewise, to the extent that the special conditions will permit under which each individual farmer is working.

DISCUSSION.

Mr. Clover: I would like to ask Prof. Woll if the Experiment Station expects to continue this competition work?

Prof. Woll: I am probably more responsible for this competition being started than any other man and there has been no provision made for continuing it. It was, in a way, a private venture of my colleague, Prof. Humphrey, and myself. We were interested in the question of having records obtained for the purpose of increasing the interest in the yearly records of our dairy cows, and having records obtained under as good conditions of modern dairying as we could get them. If, however, any body of farmers would like to have the work continued, we should be very glad to do so, but I don't feel that I personally, ought to take the initiative the second time.

A Member: What is the expense and who stands it?

Prof. Woll: The expense has fallen largely on the college. The farmers taking part in the competition have paid a fee of $5.00 a month a herd, but the competition will have cost the college anyway $1000.00 before they are through with it. The farmers who had cows entered in the competition will have paid out a good deal of money, but there will be prizes distributed in the competition that will amount to $2600.00 in cash, and nearly as much in value of stock and dairy implements that have been offered as prizes, so it is safe to say there will be possibly $5000.00 in money or money value in the competition as prizes.

Mr. Glover: How much does it cost per cow to do this testing?

Prof. Woll: I don't know that we care to figure that out, for the reason that we send a man to the farm to make these tests. He can take care of ten cows just as well as he can take care of one cow and naturally the more cows a man puts into the test, the cheaper will be the per cow expense. It is the cost per herd that is important, and that amounted to $5.00 per month, $60.00 a year, and for that a man could test ten cows. But under the present arrangement we conduct yearly tests at $8.00 per month, and that will be the price from now on, and we take care of ten cows for that. These tests are all conducted on a basis of tests conducted each month for two consecutive days, that is, each month of the year that the cow gives milk. And then we arrive at the milk yield of the cows, and get figures from the farmers and verify those figures as best we can, and we assume that the average test of the milk for those two days will be the average for the month.

Mr. Scribner: Is it not true that this expense has been taken care of a good deal by the different breed associations; that if the cow has qualified for advanced registry the breeders' association has paid that expense?

Prof. Woll: That is true in the Jersey Club, but not in the others.

A Member: You spoke of the test being of very great value to the pure breds. Wouldn't it be of great value to those who had grades also?

Prof. Woll: Yes. I have had many illustrations as to the testing value in that respect. The cattle business in Wisconsin has received great impetus through the results that we have obtained in these competitions. It naturally goes throughout the state through these parties who have entered cows in this competition.

WEDNESDAY EVENING, NOV. 15, 7:30 P. M.

President Griswold in the chair.

Music. High School Orchestra.

ADDRESS.

THE THREE R'S; A PLEA FOR THE BETTER EDUCATION.

REV. JENKIN LLOYD JONES, CHICAGO, ILLS.

(Inasmuch as Mr. Jones' address on "The Three R's; or a Plea for the Better Education," is one of his most popular lectures, frequently called for by educational and other gatherings, we are permitted to print only the following brief abstract.)

I am an alumnus of the log schoolhouse; a log schoolhouse built in the middle of the road, because it was built before the road was there; I got ahead of the surveyor. It would ill become me then to speak lightly of the old three R's that were considered the adequate foundation of an education in the old schoolhouse, readin', 'ritin' and 'rithmetic. But it has become clear that there is need of something more fundamental than these R's in the development of character and the training of citizens. These R's serve the rogue as well as the painter, the forger as well as the honest man.

There is much said in these days of the higher education—none too much. But I plead for the better education, that which was outlined by the great philosopher and pedagogue, Goethe, in his story of 'Wilhelm Meister".

In that scheme reverence was made the fundamental object of education, "for," he said, "this was a grace always acquired; no child is born reverent."

In his training school for boys there were three classes; the boys on the front form were taught on occasions calculated to stir deep and high feeling, to fold their arms before them and cast their eyes upward and to think of the marvels above.

The next higher class on similar occasions was taught to fold their arms behind them and cast their eyes downward, and think of the marvelous beauty in things lowly.

The third and highest class on similar occasions was taught to drop their arms beside them, and in military phrase to "touch elbows" and cast their eyes to the right and left, "form line," and think of the sanctities of the human, the marvel in their neighbor's eyes.

These, then, constitute the three R's, more fundamental than reading, writing or arithmetic; the reverence with the upward look, the reverence with the downward look, the reverence with the 'round look. And reverence in this connection means not only the old attitude toward the divine, but also necessarily it means respect for and deference to those in authority, tenderness towards the dependent and the helpless, respect for old age.

To develop these three reverences is the object of this lesson.

The first reverence was the primitive reverence, reaching back to the shepherd priests, who watched the stars and clothed them with divine powers.

The second reverence is peculiarly the gift of modern thought. Darwin, the great scientist of the 19th century dwelt upon the high services of the worm; he sickened at the thought of hunting, the taking by man of that which cannot be restored. * * *

Lincoln, the great twin brother of destiny, born on the same night as Darwin, was tender to the bird and the dog.

These qualities of these and other great men are illustrated by many stories. They teach the lesson that comes home to girls as well as boys, to women as well as men,—the atrocities of the milliner's trade menaces the gardens and the orchards of the country, as well as denudes vast acreas of "God's animated flowers." * * *

But the third reverence is the crowning grace of the present age. The concern for society rather than for one's individual well-being, the developement of commonwealth rather than wealth, the growth of the community feeling, the realization of the horrors of war, the growing passion for international peace. The lesson of the barnyard enforces the quest of the statesman; the thrifty farmer has learned to dehorn his herd that they may live at peace with one another, that they may make common cause against summer's heat and winter's sleet. The time is ready for the dehorning of the nations, so that rivalry and antagonism will give way to coöperation and the serving of mutual interests.

Thus, within the limits of an evening's lecture, I have tried to outline the better education which is so sorely needed, and which reaches from the little red schoolhouse on the corner to the university; begins with the kindergarten and does not end when life ends. This education glorifies things common, sanctifies things lowly, and makes beautiful the humblest life. This education is needed everywhere, nowhere more than on the farm and among farmers, for it is given to them to deal first-hand with the verities of life, the realities of nature, which are texts in God's great book of revelation.

Music.—High School Orchestra.

Adjourned to meet next day at 9 O'Clock, A. M. President Griswold in the chair.

---

9 O'CLOCK, A. M THURSDAY, Nov. 16, 1911.

ADDRESS TO YOUNG MEN TAKING PART IN THE BOYS' JUDGING CONTEST.

E. H. SCRIBNER, ROSENDALE.

I am glad to see so many boys here this morning. We want to interest them particularly along the line of live stock breeding. Those of us who have been through the mill believe there is nothing more interesting, and that if you are going to follow farming the question of live stock must necessarily be of the greatest importance, and for that

reason we have called this meeting to see if we cannot interest you along the lines of live stock work and especially dairy work.

The dairy cow of to-day, is a much different proposition from what she was in her primitive condition. Her work was then simply to rear her young and furnish enough food material for a short period to grow this calf. Now she is asked to do this same work and to give milk throughout the year and for a successive number of years.

The cow's work is not only to produce food but to reproduce herself as well, and her value depends a great deal on how she can do this particular work. If she is a good producer and a regular breeder then she is a valuable cow. On the other hand, if she fails in either one of these respects, she is of little value.

To-day we want to look at her from the utility or business standpoint. We as farmers, are too apt to neglect the business part of farming; we do not keep any account, we just let the work go on as it happens to go. It is not that we have not worked long enough or hard enough, it is because we have not used more judgment, more business methods in our work. This morning we want to look at the dairy cow from a business standpoint.

Now, I would judge all dairy cows, from the same standpoint. You may think that a singular, perhaps an unwise thing to do, but all dairy cows have practically the same purpose in life; some cows may be better adapted to give milk and others to giving cream and butter fat, but their prime object is the same, whatever breed they are. We will consider four dairy breeds this morning, the Guernsey, the Holstein, the Jersey and the Ayrshire. They have been bred, handled, fed and cared for all these years to do just one thing, and that is to make milk and butter fat. Consequently their formation has changed a great deal from what it was in the old primitive cow.

We have to-day two distinctive types of cattle; the beef type and the dairy type, they are much different in conformation. I know that the beef type is very attractive. The large majority of people rather admire the looks of the beef type cow. And she is all right for the work that she has been made for, but she is not the cow for dairy work, and so we want to consider the cow this morning that is doing work along dairy lines, her conformation is so different from the beef, that we want to consider her very carefully. As I said she may not be so beautiful, but to me handsome is that handsome does, and in my estimation the handsome cow is the one that can make a lot of butter fat or a lot of milk.

There are two or three essential things I want to speak of this morning. First I will mention constitution.

Now, we boys, for we are all boys, wouldn't amount to very much

if we didn't have constitution. We must have health, that rugged thrift that enables us to do something and that is why we are placed here on this earth—to do something.

To be profitable to us, the dairy cow should work and work all the time. I don't mean by that giving milk three hundred and sixty-five days in the year. Of course she should have a short period of rest.

Constitution is indicated in a good many ways. The general appearance of a cow goes a good ways. The head is a strong indication of constitution. I want a wide muzzle on a cow as it shows strength of constitution and strength in feeding qualities as well. I want to see open nostrils, because the usefulness of the animal is dependent in a large measure upon the air she breathes. If she has a little, restricted nose with a small opening, the amount of air she breathes is limited. There is nothing which purifies the blood except the oxygen from the air, and many times our cows are handicapped because they are kept in badly ventilated barns.

To me, the eye is an indication of constitution. When I see an eye that is dull and languid and sunken into the head, it is a sign of not much strength of constitution.

The heart has a great deal of hard work to do, so I want to see an animal have plenty of room in her heart girth. The other day at Milwaukee it was my privilege to judge certain classes of cows, and in one class particularly,—young heifers,—I found one animal that had immense capacity of barrel, but just forward of the barrel her heart girth was very small around, and that to me was a serious fault, an indication of lack of constitution. We want the particular place where the heart and lungs are situated to be strong, to have plenty of room. The heart and lungs have been proven to be larger in the dairy animal than in the beef animal, and that is indicated not only in the depth but in the width as well. When you boys are going to judge cows look at that particularly; see that the cow has plenty of constitution as shown in the heart girth, in the open nostrils and in the bright eye.

Constitution is perhaps indicated by the hair, if her coat is standing, her hair pointing toward her head, it is an indication that something is wrong.

When I step into the show-ring to judge cattle, the first general appearance of the cow is a pretty strong point with me. Many times I see judges go over a cow in careful detail, over and over again until they get confused and really don't know where they are at. When I go to judge a cow, I don't want to take her all in at one glance, I want to look at her head, at her clean-cut neck, at her withers over the shoulders. I don't want those withers real sharp because that is a

sign she hasn't quite enough strength in constitution, but I do want the shoulder bone to show it is there, sticking up a little through the shoulder. And I want it to be well sprung, I want it to come down in a wedge shape. The cow is wedge-shaped in three ways. She is wedge-shaped over the shoulders, looking down; from front, looking back sideways; also from a side view looking from front to rear. I have spent some time talking about the constitution.

Now, the working capacity of a cow is something to be considered very carefully. This wide, strong muzzle indicates a good feeder. Whenever I go into a barn to look at a newly born calf, I look first at the calf's head, and if it has a little, small, narrow nose, I say "There is a calf that never will have a good constitution or be a good feeder." If a calf is going to make a good cow, she has to be a good feeder.

It was my privilege a while ago to be in Denver, Colorado. I saw there a herd of 150 cows. The owner said to me, "Will you please pick out the best cow in the barn." Well, I looked at their beautiful udders and their great big capacity of stomach, and then I went round in front and looked at their heads, and I came across a cow that had a very wide mouth, and I said "I think I have got her right here. I I think when that cow goes through your field of grass she will mow a swath like a mower." He says, "Yes, that is the best cow I have in the barn."

So I like to see a cow with a good nose, a good wide mouth and right behind her mouth I want a good strong muscular jaw. Now, why do we want that kind of a jaw?

For this reason. A good proportion of our feeds we want to grow on our own farms—that is the roughage feeds, because they are the economical feeds that form the foundation of all our balanced rations, and it takes a strong, muscular jaw to masticate this coarse roughage. Sometimes with this wide, deep, muscular jaw, goes a meaty neck, and we don't want that; we want a thin, clear-cut neck, rather a long neck because where we have a short neck we have a short meaty body back of it. The dairy cow is not a meat producing animal. So we want to see this cleanness of the neck, clean-cut in the throat, and clean over the shoulder. When I find a cow that is broad over the shoulders like a beef animal, I am sure that cow was not intended for dairy work.

In the beef animal, the circulation of blood is heavier where the greatest amount of work is done, and that is on the top line, above this horizontal line, drawn through the body of the cow. That cow's work is to lay on flesh and this broad back is made for that identical purpose.

The dairy cow does all her work below this line and therefore the blood circulation of that cow is largely below that line. So we have to look to all these things if we are going to have a successful dairy machine.

The next indication is perhaps the backbone. I like to follow that line with my hand. On some cows it is all covered with meat or fat. We want it free from meatiness, so that you can put your finger down in the processes between the bones; that is what we call an open conformation.

We want a cow that has plenty of room below, a deep, strong barrel. Occasionally a cow may be found with a narrow barrel like a race horse or a grey-hound; good ones are sometimes found that are like that, but for steady, everyday work we like a cow with great capacity, plenty of room for storage, which is indicative of large digestive capacity.

There are some things we don't like in dairy cows. Some of our cows are sloping in the rump,—some of the best, perhaps, but we want to work toward a perfect ideal and that calls for a straight top line coming out square and nice. A very good indication of the length of an udder may be had by noticing the length between these two points. When a cow is fresh and her udder is full, it will extend as far forward as her hip, and as far backward as the pin-bone.

Now from the hip bone to the bone just at the end of the tail, which we call the pin-bone—we like to see a cow long between these two points because a good cow must have a good udder, and a good place for it, if she is going to be a good worker. I want an udder to occupy a lot of room on the body. If you are observing, you have noticed a great many different kinds of udders. We don't like the long, slim, narrow, pendant udder for with such an udder, a cow cannot walk easily; it gets soiled in wet weather and when she lies down it comes in contact with the cold, damp ground, and that causes trouble. We want an udder tied up well under the cow and attached strongly to the body. Why do I want that? Because if she is a heavy milking cow it is liable to break loose. I have seen many of them break loose from the body, and they are not a desirable type. There is another reason for having the udder occupy a large space on the body and that is because the milk is made from the blood, and if you will look on the under side of the cow, you will see great tortuous veins there; some of them are immense, as large as my wrist, and if this udder occupies a large space on the body it comes more in direct touch with the large veins coming down through the body, and gives more chance for the small arteries to run through the different cavities of the udder and deposit material for the manufacture of milk. When I am judging cattle, I always go round behind a cow and see how far in the rear this udder comes

out, and how far in front it extends. We want an udder that comes out almost in a semicircle, and a good teat on each corner. The placing of the teats means a good deal. They want to be of good size because they are more convenient to milk. The quality of the udder means a great deal. I think many judges make a great mistake not to see the cows milked out, because there is such a chance for deception. We don't want a fleshy udder. When you find a thick, meaty udder, you usually have a short period milker. It is harder work to get all the milk out of an udder that is thick and heavy. A number of years ago, Professor Woll came to our place and wanted to make an experiment. He said he wanted to milk our cows after we were through milking. We thought we were pretty careful about our milking, but he put a man to milk them after we got through, and from some he got little or none and from others he actually got three pounds. I found every cow that gave three pounds of milk had a meaty udder. If a cow has a meaty udder you are very likely to leave in a lot of milk every day and the cow will commence to shrink and dwindle in her flow. An udder that you can take up like a wet dishrag and squeeze together, you can empty perfectly. Now, the dairy cow must have a place for the udder. I have seen many beef cows that really had no place for an udder. If she is going to support a big udder, she must have a place for it. When a cow's hams are so close together that there is no room for an udder she is not a persistent milker.

We have come now to another very important point, and that is the milk veins of a cow. The blood is made by the feed the cow eats, and the blood carries material to the udder for making milk. If the milk veins are large they indicate that the udder is well supplied with blood. We used to think that the cow made milk right along from morning till night and from night till morning, but this is not the case. Experimenters have taken a cow at night with an udder well filled and killed her and cut open the udder and found very little milk in it. Simply the material is there to make milk of, and when we sit down to milk, or when a calf gets his dinner, the elaboration takes place. The milk is carried to the udder by arteries and then passes into the body again through the milk veins. You will notice on the under side of the body some large ridges which are improperly called milk veins. We used to think the milk itself flowed through them but we know now that nothing but blood flows through them and we find them very crooked and tortuous in a good dairy cow. Those milk veins must have a place to enter the body, and there you will find openings which we call milk wells. Sometimes you can almost stick two fingers into them. You will find these veins on either side

of the body; every cow has two milk veins. Sometimes one opening is not sufficient to let the blood pass into the body and back to the heart and there is found two and sometimes three or even four on a single side. I never saw a good cow without these indications and I never saw a real poor cow, with them. So, when you are judging cows, pass your hand on the under side and see how soft and pliable these veins are and follow them up to where they enter the body. You will find they vary very much. Some are quite short; some are long. You will also find little extension veins running nearly to the leg and into the body.

Not a great while ago, I saw a man loading a well bred cow into a car. She was a little stubborn about going, and what do you suppose this man did? Well, I expect some of you think he kicked her, and that is just what he did; he kicked her under the abdomen where all that wonderful network of blood veins is and in less than fifteen minutes it was swelled up there as big as my two hands, showing it injured a part of the cow's machinery.

If I should take out my watch and throw it down on the floor and step on it you would think I was a very foolish man, but the machinery of that cow is just as delicate as that in my watch and when that man kicked that cow, he was kicking some of the most delicate machinery to be found in nature. I think the dairy cow is the most sensitive animal we have, because of her nervous disposition. I don't mean nervous in the sense of fidgety, lacking nerve, or anything of that kind, but the making of milk is a nerve process and so we must handle dairy cows with a great deal of care and kindness. I tell you boys, we can catch more flies with molasses than we can with vinegar. We can do more by treating our animals kindly than by abusing them, and there is no animal that responds better to good care than the dairy cow. Be kind to her; don't even swear at her, any more than you would at your best girl.

I think the ability of the cow is measured a good deal by her skin and hair. You say what has the skin and hair to do with such a piece of machinery? The outward appearance is merely an indication of the inner machinery. If a cow's digestion is wrong, out of order, her outward appearance shows it; her hair will be rough and her hide hard and tight to her body. Perhaps you have noticed how tight the skin will be no an old horse. That is always an indication that the horse is out of condition, and it is the same with a cow. If she is out of condition you will find her hide getting tight and hard. Now, when a cow looks glossy and neat, her hair stays down nicely and the skin is soft; it shows she is in a healthy condition, that the inside machinery is working perfectly.

The business of a dairy cow is a great deal more than most of us think of; her work is tremendous; she not only works in the daytime, but at night. She works every day in the week. She is working 365 days in the year and from ten to fifteen years of her life, so we are asking a great deal of a dairy cow, more than any other animal on the farm, and she must be well taken care of. In our northern country, where we have long severe winters, we must keep her comfortable. As I go through the country, it seems as though men delighted in making it impossible for their cows to do real, honest work for them because of the conditions surrounding them. They don't furnish water sufficient or of the right temperature; they don't furnish barns having the necessary sunlight, warmth and ventilation. When we have plenty of good air in the cow barn, it makes our cows feel good; it makes them enjoy their meals. All living things enjoy God's pure air. When you boys go back to the farms see that the old barns are made happy homes for the cows, because they can't do honest work unless they have happy homes.

Pretty soon you boys will judge cattle.

(Instructions were then given in scoring and marking of papers.)

At 10 o'clock the main meeting convened.

President Griswold in the chair.

AMERICAN COW REGISTRY.

By Hon. Charles D. Rosa, Beloit.

We have met here as an Association of Dairymen of a great state to discuss the problems of our business and to speak the word that shall be mutually helpful. There is no need in a body such as this one to make the statement that the dairy cow is one of our nation's greatest assets. It is one of the truisms of our business. Neither is it necessary to prove that Wisconsin is a great dairy state, for it is well known that in Wisconsin alone there are nearly one and one-half millions of dairy cows. On the back of the pamphlet that contains our program, it is stated that the value of the dairy products of Wisconsin is now annually eighty millions of dollars. If this be true, and I have no doubt of the substantial accuracy of the statement, then those million and a half of dairy cows must annually have turned nearly their own value in grass and grain and roughage into some of the bset articles of human food.

I take it that this body can discuss no more important subject than whether this transforming of the rough produce of our farms into

dairy products is done at a profit or loss, and any sane, legitimate scheme for increasing the profits or reducing the losses of this process ought to have thoughtful consideration at our hands.

I think it is generally believed that the average Wisconsin cow just about pays for the food she eats. All the figures obtainable seem to indicate that such a belief is correct. All that the owner gets for his labor of caring for this average cow is what she returns to the soil. I would not belittle this item, and, if no other conditions were possible, I would think that it would pay the Wisconsin farmer to continue to milk cows on that basis alone, since I believe most thoroughly that all enduring agriculture must rest, generally, on live stock husbandry of some kind.

But if the average cow is just paying her way—no more—what about the cow that is below the average? We all know that there are many cows above the average and that these cows are returning to their owners a profit each year. Professor Woll told us of some of these yesterday. Hence there must be many cows below the average, and the owner of these cows must be operating them at a loss. I believe there is no more important problem facing Wisconsin dairymen to-day than how to eliminate the unprofitable cow and replace her with the profitable cow.

Thanks to the Babcock test and the brainy, farsighted men who conceived of and are pushing local cow testing associations, we have an excellent and comparatively inexpensive method of locating and eliminating the unprofitable cow. I cannot advocate too strongly the forming of such associations. The number now in our state ought to be increased until every dairyman within the state is a member of one. If such conditions obtained, in five years' time the results would be nothing short of marvelous.

But the equally brainy and equally farsighted and efficient men who conceived of and have been carrying through the Iowa and Wisconsin Dairy Cow Competition also deserve our thanks. They have been powerful factors in opening man's eyes as to the possibilities of dairy cows when well bred and properly handled and nothing that has happened, in recent times in the dairy world, in my opinion has been more important in showing us what good breeding is. It has been equally potent in showing us the possibilities that lie within the grade cow and how, with proper methods in breeding and grading, cows that are profitable and even phenomenal producers can be obtained. It needs no argument to convince the thoughtful dairyman of the state that Madge and Bessie and Molly and Jersey V. are not accidents not mutants, but the results of the right kind of breeding and the

proper kind of care and may be duplicated by any man who is willing to travel the same tortuous, almost untraveled way.

Thoroughly as I believe in the local cow testing association and important as I consider its work, I still believe that work is incomplete. There are still two things that need to be done if its most excellent work is to count for the most for the dairy world. 1st. The records of the cows tested by it—at least the cows of merit—ought to be authenticated in such a manner that they will be accepted by the public without question. And 2nd. They should be preserved in some permanent form and be given the widest possible publicity. In no other way will it be possible for them to become in the fullest possible measure, and as they should be entitled to become, the progenitors of a race of dairy cows whose claim to distinction is not based upon the color of their hair or the length of their tail or the size and shape of their teats, but upon the amount of profit they can annually pour into the milk pail.

The American Dairy Cow Registry Association was organized to meet this need and perfect this work of the local association. It is a corporation that was organized under the laws of the State of Wisconsin on the 25th day of March, 1911, by Edwin L. Rasey, Charles F. Lathers, Wesson J. Dougan, and myself, of Beliot, and E. C. Updike, of Madison. The purpose of the association is to perfect and publish a Registry of Dairy Cows based on merit. Briefly the plan of the registration is as follows:

System a Double Registry.

It will publish a registry—in fact a dual registry of dairy cows. Its work will not be limited to full bloods—in fact it is intended primarily for grades—but it will take in all cows that can produce the goods. It will refuse registry to any cow that fails to meet its requirements regardless of her breeding or the record of her ancestry. In it every tub—perhaps we had better say milk pail—will stand on its own bottom.

There Will Be a Blue Register and a Red Register.

In the Blue Register, which is the primary register of merit, there may be recorded any cow with a yearly record of production above a certain established minimum and whose record has been properly authenticated either by some agricultural experiment station or by a testor under the supervision of the registry association. In securing this authenticated record, the registry association aims to work hand in hand with the local cow testing association. In fact it aims to

help in extending such association since it is through such combinations of dairymen that it expects to get its record. The expense of testing the cows will be borne by the owner and this expense will be very much less under such a plan of combination. The methods of the local association already formed need to be changed but little so that the registry association may be certain that the records are as accurate as can be reasonably obtained and above all free from fraud.

The requirement for registration in the blue register has not been fixed, absolutely, since it cannot be so fixed until a sufficient amount of stock has been sold so that the corporation may be duly organized under the laws of the state, by electing a board of directors and officers, and may proceed to do business under the laws of the state of Wisconsin.

This requirement suggested by the authors of the plan is as follows:

Year's Fat Record.

There will be a minimum requirement for butter fat produced for one year as follows: If the test is begun on the day when the animal is two years old or under she must produce two hundred pounds of butter fat within one year from the date of beginning the test. For each day she is over two years of age at the beginning of the test, .05 pounds will be added until 255 pounds is reached, when the cow will be five years old, and this amount will be the requirement for all mature cows.

Year's Milk Record.

In addition to the above minimum requirement for butter fat, there will also be required a milk record as follows: 4,000 pounds of milk will be the minimum for an animal beginning the test the day she is two years old and for every day that she exceeds two years of age at the beginning of the test two pounds will be added until six thousand pounds is reached which will be the requirement for a mature cow.

It has also been suggested that the requirements, beginning after five years, be made progressive ones, so that at the end of twenty-five years, from the beginning of the registry there will be a material increase in the amount of butter fat and milk required for registry.

Bulls.

It has been suggested that there may be recorded in the "Blue Register" all bulls that have sired at least five females that have

been admitted to the Blue Register, provided these five females are the daughters of five different dams. This plan may be open to some criticism and should await the mature judgment of the Association when fully organized.

This Blue Register will be open to any cow, regardless of her breeding, that is able to produce the minimum requirement for registration. It is expected that it will be taken advantage of only by grades. Still it will not be closed to any pure bred that cares to come in since it is founded upon the principal of merit in production and should be open to any cow that can make good.

An effort will be made to prevent cross breeding of the different recognized breeds of dairy cattle in the following manner: When any animal is tested and her record furnished for registry the owner thereof shall give the predominating blood of the animal. The different breeds will be ranged in the register in alphabetical order, and the numbers under each breed will begin with one and be consecutive. It will thus be several registers in one. This plan will receive added emphasis in the "Red Registry." Pedigrees of all animals recorded in this registry will be issued on blue tinted paper. All important details that can be of any benefit to dairymen in general will be made a part of the record of each cow and appear upon her pedigree including such items as breeder, owner, sire, dam, predominating blood, age, amount of milk, amount and percentage of fat and total solids, number of months in calf, etc.

In the Red Register there will be recorded all heifer calves out of cows admitted to the Blue Register if sired either first by a bull recorded in the section of the Blue Register to which the predominating blood of the cow belongs, or second, sired by a bull registered in the Breed Association to which the predominating blood of the cow belongs. It is not planned to admit any bulls to this register. Entries in this Register must be made at birth or within a limited time thereafter. When heifer calves recorded in the Red Register have reached an age when they may be tested for productivity they must undergo the same test that their mothers did and pass the minimum requirements in order to be transferred into the Blue Register. Unless they can pass such a test and be admitted to the Blue Register their progeny cannot be recorded. The progeny of no animal therefore registered in the Red Register alone can be recorded. If she cannot meet the requirements of the Blue Register she is eliminated and her descendants also unless those descendants subsequently show their ability to produce the goods and are admitted to the Blue Register on the same basis as any other orginal cow.

Thus the plan automatically cuts off any descending line of in-

dividuals that fail to make good. If she does pass the test and is admitted to the Blue Register she can, through the aid of her Red Pedigree, be recorded as the descendant of her ancestry already recorded therein, thus building up a pedigree based solely on merit that will become more valuable the more it is extended. All pedigrees of animals in this registry will be issued on red tinted paper.

It will be readily seen, from this brief explanation, that the system of registry adopted aims to do several things.

First. It is open to all animals that can prove their ability to produce the goods. This is important. Such grades as Madge and Bessie and Mollie and other nearly, perhaps equally as good, brought out by the Iowa and Wisconsin Dairy Cow Competition should receive recognition. They are not accidents but the result of good breeding and that too the kind of breeding that is the most readily open to the average American farmer because of the rapidity and economy with which it can be done. To acquire a herd of any considerable number of the best pure breds of any of the pure breeds, in anything less than a lifetime, requires the expenditure of no inconsiderable amount of money. On the other hand, from a herd of native cows, in fifteen years time, by the use of pure bred bulls of the highest quality and by a rigid process of selection, one can produce a large herd of heavy producing cows—probably some of them even phenomenal cows. Remember, I say pure bred bulls of the highest quality, for there are pure breds and pure breds and there is no scrub quite as bad as the thoroughbred scrub. A thousand dollars does not make a good bull, neither does a pedigree, but the performance of all his ancestry for five or six generations are the criterion by which to judge them. Having owned some kind of pure bred animals since the time I was fourteen years of age I think I know something whereof I speak. This process of grading up by the use of the best bulls obtainable should receive the greatest possible encouragement for it must be largely by that method that the dairy farmers generally can secure large herds of porfitable cows. Our association aims to help in giving this encouragement and to give such effort, stability and continuity so that they may be built upon by future generations..

Second. Our system automatically cuts off the descending line that is sure to crop out everywhere and has been the undoing of many a would-be breeder. No animal can masquerade under a pedigree issued by our association, if it fails to make good. This is but carrying out the principal of rigid selection mentioned above—a principal that has been given all too little consideration in this country and one that must be given full sway in all lines of breeding if there is to be any advance.

Third. It is proposed to set the standard for present admissions into the registry somewhat low so that the average farmer may be encouraged by producing one or more cows good enough to enter the registry. Once he does have one or more cows in the Register he will be well started along the road to success and the incentive will be strong for him to cull and grade up so that he may have a herd all of which are good enough to be included in the register. Not only that, he will not stop until he has built up a herd that will invariably produce animals good enough to enter the registry. Once started along this road he is certain not to turn back.

The temptation is strong to enter into and extend a discussion of the principles and various fundamental laws of breeding to show how our plan is in harmony with the best thoughts of noted thremmatologists and the results of noted experimental breeders, but time will not permit.

Perhaps one other thing ought to be said. This association is a corporation organized under the laws of the state of Wisconsin and will be conducted strictly according to those laws. This will adequately protect and safeguard the interest of its stockholders. It is no New Jersey or Arizona affair. It is no great promotion scheme, such as is all too common in the business world to-day, in which the promoters get the money and the rest get the experience. The incorporators are all financially interested in dairying and are vitally interested in the advancement of that business. They believe thoroughly that the plan above set forth will help much in that advance. The capital stock consists of one thousand shares of the par value of twenty-five dollars each and it is hoped that this stock will pass rapidly into the hands of one thousand practical dairymen who desire to build up a profitable producing herd and to perpetuate their work. It is believed, from the experiences of other record associations, that the business may be so conducted that every holder of a share of stock can be furnished the herd book free of any expense to him thus giving him an invaluable record of the good cows of our country for the paltry sum of twenty-five dollars invested. In addition, the holder of the share of stock will be given a recording fee equal to one-half of that exacted of people who do not own stock. It is planned to make the recording fee the usual one in such associations. There is but one kind of stock and every stockholder will have an equal voice in conducting the affairs of the association. It is an organization purely and solely for the benefit of dairymen in general and for the benefit of its stockholders in particular and others who will record animals in its registry. It is our contribution to the advancement of dairying and we trust that it will not be one of the things of small moment that have happened in the dairy world.

DISCUSSION.

Mr. Glover: What the Judge has said, brings to my mind Mendel's law in breeding. It is a very complicated law, and I am not going to attempt to explain all of it here, but breeders must sooner or later, I think, begin to inform themselves upon this law, and I want to take this occasion to give you a peep at it. Unfortunately it has not been worked out with dairy cattle to any extent, that is, not sufficiently for us to give any exact data, but it has been followed up a great deal with Shorthorn cattle, especially in England, Scotland and some in Ireland. When a red Shorthorn and a white Shorthorn are bred together, the progeny is invariably roan, providing the animals are a pure red and a pure white. Now, breeding roans together, 25% of the progeny would be white, 25% red and 50% would be roan. If a farmer took a small herd and followed that process of breeding he would find that his percentage would not be like that, because his numbers would be too small to note an average, but where they have followed it up with thousands of animals they have found out that that percentage is practically as stated. Now, what does that mean? It means this, that the blood of that red animal still remained pure in the roan, and so did the blood of the white animal remain pure in the roan. Now, in mating these roans together the chances are that this pure white blood would strike white again and if it did a white animal would be the result, and so with the red blood, but seeing they were both roan, the chances are 50% of the animals would be roan. In other words, take two animals and breed them together; an animal out of a cow actually producing 10,000 pounds of milk and 400 pounds of fat, bred to an animal equally as good, the chances would be 50% of getting an animal that would produce the same. Suppose the animal that produced 10,000 pounds of milk had close relatives capable of producing 200 pounds of fat, and the chances would be that you would get an animal out of the 10,000-pound cow and this sire that would produce only 200 pounds of fat. Now, that, in a very brief and imperfect way, is the Mendel law, and dairymen that weigh their milk this year should continue to weigh it next year, in order to eliminate this 25 or whatever percentge of poor producing animals may be in his herd. So many men in our cow testing associations test for one year only. They have no assurance that a 500-pound cow will produce an animal like herself, it is only through continual testing that we are going to find the poor animal, the poor blood, and eliminate both from our herd.

Judge Rosa: There is one thing I want to emphasize in what Mr. Glover has said here, and that is that that 25% is practically thorough-

bred. For instance, the 25% of whites will produce whites and the 25% of reds will produce reds as though they had never been crossed. Now, you can see if you have in the make-up of your animals any 200-pound cows and you continually breed from them in the hope of getting something else, you might as well have bred from an ordinary 200 pound cow although they have been crossed with some very superior producing blood. The blood that produces the 200-pound cow must be gotten rid of. That is where we have fallen down in every breeding association in the United States. We must eliminate those inferior animals and eliminate that absolutely descending line of breeding if we are going to raise the mean of the race.

Mr. Emery: These remarks of Judge Rosa in regard to a conclusion he has reached as to the fundamental law of breeding resulting from Mr. Hopkins' experiments in corn in Illinois call to my mind a statement made by Professor Henry. He had been invited to go to Illinois to address the farmers of the state, I think at Champaign. It was known that in Wisconsin we had followed certain lines of investigation at our Agricultural Experiment Station reaching very satisfactory results, and Professor Henry realized that Illinois was specially adapted to the growing of corn and among other things he said to those men: "Here is the corn plant. How little do we know of it. This corn plant needs investigation. It needs to be studied. Now, if you Illinois farmers will go to your legislature and demand from that legislature an appropriation for the express purpose of employing a competent man to study this corn plant, you will be reimbursed many fold in the future by the improvement of the corn of this state." They accepted the idea given at that time. They went to the legislature and got an appropriation—I have forgotten the amount—and there has come as a result of this great study of the corn plant, the establishment of the principles, adding greatly to the progressiveness of the state. I want to say one thing more; while it is not perfectly in point, it seems so related that I want to give it now. Coming down on the train last night, I chanced to get a seat in front of a gentleman who spoke to me and the conversation led back to the fact that he was from Mondovi. It came out that I was coming down to the Wisconsin Dairymen's Association and he recalled that that association had met at Mondovi years ago. And then, from the interest I had in this association, and having been for so many years under the conviction that no organization in the state has ever been so far-reaching in its influences as has this association, I asked him if he noticed any change in conditions as a result of that meeting at Mondovi and he said yes, he had noticed an increase in the dairy industry, and then he said to my wife across the way, "There was a large increase in the

number of silos built, but," he said," I think that perhaps the strongest influence was the improvement in the conditions of living," and he elucidated his point by a single incident, which he said illustrated the condition. He went into the country and he came to a place of a German friend, a farmer with a considerable family who was building a home. He had a nice place, good barns and other buildings, but a poor house, but he had gone to building him a good new home and he proudly exhibited it. He said, "We were up at this meeting and one speaker spoke there about what should happen as a result of our better farming or dairying, that we should have better homes." He said, " My wife and I talked this over and we agreed to that and that if we were going to have the benefit of the home we wanted it now, so we decided to build a better home, and we are doing it now." I was greatly pleased to feel that this influence had been felt there and I think that it has in other places. This suggests simply the breeding of ideas and a better plane of living.

The following committees were appointed by the Chair:

Committee on Nominations. C. L. Hill, C. P. Goodrich and F. H. Scribner.

Committee on Resolutions. J. Q. Emery, H. C. Taylor and C. H. Everett.

Committee on Audit. H. C. Scarles, Roy Harris and Edward Salmon.

The Chairman: One of the subjects that is growing more and more important to us every day is that of the soil, and its care and management. Mr. MacDowell has made a particular study of that subject, and he will now tell us some of his conclusions.

SOIL MANAGEMENT.

J. C. McDOWELL, WAUKESHA.

Representing United States Dept. of Agriculture, Washington, D. C.

The soil is not a dead, cold mass of matter that can profitably be studied only in the chemical laboratory, or by consulting the dry pages of the numerous textbooks that have been written on the subject. No, our fertile soils are full of life and energy and they demand the constant, thoughtful care of the intelligent farmer as much as does the spirited horse, or the best cow in the barn. To be careless in our treatment of the soil is as fatal to profitable agriculture as to be indifferent in the treatment of our live stock. No one would expect much work from the shivering horse that is too thin to cast a respectable shadow, then why should anybody expect to harvest thirty bushels of wheat per acre, or expect his soil to yield eighty bushels of corn, when the land has been poorly plowed, carelessly cultivated, and when it is literally starving for lack of plant food and for want of humus?

The roots of corn wheat, oats, and barley may penetrate the soil to a depth of three or four feet, and clover and alfalfa roots may extend much deeper, yet the fact remains that nearly all the food of plants is gathered in by the great network of roots that forage in the surface six inches, or at most in the surface foot of soil. Remove from this old earth its outer twelve inch layer, or destroy this foot of surface soil in any way, and all the riches of the world would be forgotten in the cry for bread. Knowing that the natural process of soil building is very slow, and that it has required many thousands of years to make this thin soil blanket for the earth, knowing also that our soils are already badly worn in places, and that they are the final source of all our food and clothing, is it not worth while to pause a little in our rush for wealth and consider how best the fertility of these soils may be preserved?

Should our gold mines ever become exhausted, some other metal would doubtless take the place of gold; long before the coal mines yield up their last ton of coal our scientists and inventors will have harnessed the river, the tides, and the heat rays of the sun, and from these sources we will receive power, heat, and light; but when the law of diminishing returns causes our soils to respond feebly to the labor of the farmer, and the cost of living becomes unendurable, we must learn how to manage our farms so as to increase production

and at the same time maintain fertility. The so-called abandoned farms of the east, the worn-out cotton lands of the south, and the decreasing wields of wheat lands of the middle west are object lessons from which we all may learn.

I wish you could have been with me in the summer of 1910 as I traveled through parts of New York and the New England states. While inspecting the so-called abandoned farms of New York state I drove by team for three days, and during that time I saw only two men at work in the fields. I asked: "Where are the farmers?" and was told that they were in town working for a dollar and a half a day. This was in the central part of the state, where the soils at one time were good, and where the railroad facilities are among the best in the United States. Many of these farms can be bought now for one-half what it would cost to put up the buildings. Some of them are hilly and stony and in other ways unsatisfactory, but I saw a great number of abandoned farms that were not at all undesirable.

I remember one farm in particular only two and a half miles from DeRuyter, New York. The farm consisted of five hundred acres of comparatively heavy land. Four hundred acres were under the plow, gently rolling, and not very stony. The remaining hundred acres were hilly, stony, in timber, and unfit for cultivation. There was a good house and two good, large barns. We estimated the value of the buildings at six thousand dollars. Here was a farm of five hundred acres, four hundred under cultivation, six thousand dollars worth of buildings, two and a half miles from a good town and railroad station. We inquired the price and were informed that we could close the deal for three thousand dollars, part cash. This is only one of many such instances that I might relate.

What is the trouble? What has brought about this condition of affairs? I do not know what is the trouble in every case, but in the great majority of them the present conditions have been brought about by bad systems of farming.

Mr. Monroe of our department is doing what he can to bring back the old time fertility to these soils, and he is making great progress, but how much better would it have been if the fertility had never been allowed to run low. After adding lime to correct the acidity of these soils, Mr. Monroe is able to grow a fair crop of buckwheat which he plows under as a green manure. This adds humus to the soil and brings it into better physical condition. Next he grows legumes and cultivated crops, and gradually puts the land on a paying basis. All this takes time nd capital, and the solution of the problem requires all the knowledge and skill of this man who has made it a study for years.

My trip through the east was for the purpose of gaining information that would assist us in improving our western agriculture, and I learned much that will be of use to me in my work but the most impressive thing I saw was the deplorable condition in which I found some of these abandoned farms. I realized the danger into which we are drifting if we are to go on cropping our western soils in the careless way in which we have started. But if the farmer of the present will do his duty by his soil and by his country, we need have no fear concerning the prosperity of the generation that is to follow us.

What are we to do? We are not farming for the fun of it, neither are we managing our farms to demonstrate some pet theory of conservation. To be sure we all want conservation of resources, but what we desire most of all on every farm and in every occupation is utility and efficiency. We must not and can not conserve our soils by letting them lie idle. They must be made to give us the maximum of crops, and in return they must receive the best of care at our hands.

The soils of this state differ greatly in chemical composition, and every farmer should know something of the food requirements of the crops he is producing. Without this knowledge how is he to know what products can safely be sold from the farm. The farmer who goes ahead blindly and freely sells the articles that will bring the greatest immediate financial returns, regardless of effect on the soil, may make money for a time, and I know it is possible for us to rob our richest soil and pile up big bank accounts at the expense of the succeeding generation. This is the system that has been followed constantly by the pioneer in this country. Westerners speak of this as mining the soil. That is the readily available plant food is taken from the virgin soil in the easiest way possible and sold on the nearest or most convenient market for what it will bring. As soon as the yield runs low, Mr. Farmer, or Mr. Soil Robber, whichever you please to call him, sells his farm, packs his goods into a wagon, and on he goes to exploit newer lands farther west. Why, it is related of a South Dakota farmer that he had moved so many times that when his chickens saw a covered wagon stop at the door they would flop over on their backs and stick up their feet in order to be tied and thrown in.

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 conser-

vation 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. To discuss any one of these nine topics in detail would require much more time than I have at my disposal, therefore it will be best to confine my remarks to a consideration of two or three of these problems though others are doubtless fully as important.

How can we raise crops, and live stock, and sell enough from our farms to net us sufficent income with which to support ourselves and families in comfort, and still maintain our soils in their original fertility. This it not an easy question to answer, but it is not impossible of solution. The answer must of necessity be different for each locality, and as a rule it must vary to some extent for each individual farm. The city demands milk, butter, meat, grain, hay, and also the raw materials for the manufacture of clothing; and all of these mush be furnished from the farm. If the city demanded dairy products only, the problem of plant food would be easy to solve as butter and cream do not draw heavily on soil fertility.

Crops, live stock, or live stock products must be sold from the farm and each carries with it a certain amount of plant food. When plant food is sold from the fields faster than natural processes and skillful farming make it available, we must determine as to the advisability of returning to the soil as much as the crops remove.

It is fortunate that most of the elements required to produce plants are always in the soil in such large quantities that they may be disregarded, and it is also of fully as much importance that some of the elements are supplied from the air and water. If all these elements had to be purchased on the market in large enough quantity to supply our crops in full we would soon reach the end of agriculture in this country, but luckily such is not the case. Of the many elements needed in plant growth, we may usually disregard all except four: nitrogen, phosphorus and potassium; and clover, alfalfa, and other legumes are able to make the nitrogen of the air available in our soils for all crops. This means that the problem of supplying prosphorus for our crops is one of the greatest problems connected with permanent systems of agriculture.

As each product of the farm contains all these elements, there is no system of farming that will enable us to sell anything from our farms without using up at least a small amount of the phosphates of the soil, but every farmer should know to what extent his present system of farming is using up plant food, and he should adopt a sys-

tem that will at least replace the phosphates that are being used. It requires about two dollars to buy the amount of phosphorus and potassium in a ton of clover hay, and about the some amount for that in a ton of cloverseed. The ton of clover seed sells for perhaps three hundred dollars, or for fifteen times as much as the clover hay. On light soil we may be able to buy fertilizers for such crops as clover seed, while it would be out of the question for us to buy fertilizers for the production of clover hay unless the hay was to be fed on the farm. I wish I had time to develop this phase of my subject, but these figures give us some idea as to why so few farmers can afford to sell hay on the market. If time permitted, we might carry this idea a little farther and see how much more you get for phosphorus and potassium when you sell them in the form of beef and pork, than when they are sold in the form of hay. If you will investigate a little you will find that butter being composed largely of carbon, hydrogen and oxygen, which are supplied entirely from air and water, takes little fertility from the soil. With butter at thirty-five cents a pound, the phosphorus and potassium in seven thousand dollars worth costs but one dollar.

Being a westerner and having lived in the west and middle west all my life, I am inclined to believe in those systems of farming that include little or no commercial fertilizer. By following systems of farming that include much live stock, by the careful preservation and intelligent application of barnyard manures, by the plowing under of hairy vetch or some other legum as green manure on those fields at a distance from the barnyard, and by the practice of a rotation of crops in which grain, legumes, and cultivated crops follow each other in logical order, I believe we can maintain permanently the fertility of the soil with the minimum of commercial fertilizer.

Undoubtedly there are many of our western soils from which the net financial returns can be much increased by the use of potash and phosphate fertilizers, by some of our enterprising farmers, Let me relate an incident that came under my observation a short time ago.

It was with pleasure that I noted the remarkable results obtained this season by the use of rock phosphate and muriate of potash on the farm of G. R. Rice near the village of Genesee, Waukesha County, Wisconsin. I had heard of the work that Mr. Rice is doing, but was unable to visit his farm until early in September.

Mr. Rice is using commercial fertilizers carefully and economically, and he is working for financial gain on each acre fertilized. From the appearance of his cornfields he is certainly getting his money back many times over in this one crop though the yields are not phenomenal. Mr. Rice this year applied 200 pounds of muriate of potash

per acre for corn on marsh soil, and on other parts of the same field he used 800 pounds of ground rock phosphate per acre with ten tons of barnyard manure. Where the fertilizer was applied the corn yielded about ten to twelve tons of ensilage per acre and on those parts of the field where fertilizer was not used the corn was worthless. The results this year were about equal from the potash without manure and the larger amount of phosphate rock with the manure. It is to be expected, however, that the latter will be much more lasting and that the phosphate, which in this form is slowly available, will continue to give increased yields for a number of years. On many of our low lands in southern Wisconsin corn has failed this summer. How much the crop could have been improved by fertilizers, no one can say, but the object lesson on the Rice farm was very interesting and instructive. It is well known that many marsh soils are low in potash. Fertilizer trials on reasonably small plots are inexpensive and frequently they indicate exactly what is needed to make our soils productive.

In Michigan, Wisconsin and Minnesota systems of farming are sometimes unsuccessful on account of sour soils. After having tested with blue litmus paper several thousand samples of soil in this area and having found about seventy-five per cent of those tested to be sour, I am of the opinion that there are large areas in these states where the application of a moderate quantity of lime in some form will greatly increase the profits, and that failure may be changed to success with little effort and at small expense. It is probable that the percentage of sour soils mentioned is much above the average for the total area considered, because most of the tests were made on soils that were thought to be acid. It is also possible that the litmus paper test is not always to be depended upon.

No matter what the systems of farming, whether it be the production of live stock or the growing of grains, potatoes, hay, or clover for hay or seed, success must depend primarily upon the condition of the soil. If the soil is poorly drained, lacks plant food, is in bad physical condition, or sour, no system of farming can ever become highly successful under such conditions or until such conditions have been removed. Successful dairying depends largely on corn, clover, and alfalfa. Clover and alfalfa require a soil that is free from acid and rich in lime, while corn and many other general farm crops never reach their highest development in sour soils. While lime is not a universal remedy for soils under all circumstances, there can be no question but that the sweetening of sour soils is essential to successful farming on these soils.

Lime improves the physical condition of clay soils by uniting the soil grains, thus giving them greater size and causing the soil to be-

come more open and porous. On sandy soils lime has the effect of partially cementing the particles, thus making these soils more compact. In this way lime improves the physical condition of our heavy soils and also of our sandy soils. To sweeten the soil is by far the most important agricultural use of lime, yet as calcium is an essential plant food, the addition of lime in any form to our soils increases this element of soil fertility. Clover, alfalfa and other legumes contain much calcium and consequently require that the soil be rich in lime. As all farm crops require a certain amount of calcium, soils that are extremely low in lime do not produce maximum growth in any kind of crop.

Lime may be applied in several different forms, and the form in which it should be applied will depend largely upon the cost. Calcium oxide or quicklime is the most effective, pound for pound, if carefully applied, but throughout the middle west this form of lime is too expensive for our use. In using quicklime it is necessary to be particularly careful in its application because its action is caustic and lime in this form will burn vegetation and destroy all kinds of organic matter with which it comes in contact. If quicklime is to be used it must be applied to the surface of the soil and at a time of year when no crop is growing on the soil.

When quicklime is slaked with water it forms hydrate of lime or calcium hydroxide. Lime is often used in this form in the east. Water slaked lime has most of the objections of quicklime. As it is manufactured from quicklime it is expensive and its chemical action makes it caustic to vegetation and to organic matter. The only reason why anyone in the middle west should use burned lime or water slaked lime is to save freight. I am informed, however, that the freight rates are higher on the caustic lime than on marl and ground limestone, and therefore that there is no opportunity to save much on the freight

Finely ground calcium carbonate or magnesium calcium carbonate are the cheapest forms in which to buy lime for agricultural purposes. Marl is, as a rule, nearly pure calcium carbonate, while ground limestone may be calcium carbonate or magnesium calcium carbonate. As a plant food calcium carbonate is richer than magnesium calcium carbonate, but for the purpose of sweetening soils there is little difference and that difference is in favor of magnesium calcium carbonate though its action may be a little slower. As a rule the best of the marls contain about 95 per cent calcium carbonate, and the dolomitic limestones about 53 per cent of calcium carbonate and 42 per cent of magnesium carbonate. For correcting acid in soils dolomite or calcium magnesium carbonate is to pure calcium carbonate as 109 is to

100. As authority for this I wish to refer you to page 169 in Hopkin's "Soil Fertility and Permanent Agriculture."

The waste lime from sugar beet factories though caustic, often gives good results. If wet it may be difficult to spread. Frequently it can be obtained at low cost. Gypsum or land plaster, is sometimes spoken of as lime. This idea is somewhat misleading though land plaster is rich in calcium. It probably has no power to correct the sourness of soils. The great value of land plaster is that it furnishes calcium and sulphur as plant food and that it liberates potash in the soil. Ground limestone and marl also have the power to make some of the potash of the soil more available.

To test soils for acidity, pack moist soil about a sheet of sensitive blue litmus paper, leave it there for about five minutes, then remove the paper from the soil. If during this time the blue litmus paper turns red or becomes dotted with little red spots the soil is considered to be acid or sour. The degree to which the litmus paper turns red is some indication of the sourness of the soil. The growth of sorrel generally on soils is an indication that such soils are acid, but not an absolute proof that they are acid.

It is a difficult matter to say how much ground limestone or marl should be applied per acre, but where lime is needed at all it is usually advisable to apply at least two tons. Some soils may not need more than one ton while other soils require as high as five or six tons per acre to correct the acidity. I have seen soils so sour that they would produce no crop of any kind. When ground limestone was added in large quantities to these soils, crops of all kinds grew rapidly. I recently observed a field of alfalfa on which ground limestone was applied last spring. This soil was decidedly sour before the limestone was applied, and the ground limestone was used at the rate of four tons per acre. As the farmer did not have enough ground limestone to cover the entire field there was a small area on which no limestone was applied. Where ground limestone was used the alfalfa was large, dark green in color, and thoroughly inoculated, and where limestone was not applied the crop was worthless. In order to determine more certainly that the use of lime was the cause of the successful stand of alfalfa and that the lack of lime was the cause of failure, I tested with litmus paper the soil in various parts of this field. Where the alfalfa was vigorous the moist soil did not change the color of the blue litmus paper, and where the alfalfa was poor the blue litmus paper was turned a decided red. This is only one of the many striking cases that have come under my observation this year that show decided benefits from the use of ground limestone. Letters that I am receiving daily on this subject do not indicate that ground lime-

stone and marl are giving marked results universally but many of these letters indicate that the use of lime has brought success where otherwise there would have been failure.

In many sections of the Middle West clover, alfalfa, and other legumes are not doing well. In some cases the cause of this is undoubtedly lack of fertility, in others lack of moisture, and frequently the cause of failure is lack of inoculation; but I have noticed that where all conditions were ideal except that the soil was acid no amount of plant food, moisture, or inoculation caused the successful production of any of these crops. The legumes use much lime as plant food, and they absolutely require a sweet soil in order that their nitrogen gathering bacteria may develop. There is no use in inoculating soil with clover or alfalfa bacteria unless the soil is sweet because these bacteria do not develop rapidly in sour soils. If clover or alfalfa fail to catch, grow slowly, or become yellow in color, the indications are that there is a lack of inoculation, and the probabilities are that the lack of inoculation is due to a deficiency of carbonates.

Besides the bacteria that live in the nodules on clover, alfalfa, and other legumes, good soil contains other nitrogen fixing forms of bacteria. These increase rapidly in sweet soils and are sometimes almost wholly wanting in soils that are sour. It is also true that denitrifying or nitrate destroying bacteria flourish in sour soils.

We are at present collecting much data concerning the use of ground limestone and marl in various parts of Michigan and Wisconsin. From the data in my office it would seem that at least five thousand tons of ground limestone and marl have been used this year for agricultural purposes in Wisconsin, and that the farmers of Michigan have used fully as much. We are trying to get in touch with all of this kind of work that is being done in these two states, and would be pleased to hear from farmers everywhere who are using the lime in any form. It has been my observation that the farmers whose soils need lime the most are the last to use it. They say that they can not afford to buy it. The sourness of their soils has caused poor crops, the poor crops have cut down their income, and they do not feel that they can afford to risk even a small amount of money where the results are not absolutely certain. To such I would advise the purchase of a small quantity of finely ground limestone or marl, just enough to make a thorough test on a small area. Instead of applying a small amount to a large area, I would apply a large amount to a small area, while making the trial. This is because it is much better to correct the acidity than to decrease it. An experiment of this kind is inexpensive to anyone and should be made on every farm where the litmus paper test indicates that the soil is deficient in carbonates.

The addition of humus to the soil helps to keep it in good physical condition, and adds considerably to its fertility. The chemical action due to the decay of organic matter has the power to make available large quantities of plant food that were previously stored in the soil in a form unavailable to the plant roots. Humus is itself a plant food, and furnishes a suitable medium in which beneficial soil bacteria increase in numbers. Looked at from any viewpoint, there is hardly a more important problem connected with soil management than the maintenance of the supply of humus.

From observations made this year in the drouth striken areas of the middle west I feel that our systems of farming that allow the humus of the soil to run low are, in large measure, responsible for the injurious effects of the drouth. From experimental data along this line collected by some of our experiment stations it is definitely settled that soil humus helps greatly in the conservation of soil moisture. It is unfortunate that we have not yet been able to get more absolute figures concerning the conservation of soil moisture, but we do know that moisture can be conserved by the addition of well rotted manure, by deep plowing at the right time, by packing the subsurface, by frequent surface cultivation, and by top dressing with manure. Three years ago last summer as I traveled over the central part of North Dakota making a preliminary agricultural survey of that section for the United States Department of Agriculture, I gave special attention to the moisture holding capacity of the soils. Early in July of that year, the crops all looked well and appeared to have plenty of moisture, but by the middle of the month there were large areas where the dry weather and the hot winds had taken almost all the moisture out of the soil. As I drove along one day during this drought, I noticed that the wheat, corn, potatoes, and all other crops were withering rapidly under the scorching heat of the sun, and the hot drying wind. For miles and miles in every direction it appeared as though there was no chance for any of the crops to recover. Imagine my surprise as one day I passed a well kept farm on which all the crops were green, and on which even the pastures seemed to have plenty of moisture. I was so surprised and pleased with what I saw that I drove in to meet that farmer and to study his system of farming that had brought such results. I wanted to find out what this farmer was doing that his his neighbors were not doing. His solution of the problem was very simple. On a farm of moderate size he kept over a hundred head of live stock, and by so doing he was able to keep his soil rich in humus. He went all over the farm with me, and we examined the soil in all the different fields. Everywhere the soil was full of organic matter, and everywhere it was well supplied with mois-

ture. On close examination I could not discover that any of his crops were suffering in the least from drouth, and I afterward learned that he harvested a big crop that fall.

Just before I left his farm he said to me, "You know the farmers all over this western country say that you must not manure the soil, because if you do you will dry it out. I am putting into my soil all the manure I can get hold of and you notice the results." I noted the results on his farm and I have seen similar results since as I have travelled over North Dakota and other states, but do not know that I have ever seen the contrast quite so marked as on that hot day in July, 1908.

Here was intelligent and successful farming in the semi-arid west. Such work is an inspiration to us all. It is a pity that there are still large areas in this great country where skillful farming is the exception rather than the rule. I have actually seen many western wheat growers trying to produce wheat on land that had been cropped to wheat year after year for forty years in succession without rest, fertilization, or rotation; yet these men were sure that they would get bumper crops if only they could have back again the old time seasons of thirty years ago. The land was plowed to a depth of about three and one-half inches, it was almost exhausted of humus, it was compact and hard, and there was no more chance that it would yield thirty bushels of wheat per acre than that great dairy cow, Colantha 4th Johanna, would break a world's record while living on a ration of rye straw.

To the owner of fine horses, to the breeder of dairy cattle, to the producer of fat hogs, and to all other live stock men, I wish to say: Your success will be in direct proportion to the ability with which you manage your soils. To be sure, the feeding, the housing, the breeding, and the marketing of the live stock and live stock products are all of great importance, but if all these phases of the live stock business are handled intelligently, the extent of your business will be limited only by the crops you can produce. If your quarter section is carrying twenty cows, why not double the production of each acre and make it carry forty? Would not this be better and easier than to buy another quarter section? To be sure it would require more labor to produce eighty bushels of corn on an acre than to produce forty but will it require more labor to produce eighty bushels of corn on one acre than on two? Is it not better to let land lie idle than to work it at a loss? The unprofitable acre is like the unprofitable dairy cow, the fewer of them in your possession the better you are off. Did you ever stop and figure out what portion of your farm was yielding a satisfactory net profit? It is remarkable how fast the dollars pile

up when there is a substantial margin of profit from every acre. There are many, many acres of naturally good land in this state that are producing no profit at all. While land is advancing rapidly in price there is great temptation for us to secure and hold as many acres as possible; yet its ability to produce, and the market value of farm products must determine the final price of land. One of the strangest things that I have seen in all my travels is the narrow range in the price of land regardless of its quality or location. This will change rapidly when our motto becomes maximum profit, instead of maximum acreage.

In conclusion I wish to say that while our knowledge of soil management is yet in its infancy we have already learned a few things about the soil that are of great value. As I visit various sections in connection with my work in farm management I find much careless, shiftless farming, but on the other hand I see a high average intelligence among farmers generally. Financially agriculture is on the up grade and the advance is largely due to a more thorough knowledge of the soil. I have seen farmers living in comfort on the swamp lands of Northern Minnesota, I have seen luxurious homes among the stumps of central and northern Wisconsin, I have seen men making money on the jack pine sandy lands of central Michigan, and I have finally become convinced that the ability to farm successfully on almost any type of soil or with almost any system of farming depends primarily on knowing how.

DISCUSSION.

A Member: What is green manure?

Mr. MacDowell: By green manure we don't mean fresh manure or barnyard manure in any form, but we mean a green crop plowed under for its manurial value, clover or alfalfa or vetch.

A Member: Which is the best?

Mr. MacDowell: There is not a great deal of difference between those three.

A Member: How would that crop compare with a good spreading of barnyard manure?

Mr. MacDowell: Barnyard manure is said to be about 70% moisture, whether it is fresh manure or well rotted manure, and green manure does not differ very greatly in that respect. That means if you apply ten tons of barnyard manure you are applying about two and a half tons of dry matter if you plow under what would give you two and one-half tons of dry matter in the form of hay, you are plowing under pretty

nearly the same amount of organic matter, but there are not very many single crops that will give you anywhere near that much dry matter—clover sometimes does it; the vetches will hardly ever give you as heavy an application. I suppose that if you have a pretty fair crop of clover or vetches or alfalfa, and you plow them under, you will be plowing under more than half as much—probably three-quaretrs as much organic matter or manure as though you put on and plowed under an application of ten tons of barnyard manure.

A Member: How about peas?

Mr. MacDowell: Peas are good; as good as vetches. We are doing a great deal of work in Michigan and Wisconsin with the hairy vetch as a green manure crop. There is a crop that will grow on the richest land, and it will also grow rapidly and luxuriantly on the sandiest soils in the state of Wisconsin. I am satisfied it will grow anywhere that sandburs will grow. Up in Marquette county, Adams county and other sections we have been able to get such a heavy crop of vetch that it was almost impossible to plow it under in the spring, and the great advantage is that you can sow it in the fall after other crops have been taken off; it will stay green under the snow, and in the spring you will have a tremendous crop to plow under. You can grow it in the fall and spring when the land would not be doing anything else anyway.

A Member. I would like to ask about the application of limerock before seeding to alfalfa. How much should be used to the acre?

Mr. MacDowell: You can put it on any time. I am recommending nothing less than a ton. If you need it at all you need a ton.

A Member: And how about the application of more manure?

Mr. MacDowell: O, well, the more manure the better.

A Member: As long as it does not smother your plant.

Mr. MacDowell: You will have to be a little careful in using manure top-dressing, the more the better as long as it does not smother the alfalfa. But in using ground limestone as a top dressing most farmers are using two tons to the acre as top-dressing.

A Member: On my soil with a gravel subsoil is there danger of its being driven through into the subsoil?

Mr. MacDowell: There will be some loss. There have been certain experiments carried on by our department in Washington that indicate that lime does not leach to any appreciable extent. They have even gone so far as to say that when we put lime on and disk it in, it only influences the soil down as deep as we disk it, and that it does not affect the subsoil at all for a good many years, and that it leaches very slowly down into it. I was talking with Professor Smith a short

time ago, after I had been reading about this work done in Washington, and he said, "What has been your own experience?" I told him my own experience showed that we took the acid out of the subsoil within three months of the time we plowed it on the surface soil. He said, "I would rather you would take your own figures than the figures we have in Washington."

A Member: Is it not true that a well drained, loose soil will be less likely to be acid than one that is more compact?

Mr. MacDowell: I hardly know what to say in answer to that question. The soils of southern Wisconsin are comparatively heavy, yet they are not anywhere near as acid as the sandy soils of central Wisconsin, where the drainage is most excellent and where the subsoil is loose and porous. Looking at it from a practical standpoint, and having been all over this territory, and having examined the soil and tested for acid all over the state, I find that the sandy soils of central Wisconsin are the most acid of any soils in the state, except the heavy clay soils in the northern part of the state.

For those soils I am recommending two or three tons of limestone per acre, while on my brother's farm near Waukesha last spring I tested the soil, and the litmus paper absolutely showed no acid, but I recommended just the same that he put on two tons of ground limestone to the acre. He did so and his alfalfa was easily twice as good a crop this fall where he used the limestone as where he did not, yet his soil did not show acid. The limestone cropped out all over the farm of Mr. Roberts Morey and there was a big limestone quarry, yet I tested all over that farm and at least half the places were acid, and for fear that the litmus test was not reliable I sent some samples of that soil to the chemical laboratory and they reported that the soil was quite acid. Showing that the litmus paper test was fairly reliable. There is danger that the organic matter in the soil or even the soil itself may disturb the blue coloring matter of the litmus paper, but having experimented a great deal with litmus paper, I feel quite certain when I see red color coming into the paper without the rest of the paper losing its blue color, that is, when there is no excess of water to cause the colors to run, that that soil is acid. I have sent quite a number of those soils to Washington, and they have always presented that acid after having been given the laboratory test.

A Member: I have raised vetch and the very rapid growth caused me to think it drew severely on the surface soil.

Mr. MacDowell: Vetch does not really add any element to the soil that was not there before except nitrogen, but it certainly puts the soil in better condition.

A Member: Then such crops would be better on a clay soil?

Mr. MacDowell: It loosens up the clay soil, and gives sandy soil greater power to hold moisture.

THE WORK OF THE DAIRY DIVISION.

B. H. Rawl, Chief of Dairy Division, Washington, D. C.

The Dairy Division of the Department of Agriculture was organized in 1895, and consisted then of only four persons. The work has increased until now the Division employs about one hundred persons. Aside from what is termed administrative work, the Division is organized into four subdivisions or sections, devoted respectively to work in dairy farming, dairy manufactories, market milk, and the research laboratories. These four branches of the work will be described below. All the work of the Division may be divided into three classes, as follows: Research, educational, and police.

RESEARCH WORK.

This work in the main organized by problems. For example, a problem in cheese making will require a chemist, a bacteriologist, and a practical cheese maker. This makes a well balanced corps of workers for a big problem, and each serves as a check for the others.

The research work that is in progress pertains to the production of milk, the handling and delivery of milk as such to the consumer, and the manufacture of milk into various products. The research work in production has been restricted, aside from the coöperative work at Columbia, Missouri, to studies relative to barn ventilation, silo pressure, types of dairy barns, silos, milk houses, etc. Many problems in this line have not been taken up before because of the lack of a dairy herd and a farm, which have recently been supplied.

EXPERIMENTAL DAIRY FARM.

Last year a farm was purchased at Beltsville, Maryland, about thirteen miles from Washington, by the Bureau of Animal Industry. The Dairy Division part of this farm contains about 200 acres of ground, all of which is arable. The ground has been under cultivation possibly more than a hundred years, and while it is in a wornout condition, it is evident from the results so far obtained that with good handling the

farm will improve rapidly. It is proposed to keep an account of everything that is not on and taken off of the ground, so as to determine the possibilities of developing a wornout farm in this section.

Two concrete silos have been built and filled, and the dairy barn is being built at present. A feed barn 40x100 feet is being built of concrete. Two wings for cattle are being built, one to be used as an open shed, the other as an ordinary type of dairy barn. The plans contemplate the complete equipment of this farm as an experimental dairy farm. A small herd will be bought in the near future. This farm will serve two very important purposes. First, it will enable the Division to take up further experimental work, not only in production, but in the laboratories as well; and, second, by keeping all of the Dairy Division's employees closely in touch with this farm, it will tend to make the educational work better and safer.

Since the advancement of the dairy industry depends to such a large extent on production, it is to be believed that this farm is going to add enormously to the usefulness of the Division.

The research work in connection with the manufacture of dairy products consists of engineering problems, factory problems, and bacteriological and chemical studies.

ENGINEERING PROBLEMS.

Until recently the engineering work of the Dairy Division was restricted largely to the preparation of plans of various dairy buildings. This work has now been extended to include the study of various other problems. For example, the saving that can be effected by the proper utilization of exhaust steam for heating water, pasteurization, etc. A study of refrigeration is being made. Much of the refrigeration that is in use now, while reasonably effective, is very wasteful. The study of the refrigeration of milk in transit is being given special attention.

The whole question of energy requirements for dairy machinery has been almost entirely ignored. There is not one manufacturer out of ten, probably, who can tell how much energy is required to operate his machinery under given conditions. Many economics can doubtless be affected in this line, and the Dairy Division hopes to be able to indicate some of them.

RESEARCH LABORATORIES.

The Dairy Division maintains laboratories, employing twenty-seven men, for studying the scientific principles which underlie successful dairy farming and dairy manufacture.

The main laboratory is at Washington, where a study is made of the various bacteriology and chemical problems involved in the distribution of milk to the consumer, as, for instance, the chemical changes produced in milk by pasteurization and the relative number and kinds of bacteria in the raw and the pasteurized milk; the nature of the chemical changes which affect the flavor of butter and the factors controlling them; the principles of renovating butter; methods of improving the quality of farm butter; and the chemical and bacteriological changes producing the eyes and peculiar flavor of Swiss cheese.

In connection with the Washington laboratory, a field laboratory is maintained at Troy, Pennsylvania, where work requiring close contact with creamery operations is performed.

At Columbia, Missouri, coöperative work is conducted on some of the fundamental questions involved in the secretion of milk, and at Madison, Wisconsin, the Dairy Division, in coöperation with the Wisconsin Experiment Station, is studying the manufacture and ripening of cheddar cheese.

Coöperative work is also maintained at Storrs, Connecticut, in an attempt to make possible the manufacture in this country of cheese of the Camembert and Roquefort type.

All of this work is conducted, not to obtain results of immediate practical use, but with the object of securing exact and reliable information on the complex, chemical and bacteriological questions involved in dairying. Whenever results are obtained which promise to be of value in practice, they are tested under commercial conditions and are given to the public in the form of bulletins and circulars.

EDUCATIONAL WORK.

This branch of the work of the Division is conducted almost entirely in coöperation with state or city officials, the object being to give assistance in starting new work where such assistance is needed, and as soon as it is no longer needed to transfer it elsewhere.

Special attention is given by the dairy farming section, where twenty men are employed, to such matters as dairy farm management, feeding, breeding, keeping of herd records, organizing cow test associations, and anything that will improve the condition of the dairy farmer and put the business on a beter footing. A great deal of educational work has been done in the states where dairying is as yet not highly developed. This work was begun in the South and has more recently been extended to some of the far western states. The farmers who have dairy herds are given advice and assistance in the improvement of their cattle, in feeding, and in the construction of proper buildings.

Dairy organizations are encouraged, short courses in dairying are conducted, and model dairies are exhibited at the fairs.

In sections where dairy herds are more numerous, so that a sufficient number may be found within reasonable limits, cow testing associations are organized as a means of improving the quality of the animals and securing better methods. There are now about eighty-five of these associations in the United States, testing about 42,000 cows. While the Dairy Division has been instrumental in organizing the greater number of these associations, the plan always followed is to have local officials assume the responsibility of their maintenance. The benefits to be derived from this coöperative testing may be seen in the results obtained by a Michigan association. Nine herds containing eighty cows were tested continuously for four years, at the end of which time, by better methods, and by weeding out of poorer animals, the average annual production of butter fat per cow had been increased from 232 to 277 pounds and the average profit per cow had been doubled.

Special attention is given to the building of silos, and wherever a dairyman can be induced to put up one, his example is almost invariably followed by others in the community. During the year ending June 30, 1911, the field men of the Dairy Division gave personal assistance in the building of 140 silos, and applications for such assistance have continued to come in. In nearly every case where the feeding of silage is begun, its value is immediately apparent in the lower cost of feed and increased production of milk. In the same year plans were furnished for the construction of 236 barns, 124 milk houses, 45 ice houses, 8 dairy schools, and more than one hundred other buildings. This work has been received with much appreciation by the farmers, and it has been necessary to refuse many requests for plans to suit specific requirements, owing to the pressure of other work.

The Dairy Division is endeavoring, through its market milk section, to promote higher sanitary ideals with regard to milk at the same time to help the producers to meet these ideals. Work to this end consists chiefly in coöperation with local officials with the view of introducing efficient systems of dairy inspection that will provide for the consumer a safe milk supply at reasonable prices without injustice or hardship to the producer. During the last fiscal year the Division employes did coöperative work of this kind for 51 cities in 27 states.

Judges are provided for milk and butter contests and these public events are used as a means of educating both the producer and the consumer of milk. Illustrated lectures are frequently given at public meetings, setting forth the essentials of sanitary milk production, the dangers of unclean milk, and other subjects relating to milk trade. Assistance is given to state and city officials in the framing of suitable

laws and ordinances covering the production and distribution of milk. Careful studies have been made of the milk supply of several of our largest cities, particularly with regard to the source of supply, transportation facilities, methods of distribution, and prices. The results of these investigations have been published and afford a valuable fund of information for health officials, dairy inspectors, milk dealers and producers.

Through the dairy manufacturing section, employing eighteen men, an effort is being made to increase the efficiency of the creameries and cheese factories. It is not practicable to reach all of them directly but it is hoped, by means of correspondence and the personal assistance of field men, to bring a few up to such a high standard that may serve as models for others in the same neighborhood.

Much of the butter offered for sale in the large markets is inspected by representatives of the Dairy Division, and in case of marked defects, report is made to the creameries from which it was shipped and remedies suggested. In this way many of the creameries have been enabled to improve their product and secure higher prices.

Encouragement has been given to the practice of grading cream, so that first-class cream may be separated from the inferior cream and each paid for according to quality.

The men engaged in field work have used their influence to prevent as far as possible the building of creameries by "promoters" in places where there is not sufficient supply of raw material to make the business profitable. Of 52 creameries built in one state, mainly by promoting concerns, only 17 proved successful. In another state, one in seven survived. The loss of confidence caused in this way greatly retards the real development of the dairying. The Diary Division is frequently consulted my persons contemplating the establishment of creameries, and where conditions seem favorable to such an enterprise, the company is furnished with articles of agreement, by-laws, lists of machinery, with free advice as to installation and operation.

Periodical reports are secured from 400 creameries, and much valuable data is in this way collected, showing the general state of the industry as well as the conditions and methods of operation in the individual plants.

POLICE WORK.

The Dairy Division is required by law to inspect the renovated butter factories and their product and see that the sanitary conditions are kept up to a certain standard. The quality of the stock, or butter to be renovated, is also passed upon by the inspectors.

DAIRY FARM AT ANNAPOLIS.

The Division is coöperating with the United States Naval Academy in equipping and operating a dairy farm to supply milk for that institution. Grade Holstein cows will be used and the equipment is to be the best that can be provided within the limits of reasonable economy, as it is the intention to make this plant an object lesson for visitors, especially those who are interested in sanitary and economical milk production.

Such are the principal features of the work that is being done by the Dairy Division. The aim is to collect practical information and scientific knowledge from every possible source and place it before the farmer, the dairyman, the milk dealer, and the consumer; to coöperate with the state and municipal governments, with the dairy schools, and with all other institutions and organizations that are working to further the dairy interests and provide an ample and safe milk supply for the country at large.

Recess to 1:30 P. M.

The Convention met after recess at 1:30 P. M., the president in the chair.

The Chairman: The regular work that this association is doing at the present time, more than anything else, is the work of establishing cow testing associations throughout the state, and we have here this afternoon the young men who are doing that work, and we will hear from a number of them, so that we will know exactly how that work is being carried on. Before they give their reports, however, we will listen to a talk on Barn Construction, by Mr. W. D. James of Fort Atkinson, who has set up in this hall a very beautiful model of a barn.

BUILDING THE DAIRY BARN.

By W. D. James, Ft. Atkinson.

Mr. Chairman, Ladies and Gentlemen: In responding to the call from Mr. Glover for a talk on barn construction, I did not realize the task before me; I am handicapped by not being a public speaker, but with your kind attention, I will endeavor to give you some of the facts that should be taken into consideration when building a dairy barn.

The proper and economical erection of dairy barns requires more foresight and planning than is ordinarily given to their construction.

A barn once built is not easily moved, or altered in size or shape; hence it is important that it be carefully planned before building. There are many points on which men differ in regard to barn construction, and with this in mind, it is my purpose to give some general information which may be of help to the prospective builder, and also to give a number of cuts of barn plans which are considered convenient, practical and up-to-date.

In planning the dairy barn, the important things to be considered are cleanliness, cow comfort and cow health, and convenience in caring for the cows.

The first great essential in the dairy barn is sanitation, and the stable must be so constructed that it can be readily kept clean. The one thing always to be kept in mind is the fact that the barn is a place where human food is manufactured.

SITE.

The first thing to be thought of in the erection of a barn is the site. Location as to the points of the compass, so that a sheltered barnyard will be on the south side; the appearance from the highway; the position of the surrounding buildings; and the location of trees and hedges for windbreaks should detrmine this. Farm barns should be arranged as compactly as possible to facilitate feeding and watering.

The barn should also be so located that the yard will have a natural slope, or can be so graded that the surface water will run off. If the yard is thus kept dry, it is an easy matter to remove the few droppings that will be left daily.

A clean yard is of the greatest help in keeping the cows clean.

SIZE.

The next thing to be thought of is the size to build the barn, in order to supply sufficient storage capacity. This caluculation should be based upon the present and prospective size of the farm, the number of acres in crops, the kind and number of head of stock and system of farming.

The size of a barn is determined by certain measurements of stalls, mangers, gutters and passageways that have been found by experience to be the most practical. Following these measurements it has been found that for the best and most practical results a barn should be 36 feet wide, and thus have room for two rows of cows.

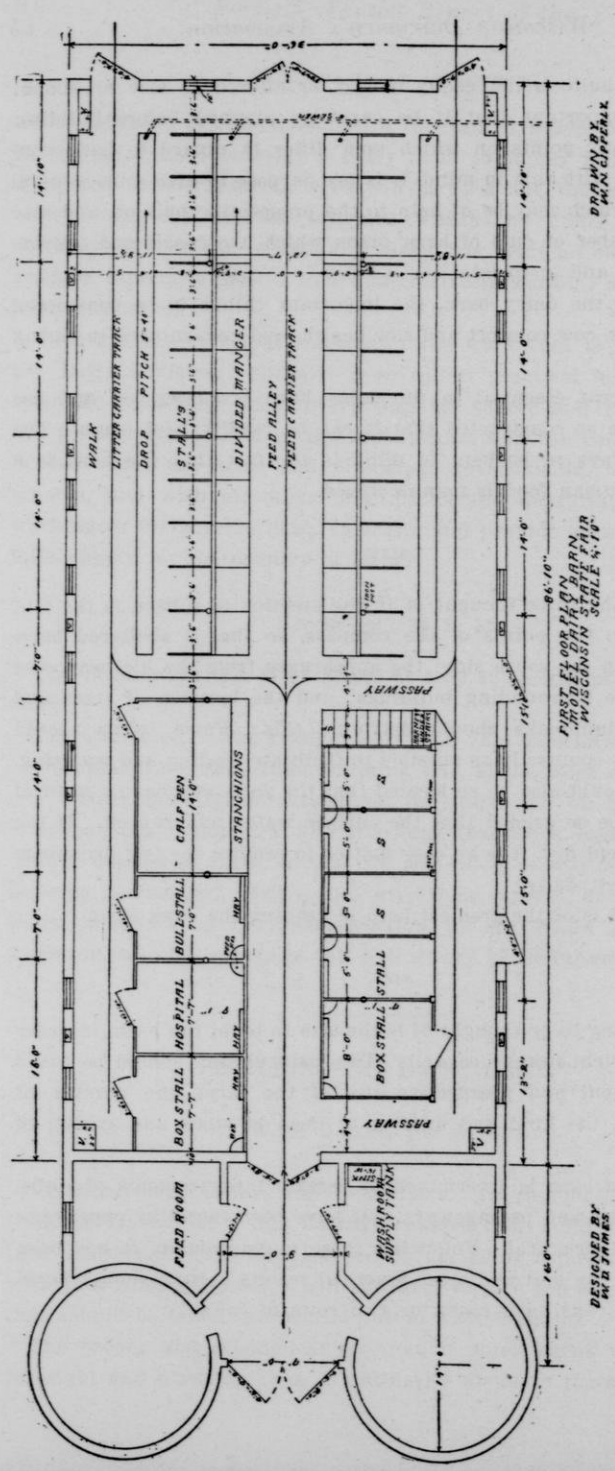

FIG. 1.—FIRST FLOOR PLAN OF MODEL DAIRY BARN AT THE WISCONSIN STATE FAIR.

Designed by W. D. James.

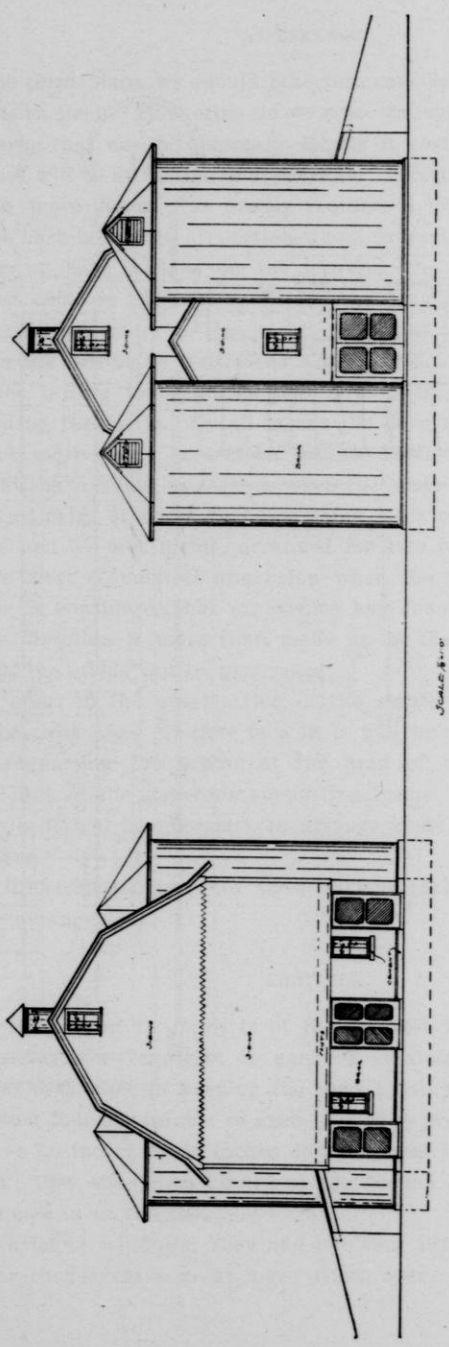

FIG. 2.—ELEVATION OF MODEL BARN AT WISCONSIN STATE FAIR.

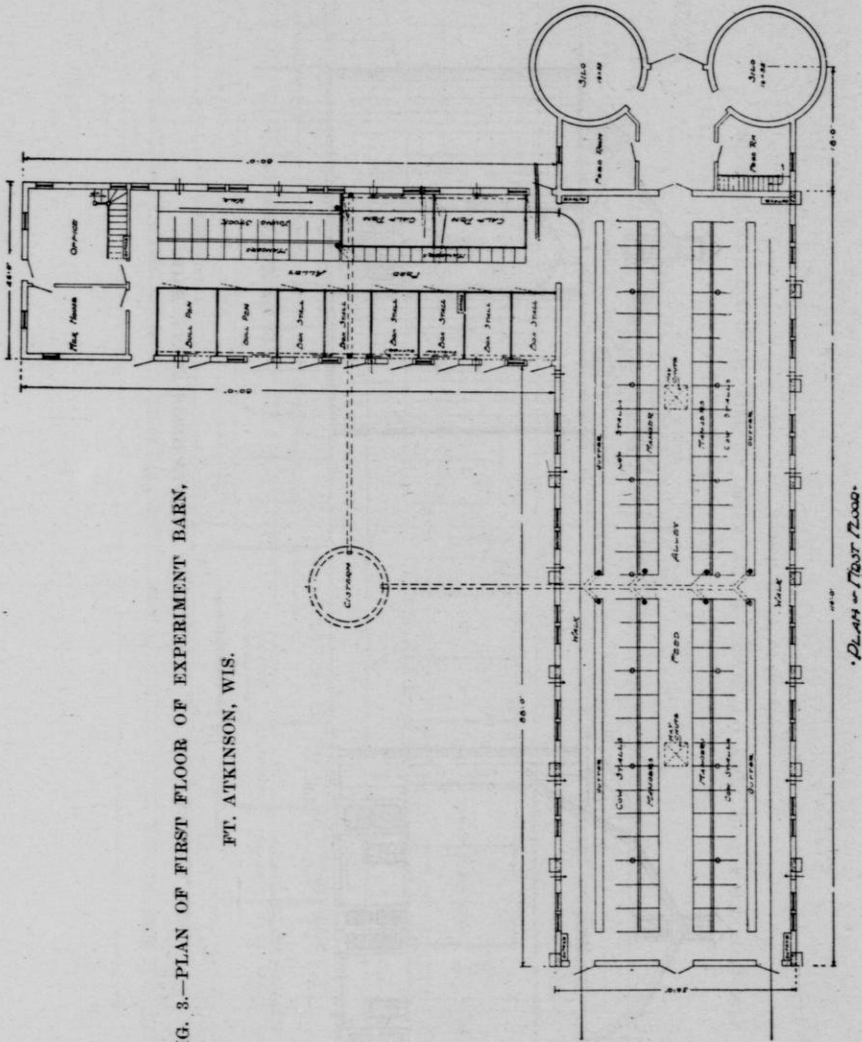

FIG. 3.—PLAN OF FIRST FLOOR OF EXPERIMENT BARN,

FT. ATKINSON, WIS.

APPEARANCE.

In the third place, we should take into consideration the appearance of the barn itself. How often do we pass through the country and see new barns that are "eye sores." Really it costs no more to build a barn that will be attractive in appearance; it requires no more material and no more labor. It merely requires a little forethought to see that the barn is rightly proportioned and properly designed.

After we have decided on the location, the size and type of the barn, we come to the construction of the barn itself.

For the first story or basement, a height of nine feet from the floor to the ceiling is considered about right. It is not advisable to have the ceiling too high, as that only adds more air space to be warmed by the cattle. By all means the barn should be ceiled; it is so much more easily kept clean because there is no chance for dust and cobwebs to collect as there is when the joists are exposed.

The majority of barns that are being built to-day are 36 feet wide outside and 34 feet inside, arranged for two rows of cows. This is not the most economical dimension when the relation of wall space to floor is considered, but experience has demonstrated that the loss in this direction is more than made up in the ease with which the work of the stable can be performed.

One point in the construction of the stable will depend on which way the cows face. If they face in it will be necessary to place the posts supporting the ceiling at the head of the stall which is six inches back of the stanchion supporting frame. Where the cattle face the walls it will be necessary to arrange posts just back of the stall partitions.

The illustrations herewith show various styles of barns and their proper arrangement.

LIGHTING.

The lighting of the barn is of the greatest importance. Make the barn sunny, for "sunlight is nature's greatest disinfectant" and is of great assistance in keeping the cows healthy.

At least four square feet of glass should be provided for each animal, windows 30 inches by 48 inches double glazed have proved very satisfactory; they should be hinged at the bottom and when open should be dropped in at the top.

Use a lot of windows; they add but very little to the cost and will pay for themselves a great many times over.

GUTTERS.

Gutters which have proven most satisfactory are sixteen inches wide, seven or eight inches deep on the stall side and four inches deep on the other.

These gutters should have a fall of about one-half inch to forty feet. Experience has shown that a standing platform eight feet four inches from the bottom of the stanchion to the edge of the gutter is about right for the average cow. However in a great many cases a standing platform of four feet ten inches to five feet is used for holsteins.

Feed mangers require space of about two feet nine inches and the feed alley in front of the manger should be about four feet. We have found that a fall of an inch from the standing platform has been very satisfactory, and where a driveway is used it should be crowning in the center.

The object in giving a pitch to the floor, crowning the center of the driveway, is to make it possible to flush the entire floor, the water draining off at the ends of the gutter and mangers where traps should be provided.

VENTILATION.

Now as to ventilating the barn. There is no system that answers the requirements better than that designed by Prof. F. H. King, and anyone interested in buiding a dairy barn should read carefully Prof. King's book on this subject.

Did it ever occur to you that a 1,000 pound cow requires daily the equivalent of about 30 pounds of hay and grain and 70 pounds of water or an average of 100 pounds per head each day of solid and liquid food; and that she requires 224 pounds of pure air, twice the weight of air that she does food and water combined?

Air is the great first essential for all animal life. The oxygen of the air is breathed into the tissues of the body and the poisonous waste products—carbon dioxide gas, ammonia gas, etc.—are removed from the body in breathing.

If these poisonous waste products are not removed from the stable, the health and energy of the cow will be affected and her milk flow diminished.

Fresh air, and lots of it, gives life and health to the cow and is of vital importance in the making of milk.

From these facts we can plainly see how important it is that our barns be equipped with an adequate ventilating system.

A good ventilating flue should have all the characteristics possessed by a good chimney. It should be constructed with air-tight walls and should rise above the highest portion of the roof, so as to get the full force of the wind. It should be as nearly straight as practicable and should have an ample cross section.

There should be provided one outtake flue 2 feet square inside measurement for every twenty cows, two for forty cows and so on.

When a barn is arranged so the cattle face each other, the intake flues should be continued to the center of the barn that the fresh air will be discharged in front of the cattle, having the outtake flues at the rear; the fresh air will then pass the noses of the cows before it does the gutter.

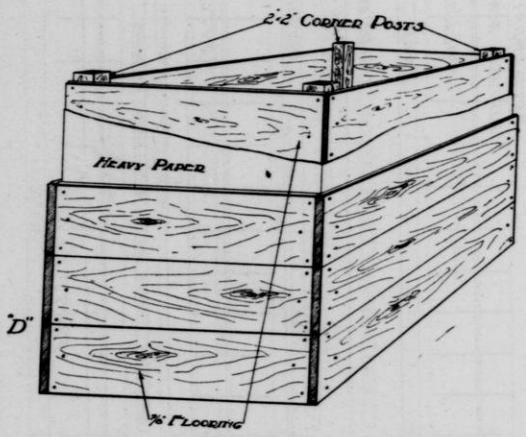

FIG. 4.—SHOWING CONSTRUCTION OF VENTILATOR.

In this system the coldest air being at the floor, the ceiling being tight, it is the cold air that is removed through the outtakes and you can therefore stand a great deal of ventilation. If the pure air is introduced at the ceiling, you bring the fresh air in contact with that which has already been warmed, thus utilizing what would otherwise be waste heat, to warm the air before it comes in contact with the bodies of the cows. The air being brought in through a number of intake flues placed around the sides of the stable, the tendency to produce a cold draught is reduced to a minimum.

Provision is made for the air to enter the intake outside at a distance of 3 or 4 feet above the ground, so as to prevent the warm air being drawn out at these places by suction or passing directly as it would if they opened directly through the walls.

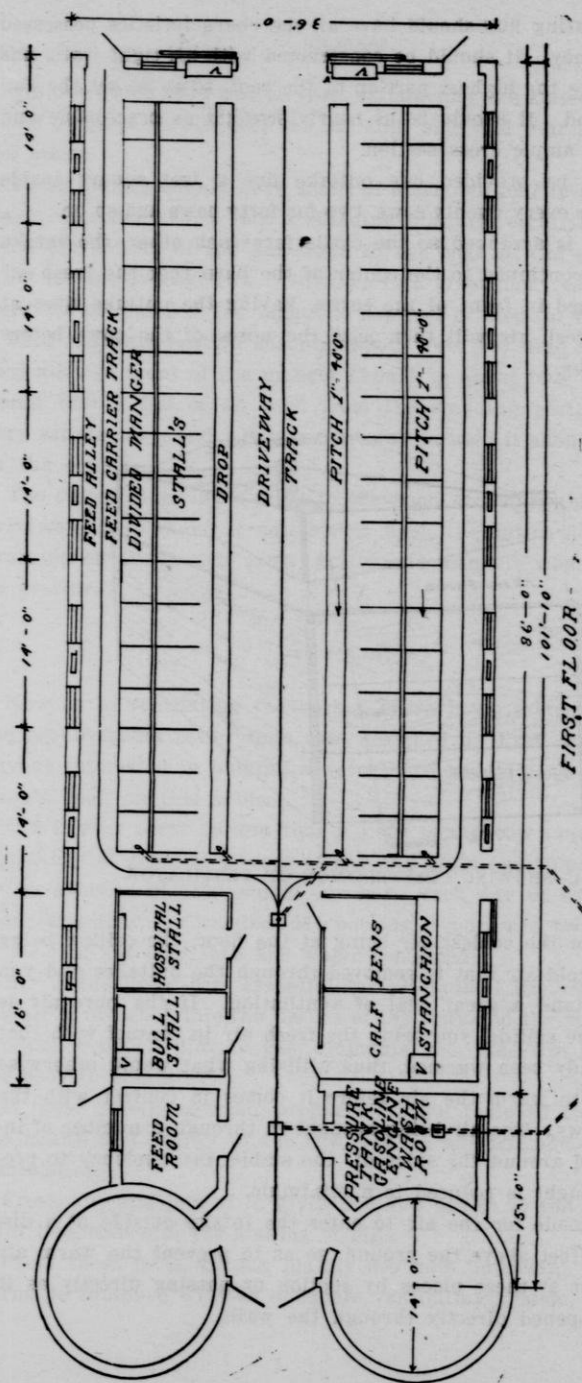

FIG. 5.—SHOWING ARRANGEMENT OF BARN WITH COWS FACING OUT.

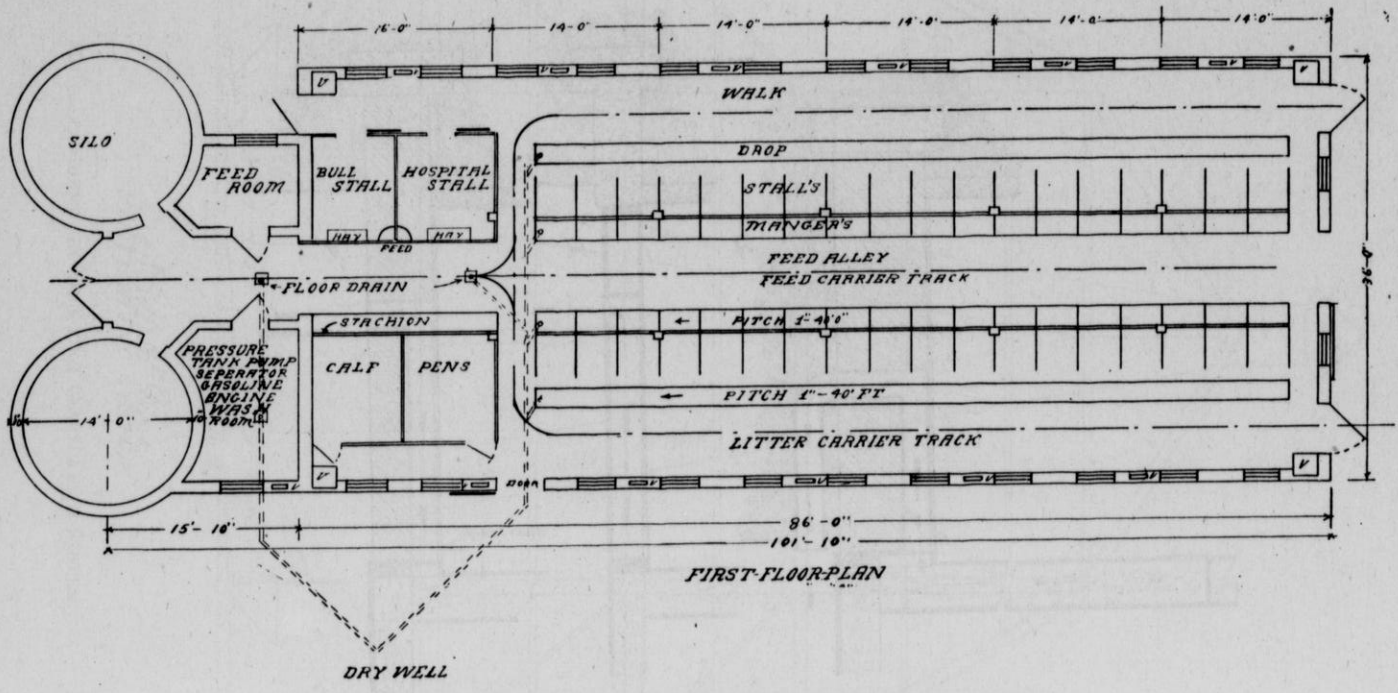

FIG. 6.—SHOWING SAME BARN AS FIGURE 4 WITH COWS FACING IN.

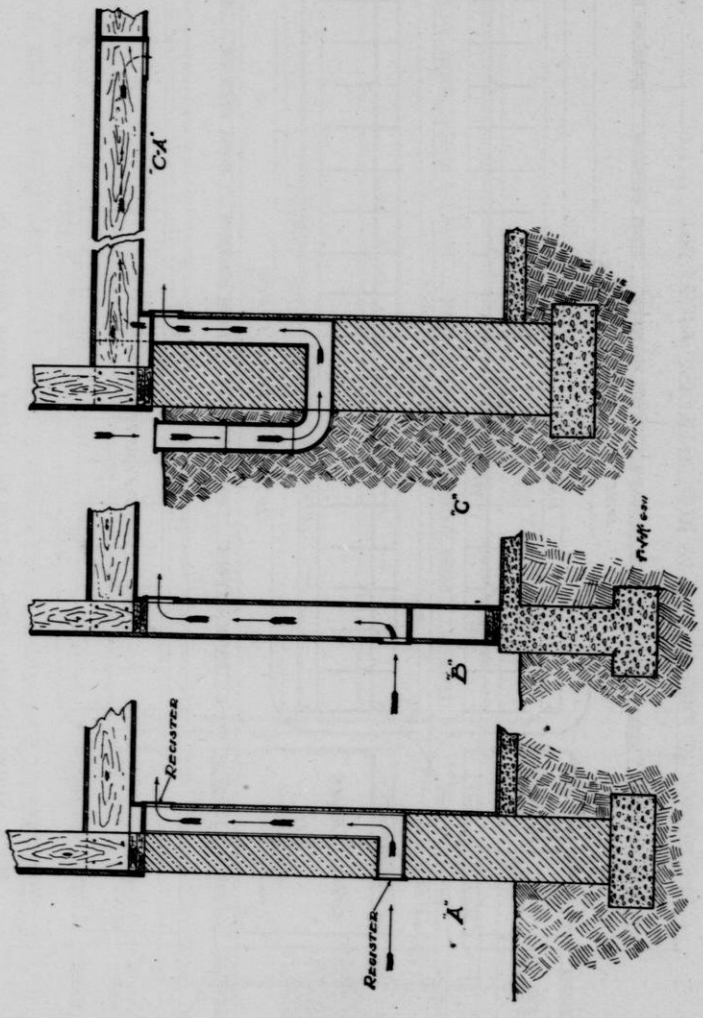

FIG. 7.—SHOWING CONSTRUCTION OF INTAKE FLUES.

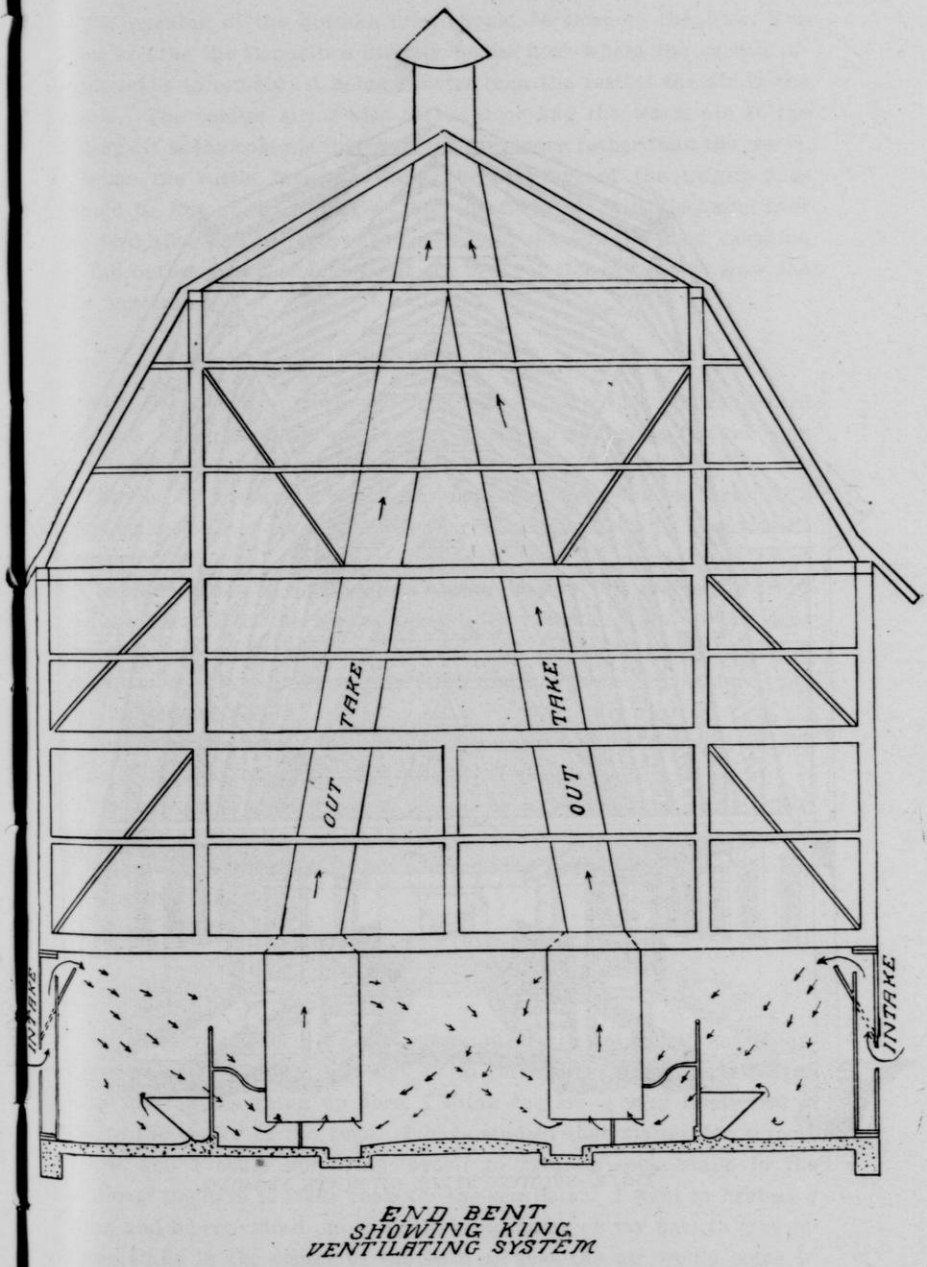

FIG. 8.—END BENT SHOWING KING VENTILATING SYSTEM.

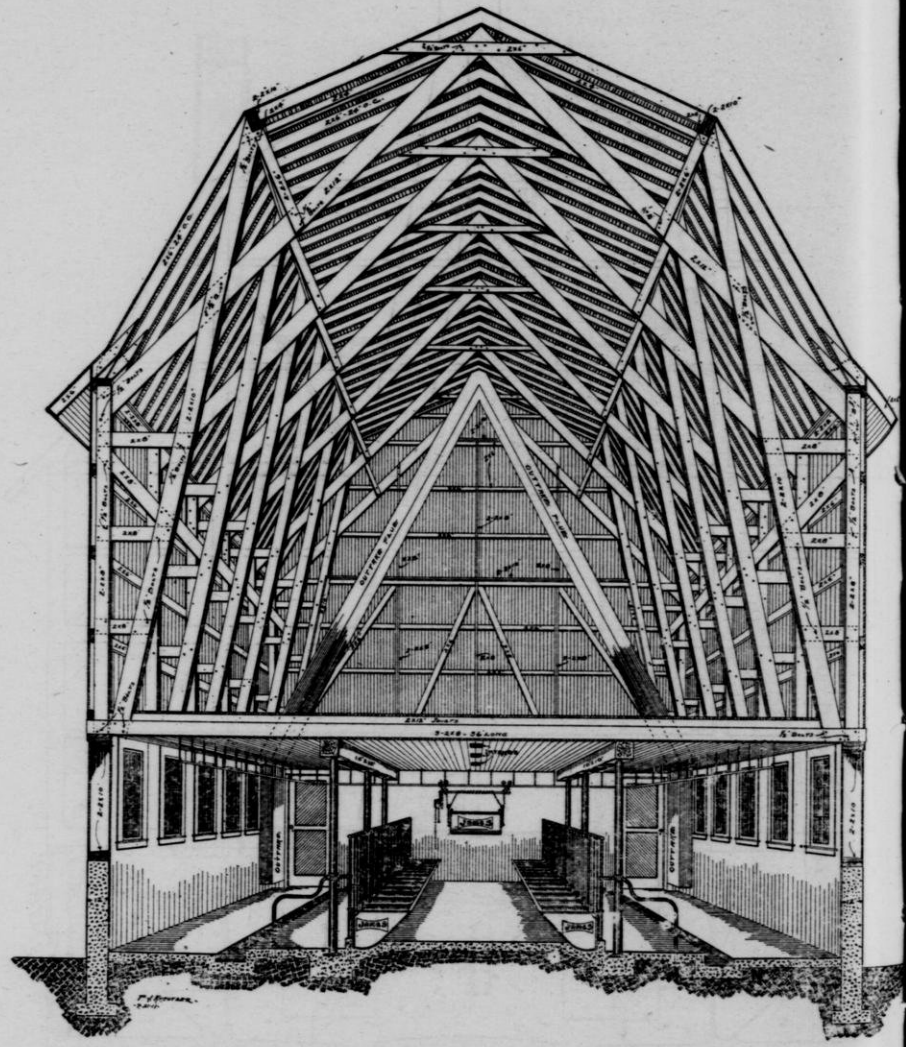

FIG. 9.—SHOWING STYLE OF PLANK FRAMING.

The opening of the outtake flues should be close to the floor. The cows breathe the impurities directly to the floor where the carbon dioxide tends to remain; it being heavier than the rest of the air in the stable. The coldest air is also at the floor and the warm air at the ceiling. It is the cold air that we wish to remove rather than the warm.

When the cattle face the walls, the openings of the intake flues should be just at the ceiling so that the fresh air will discharge over the feed alley and work toward the rear to the outtake flues. Location of the outtake flues should be at the rear of the cattle just over the the gutters.

PLANK FRAMING.

With the scarcity of heavy timber and its high cost, we are forced to study newer methods of framing where no timber is thicker than two inches and from six to ten inches wide.

The use of hay and grain elevating machinery requires barns with open centers. Open crossbeams, collar beams, etc., are in a way quite necessary.

The illustration herewith gives a clear idea of this method of framing the barn. It is the newest thing in barn framing and at the same time is very much stronger than the old fashioned frame made of large timber. It is not nearly as costly and a first-class carpenter is not required to erect it.

The driveway should be used on the second floor, where it is possible to have an approach that is not too steep.

The granary and feed rooms should be located on the second floor preferably at the silo end of the barn, thus adding to the convenience in handling feed, etc. Silos and feed rooms should be located at the ends of the barn.

Discussion.

Mr. Emery: Where the air passes in at the intake, it has a tendency to come straight and not go to the center of the barn. Even with four shutes going up here, I think the air is very likely not to get to the center of the barn. I have studied that matter for several years, and I could not bring myself to give up some stalls in the center of the barn to make room for the ventilator. I went to Professor King and he convinced me it would be economy on my part to give up those stalls in the center of the barn so that the air would come in there and go all over the barn, and go directly up out of the barn from the center.

Mr. James: That has not been our experience. You appreciate that we continue those intake flues to the center of the barn. And we know from experience that we can bring the air to the center in that way.

Judge Rosa: I have the utmost respect for Mr. Goodrich, and the first slip I have known him to make since he has been here was when he talked about the air being sucked up. In every ventilating system like this there is no such thing as the air being sucked up—the air is pushed out, you want to bear that in mind. The warm air goes out of the barn only as it is forced by the cold air, the same as it will go out of a tin can if you pour water into it. As you pour the cold air into the barn you force the warm air out, and that is the only way it is forced out. I think that as the cold air comes in it would have a tendency to get warmed up considerably, instead of dropping to the floor it would probably take a shoot out toward the end of the barn, from these little intakes, and the reason for that is this, that it is pure air that comes in. We know that impure air contains carbon dioxide and is much heavier than pure air, and I would be much afraid of the impure air although possibly it may be a little warmer than the air coming in, and would just over-balance it in weight. I would want to see this work before I built a barn that way.

Mr. James: I want to assure all the dairymen here to-day that that system is working. Last year there were two hundred and some barns built this way and this year three hundred and thirty—not all of them built this way, but in the majority of barns the cattle face to the center. We advocated that plan and it works very successfully.

Mr. Glover: There is a four-row barn in the Elgin district where two rows of cattle face each other and the air is brought in exactly the same as the air is taken into that two-row barn, and it does diffuse very well. Now, in reference to carbon dioxide being heavier than air. That is true, and in a room where there are no currents it would settle to the floor, but every animal is a living thing, she throws off heat, she breaths, and in doing this she sets up motion in the air and it is all mixed together. The theory held by Professor King is a good one, and I don't wish to question his statement that the impure and cold air is at the bottom, but the United States Department of Agriculture has conducted over five hundred experiments, measuring the temperature of the barn with instruments, analysing the air to determine the amount of carbon-dioxide gas taken from different parts of the barn, and they find that there is as much carbon-dioxide gas at the ceiling as at the floor, and they account for it in this way: the animal is constantly mixing the air, making it all the same composition, whether it is found at the ceiling or on the floor. I feel

confident that that system of ventilation will work and work well. Whether it will work in theory or not, my experience confirms what Mr. James has said as to its working in practice.

Mr. Emery: I think that system will work well. I think a system by which the opening of the ventilator is placed near the center so that the air can come from all sides around to it, instead of on one side, will work better. That is the only point I make. Now, about this mixing of the air. That mixing of the air in a room is done by the principle known as diffusion of gases. It is ascertainable, and the books record the degree and the time in which this diffusion of gases takes place. A peculiar principle acts, so that this carbon-dioxide gas which is heavier than the air has a tendency to settle. At the same time there is another principle working against that, tending to cause the heavier gas to rise—by what is known as the principle of diffusion—all the while toward the surface, and causing them to commingle, and where ventilation consists simply of a change of air in a room this theory—not only theory but a demonstrated fact—of the warmer air accumulating along the ceiling, being warmer, increases in expansive force as it is warmed and creates a pressure downward. That pressure downward tends to drive this air in the lower portion of the building out through these ventilating shafts. That is the whole principle and you have it just the same as you have with a dish of water replacing air. The top of the bottle represents the ceiling here and as you pour that water into the bottle and it reaches the top, it is going to overflow. So when you fill this barn with air and press downward, it is going to overflow in the reverse way from what the water does. I do not say these things for the purpose of controverting any assertion that this plan will do good work; I believe it will. I believe that this system is by far the best means that we know of for handling barns, but I maintain as a result of not a little study and some experience with this whole system, that when you place these nearer the center so that the air can come out from all sides toward it, you will get better ventilation than you will when you place it at the ends of the barn.

Mr. Goodrich: This other barn over here is calculated to take in hay at the end. How will you manage your ventilating flues there?

Mr. James: In that barn the cattle face out. You will notice that the ventilators are on either side of the center and there are ten feet between the flues.

Mr. Everett: I believe there is a great deal of suction. Why is a chimney run above the roof? The ventilator is nothing in the world but a chimney to take the foul air out of the barn, instead of smoke,

and we have been instructed always to build those ventilators above the roof, so that we are benefited by the current of air. You can enclose that barn absolutely tight and there will be a draft going out of that ventilator. We have a barn similar to that on the state fair grounds at Milwaukee, and I am going to confess something which I never told to but one member of the State Board of Agriculture; there are two of them here who don't know anything about it. I was curious; I happened to be on the ground, as I am many times, alone, and saw that barn was ventilated as this model barn is, and I was curious to know how smoke would act in that barn. So I went into it and I kindled three little fires with damp straw. I wanted to see in what direction that smoke would go, and how long it would take it to disappear. I stood watching it a long time, and the smoke gradually went to the ceiling. It finally became affected by the intake current and I saw the movement at the ceiling begin working. It gradually began to penetrate different portions of the basement room and it finally began to work towards the outtake flue the faster it traveled, and it finally went out with the—suction—I call it draft. I hold that smoke was not forced out by the current of intake air. But it very gradually penetrated all parts of the basement and stayed there until it all disappeared in the outtake flue. Now, that smoke did not eddy around and immediately travel to these intake flues as Professor Emery suggested, but it was very gradual and very slow in moving over that entire basement until it was taken out by the flue. That was an illustration to me and an important one, because it proved what I have always believed, that the King system of ventilation is a very practical system. I was forced to believe it from what I saw. That smoke traveled exactly the same as the air traveled in that barn and that outtake ventilating flue should be built tight so as to ensure a good draft. Of course the air that goes up the chimney is warm from the stove and the warmer that flue is the greater will be the draft. You all know if your chimney doesn't draw, it will smoke.

Mr. Everett: I want to read from the gospel of Professor King. I quote from the 27th Annual Report of the Dairymen's Association:

"Q: There is one factor in a chimney that makes it a ventilating shaft, that is the fire.

"Prof. King: That is true, and the heat from the bodies of the cows in a measure acts in the same way; but you are all familiar with the fact that on a windy day the air currents passing across the top of a chimney tend always to produce a stronger draft, and all good chimneys have a draft through them even when there is no fire, and the same thing would be true of a properly constructed ven-

tilating shaft which is air-tight from top to bottom, except where openings are provided,—the air blowing across the top acts like an inspirator tending to draw the air out.

"The best ventilating shaft is such as would make the best chimney. If you understand what are the essential conditions of a good chimney, then you know what are the essential features of a good ventilating shaft."

REPORTS OF YOUNG MEN IN CHARGE OF COW TESTING ASSOCIATIONS.

The young men in charge of the Cow Testing Associations of Wisconsin held a meeting. Six of them prepared papers giving their experiences in operating cow testing associations.

The great work that the Wisconsin Dairymen's Association is doing is to a large degree in the hands of these young men. Wisconsin has twelve good cow testing associations containing, in round numbers, 5000 cows. Every one of these men is very much interested in his work and not only helps the farmers in determining individual differences in the cows of their herds, but also discusses the matters pertaining to farming.

REPORT OF THE WINNEBAGO COUNTY COW TESTING ASSOCIATION.

By Walter Pryse, Neenah, Wis.

The Winnebago County Association was organized in January, 1908. From this time till February, 1911, the organization had a slow but steady growth with about 200 cows under test at a charge of $1.50 per cow per year. The slow growth of the association was thought to be due to the charges for testing. Hence, in February of the present year a reorganization was made whereby the association was attached more directly with the County Agricultural School. The fees were reduced to $1.00 per cow with the minimum of 12 cows for each herd tested.

Subsequent to this change and as the result of persistent boosting on the part of those interested, especially the Instructor of the State Dairymen's Association, Mr. H. C. Searles, the original testing associ-

ation grew so large that a division was made necessary. At present, two divisions are in operation with a tester in charge of each and a total of over 800 cows under test.

To give at this time the benefits which the farmers have derived from the work of the testing and the association as a whole is difficult. However, it can be said that the association has had its good influences since its first organization in 1908. Of the 26 farmers in the older division, 25 of the number have silos, and 5 have pure bred herds. Furthermore, practically all of the members in this older division have registered sires to head their herds.

WHY A FARMER SHOULD HAVE HIS COWS TESTED.

By Walter Dombrak, Waupun, Wis.

A good many of the farmers have some cows in their herds that are not paying for themselves. Therefore, if he had them tested he could tell whether or not they are a profit or a loss to him. And another thing, if he has his cows tested, he knows what each cow tests, and can then raise the heifer calves from the cows that are profitable. In this way he can also grade up his herd, because generally if the dam is a good tester, her calf will be a high tester.

Many of the farmers are feeding their cows a great deal more than they really want to feed them. I have had some farmers guess at the weight of the feed fed to one cow, and they would guess 6 or 7 pounds, when it would weigh 10 pounds. In this way if the farmers would have their cows tested, I think they would get a better knowledge of what they were feeding.

By having their cows tested, they get the cow's average test, number pounds of milk she will produce in one year, number pounds of butter fat, value of her butter fat, number pounds of feed fed per day and year, and value of it. By doing this, a farmer can find out what cows he is feeding at a loss, and at a profit and how much. I know of some farmers that will milk later at night and later in the morning on the day the tester is there, so as to get more milk so the average pounds of milk will be more for the month, just in order to have a good showing in the book.

But if a farmer does this, the test is no good whatever, because he don't get the right number pounds of milk of the right test, and if he does this wouldn't know any more about what his cows were doing, than he would if he didn't have the test. I have found that a

great many of the farmers don't take care of their cows and feed them the way they should. I have averaged up two herds of about the same size and same breed, only one had good care and a good balanced ration, and the other poor care and judgment in feeding.

Twenty-three cows in a six months' test:

Number pounds of milk	94,804.00
Number pounds of butter fat	3,303.51
Value of butter fat	$836.40
Cost of roughage	209.09
Cost of grain	101.23
Total cost of feed	310.32
Net profit	526.08

Feed used; silage, 39 lbs.; clover hay, 5 lbs.; ground oats, 6.5 lbs.

Twenty-five cows:

Number pounds of milk	100,567.00
Number pounds of butter fat	3,359.38
Value of butter fat	$852.24
Cost of roughage	288.51
Cost of grain	211.03
Total cost of feed	499.54
Net profit	352.70

Feed Given: Silage, 35 lbs.; clover hay, 4 lbs.; corn stover, 9 lbs.; corn and oats, 4 lbs.; corncob meal, 7 lbs.

Difference in profit $173.38. The dairy farmer with 23 cows and the better system of breeding made the most profit.

Mr. Dombrak: There are few difficulties that I experience in going among the farmers in doing this testing work. Some of them do not give the right number of pounds of feed given to their cows a day. They think it sounds better to show that their cows are not fed so high, that it shows a better profit at the end of the month. Then again, some of them milk later in the morning and at night, so as to get more milk, making the average pounds of milk more for the month. In some cases their reports have not corresponded with the factory reports, and I have found one of these things is the reason why. We have found in organizing these associations, that if men don't care very much about going in, it is better not to take them in at all, because after they are in they don't take any real interest in the work, and they are the kind that will go around to their neighbors

and say, "By Jinks, it is no good at all. You are throwing away your money."

DISCUSSION.

Mr. Dougan: It should be impressed upon the farmers for whom these young men are testing cows that it is to the interest of the farmers to keep these books, these data, accurately, and that the young men are to do their part accurately and secretly. If the farmer does not report properly and know the importance of doing so, he does not know anything about the principles of a cow testing association. The young men want to impress upon the farmer, "This is your test, these are your cows, you want to get just as accurate a record as you can, and if you vary one way or the other from the facts, at the end of the year your record does not mean anything at all, and you have wasted your money in having it made." I would specially urge upon the testers absolute secrecy, and upon the farmers absolute honesty.

The Chairman: It is all right to have the tester do all he can, but the farmer must do a lot of personal work. He must look out for the health and the feeding of the cows; he must be back of every one of his cows if he is going to get the best results. We have other testers here and we will hear from them.

BLOOMER AND EAGLE POINT COW TESTING ASSOCIATION.

By S. K. Andreassen, Bloomer, Wis.

This association is now in its third year of existence. Most of the members that were with the association when it was organized are still members of it.

The methods I use to increase the profits in dairying are as follows:

(1) By keeping only dairy cows and not trying to make a beef cow do the work of a dairy cow.

(2) I try to impress on each herdsman the need of studying his cattle so he can tell me some new thing about his herd every time I get there.

(3) When they get a bull to head their herds get a good one and pay a good price for him rather than to get an inferior one at a low cost.

I will relate a little incident of two of the farmers on the route last winter. They both had fairly good dairy cows. One was feeding grain and the other was not. I asked the latter why he did not feed grain. He answered, "It costs too much to feed grain."

Now I will show you as I showed him the figures for these two herds for the month of February. The former was feeding ensilage, timothy hay and one pound of grain to every three pounds of average testing milk. The latter was feeding ensilage, timothy hay and no grain. It cost the former 60.6 cents to produce one hundred pounds of milk and 12 cents to produce one pound of butter fat, while it cost the latter 91 cents to produce 100 pounds of milk, and 29 cents per pound butter fat. In addition to this the man's cows that were getting grain were in fairly good condition and were holding a good flow of milk, while those that were not getting the grain were losing in both milk and in flesh. They gave as good a flow of milk as long as the excess body tissues would supply them, but when those began to give way, the milk decreased and very fast. The man who was not feeding grain thought that when he had a silo he did not need to feed any grain.

Some of the most progressive dairymen on my route are putting water into their barns so that their cows do not have to be exposed to the cold even to get their water, which is an essential thing if the cattle are going to give the best returns for the money invested and the feed given them.

The worst trouble I find is to get the men to feed a balanced ration. They want to get the balanced ration, but don't want to use them.

One man last year used the balanced ration who had not used it the year before, and he increased the butter fat from his herd sixty pounds per head with the same herd with the addition of a few heifers.

IMPRESSIONS OF A COW TESTER.

THEO. HALVERSON, OMRO, WIS.

Fellow Testers:—As I have been in this work only a few months it will hardly be right for me to contrast the best herd with the poorest as we had planned. It will be enough to state that the only man who has had the testing work done before, has the best producing herd so far. I do not think I have anything new to say but some of the things have been brought home clearly to me. One of the things is this: I believe pasture is profitable, on high priced lands in small tracts only.

Those who have had very small pastures this summer have received just as much good from them as those with large ones. One of my patrons has only eight acres for fifteen cows. He has used no more supplementary feed than his neighbor who has about three times as much and his cows have been fed to their full capacity.

Another thing is the cheapness of silage. Not only have the cows fed silage produced more milk and appear better than those not fed silage, but they produced it more cheaply. I have been surprised to find how little really good corn it takes for silage. One of my patrons filled a silo 14 feet by 32 feet with a little over five acres. Another filled three silos from 45 acres. One of the silos was 20x48, another 16x40 and the other 14x40. These silos were filled in spite of the fact that we had a poor year for corn in our county.

One of the things we testers have to contend with is the breeder of pure bred cattle who will not test. I have found two such cases in my work. They are afraid their cattle will not make a good showing. Their cattle are good because they are pure bred, not because they are high producers. Is it less than a crime to sell an animal for a good one when the only thing good about it is that it, by accident of birth, is bred pure? This is what I call a pure bred scrub. Will not a pure bred scrub be a poorer breeder than a common scrub, because of its prepotency? It is wrong not only to the purchaser but to the breed as well.

Some day these breeders will awaken to the fact that their cattle are not as good as those who have tested systematically and regularly and have graded up with good pure bred sires.

TROUBLES OF A TESTER.

By C. O. Heldstab.

To begin with, the difficulties of the work are not so very numerous. The working out of balanced rations with the feeds we have at hand is, I believe, the worst we have to contend with, and that is becoming much easier with the advent of the silo, as a ration is easier to compound with silage and good results are sure to follow in use in connection with other feeds; that is, if it is properly put in and cared for when taken out.

Another trouble is to induce men to feed liberally. With the high prices of hay and other feedstuff it is a great temptation to sell off the

most of it and drag the cows through on corn stalks and shredded fodder. Of course, some are justified in so doing as there are a few cows that unquestionably do not pay for their feed and that is where the benefits of testing come in. Among the strictly dairy bred herds this is not so noticeable, but even there we find it too frequently. It is true that we often find good cows among the scrubs, but as a rule they have missed their calling, and their owners have failed to hear the call of the butcher.

We find as a rule that the members of the association are ready to adopt better methods of feeding and caring for the cow and the handling of her product. Of course there are exceptions to this and the best we can do in this case is to grin and bear it, and speak the advice mentally, trusting that the rut will eventually become deep enough to bury the man or make him sit up and take notice. As an experience to a young man, I think it cannot be valued in dollars and cents (especially when they are slow about paying their dues) as we meet with so many different ways and ideas of doing things that work toward the same end. Not alone in the way of housing, feeding and general care of stock, but all around the farm there is a chance to learn some very good lessons.

LA CROSSE COUNTY COW TESTING ASSOCIATION.

OLE HANSEN, ONLASKA, WIS.

The La Crosse County Cow Testing Association was organized in the spring of 1910, and began its work May 10th, with O. J. Mottard as tester. December 1st O. J. Mottard gave up his position and O. C. Hansen took charge. At the end of that year some of the smaller herds dropped out, and we took a few larger herds in their places.

We have some members who think there is nothing like the testing association. They say it is the best thing that has ever been started from the school. They can't see why it is that more farmers do not join, as the price is comparatively small considering the profits derived. They take more interest in their work, as do also the hired men.

A member of our association, whose herd stands in the lead of all the herds tested, fed balanced ration for most of the winter, and said that he never thought there was so much difference in feeding.

Results of last year's work were published in the local paper, and this fall I hope to balance rations for many of the members. There

seems to be more interest among the better dairymen than there has been to this time, so I think I will have a very interesting winter's work.

DISCUSSION.

Mr. Glover: A few years ago it was my good fortune to test cattle for butter fat in Illinois. I directed the work for three years and a half on farms in the northern part of Illinois. I had one pure bred herd that I visited for over three years, and in it was a cow capable of making only one hundred and fifty pounds of fat per year, and yet the bulls from that cow were being sold to my knowledge for more than $100.00 apiece, simply because she was a registered animal. Now, a great many people used to say to me, "Is it practical to test cows? Isn't it just a fad? Weren't these positions created just to give some of you fellows a job?" What is more practical for a man to know, whether his cow was producing a hundred and fifty pounds of fat in a year or whether she was producing three hundred and fifty pounds? What is a practical thing? Is it keeping something so poor that it won't return the price of the feed it eats? Or is it rather having some understanding of your own business, knowing whether that animal is giving you a profit or not? I use this illustration to show the importance of keeping a good cow; an animal that will yield a hundred and fifty-one pounds of fat at present prices is giving a profit of one pound of fat; the cow that will give you a hundred and fifty-two pounds of fat is giving you two pounds of profit, and the latter is twice as profitable a cow as the former.

The poor cow requires as much stall room as the good one. She requires for all practical purposes, as much attention. She occupies a place in the pasture equal to that of the good one, and there is so little difference in the investment between the good and the poor one that we might say we have an equal amount of money invested in each. Then why milk a dozen cows when you can get five cows to do the same work and bring you the same profit? In that test work I found a herd of twenty-eight cows that did not return to the farmer as much as he put into them in actual expense, to say nothing of hard work, and another farmer nearby, with the same soil, the same climate, selling to the same creamery, was getting a nice income over and above his feed from six cows. In other words the six cows yielded their owner a profit of around $300.00 while the other man with 28 cows had to pay something for keeping them. I will admit that there is hardly a cow so poor that she does not pay her way upon the farm,

but what I am saying is that she will not pay for her feed at market prices; that if you were to sell this feed in the market for what it is worth and what you could get for it, that it would return more than you will get from that kind of a cow. Of course, if you take the cows away from the farm a great deal of this feed would become valueless. Alfalfa hay to-day can be bought for $3.00 a ton in the stack, in some of the western states and we are mighty glad to buy it for $18.00 and $20.00. What gives it that value? It is the dairy cow; she is the market and there is no reason why a farmer should not have a good market in his barn rather than a poor one. I think it is the highest sort of practical business, the hardest kind of common sense for a man to look for a market where he can sell his grain for the highest price.

The convention adjourned to meet at 10 o'clock to-morrow morning.

Convention met at 10 O'Clock A. M. Friday, Nov. 17, 1911. President Griswold in the chair.

The committee on Nominations made its report, recommending the name of C. E. Jacobs of Elk Mound as president, and the name of A. J. Glover of Fort Atkinson as secretary of the association. The president of the association was instructed to cast the vote of the association for Mr. C. E. Jacobs as president, and Mr. A. J. Glover as secretary, which was done and they were declared duly elected.

The committee also recommended that Mr. H. K. Loomis of Sheboygan Falls be made the treasurer of the association for the ensuing year.

The secretary was instructed to cast the vote of the association for Mr. H. K. Loomis, which was done and he was declared duly elected.

The committee on Resolutions reported through its chairman, Professor Emery, as follows:

RESOLUTIONS PASSED AT THE WISCONSIN DAIRYMEN'S ASSOCIATION CONVENTION.

The committee on resolutions appointed by the president begs leave to offer the following report:

Resolved, That the Wisconsin Dairymen's Association, assembled in its Fortieth annual session at Beloit, this seventeenth day of November, 1911, records the following declaration:

Oleomargarine, when made in resemblance or imitation of yellow butter, is a counterfeit article; and square dealing demands alike for the consuming public and the producers of honest butter that the law compels oleomargarine to look like itself and not like yellow butter. We recognize that when oleomargarine is made to look like itself and not like yellow butter, it may be a legitimate substitute for butter; but when it is made to masquerade in the color and garb of yellow butter, it is a counterfeit. A counterfeit dollar is not tolerated by law, and a counterfeit of yellow butter has no more right to the tolerance of law than has a counterfeit dollar. Counterfeit oleomargarine does not compete with genuine butter; it defrauds butter and the would-be consumers thereof.

The present National Internal Revenue tax of ten cents a pound on artificially colored oleomargarine is in effect a tax on a bogus, a counterfeit, a fraudulent article. The tax of only one-fourth of a cent a pound on uncolored oleomargarine, that is on the article which Congress by that law intended to compel to look like itself and not like yellow butter, is barely sufficient to meet the expense of enforcing the law which enables the consumer to get what he pays for without being cheated.

The claim that the National Revenue tax on oleomargarine raises the price of butter, made by the author of one of the bills to repeal the national oleomargarine law now pending in the House of Representatives, which claim is being sent broadcast in circular letters accompanied with an appeal for petitions to Congress for the removal of the internal revenue tax on oleomargarine, is inaccurate, specious and misleading. The Wisconsin Dairymen's Association protests against the repeal of the present oleomargarine law unless it shall be found that Congress possesses the constitutional power and uses it, to prohibit the manufacture, sale and shipment of oleomargarine which shall be in resemblance or imitation of yellow butter, made such either by the use of a dye or by the selection of material. The Wisconsin Dairymen's Association protests against the repeal as is proposed in the Burleson bill now pending in Congress, of that clause of the present national oleomargarine law which provides that when oleomargarine is introduced into any state from any other state, it shall be subject to the laws of that state the same as though it had been manufactured in the state into which introduced.

Resolved, That the secretary of this association be and hereby is instructed to send a copy of the foregoing resolution to each member of Congress from this state, to the chairman of the committee on agriculture of the House of Representatives and to the President of United States.

On motion, duly seconded, the above resolutions were adopted.

SILAGE AND ALFALFA FOR DAIRY COWS AND THEIR VALUES AS COMPARED TO OTHER CROPS.

A. J. GLOVER, FORT ATKINSON.

Alfalfa was grown in Rome more than 2,000 years ago and valued very highly then as a forage crop. It has been grown in all parts of Europe for hundreds of years, but it is only recently that the American farmer began to value it as our greatest forage crop. Probably the slowness with which this product has come to the front is due to the lack of understanding its value, the difficulty under which a stand is obtained,—unless proper methods are used in preparing the soil,—and the diseases which prevent its development.

More than fifty years ago some of the German settlers in Carver county, Minn., began growing alfalfa from seed brought with them from Germany, and it has been grown ever since in that county. It has became locally known as "Everlasting" Clover. The name indicates its persistence when once established. Seed has been saved in that county and has been quite well distributed throughout the United States but the general value of alfalfa is not generally known even at the present time.

For seven years it has been my good opportunity to note the success Hoard's Dairyman farm has had in growing alfalfa. About fifteen years ago, former Governor Hoard began to experiment with the growing of alfalfa. W. A. Henry, then Dean and Director of the Wisconsin Experiment Station, also made some atttempts to grow this plant. The results were discouraging, and the conclusions were that it was almost useless to attempt to grow this plant under Wisconsin conditions. But Ex-Governor Hoard did not dispair and as he had a number of vacant lots in Fort Atkinson, he began a detailed study of the plant. Finally, after mastering a few of the fundamental principles, he was successful in growing it on his farm. It is now grown with as much assurance, if not more, than red clover. At the present time the farm is growing 60 acres. For a while wood ashes, as well as manure, were used freely upon land on which alfalfa was to be sown, but after we learned what Dr. Hopkins of the Illinois Experiment Station had to say of the value of ground limestone and phosphorus for alfalfa, these materials have been used according to his directions. It is the practice now on Hoard's Dairyman farm to apply eight or ten loads of manure to an acre, using 40 to 50 pounds of raw rock phosphate to each load. Where it is possible, the land is plowed in the fall, turning the manure under. In the spring

before seeding alfalfa, about two tons of either ground limestone or marl are applied per acre.

The feeding value of alfalfa depends to no small degree upon the process of curing. If it is permitted to dry in the swath, the sun dries the leaves and bleaches the alfalfa which carries off some of its nutrients or at any rate makes them less usable and makes it less palatable. In handling it, after it is cured in the swath, a large amount of the leaves are lost and the leaves are the most nourishing part of the alfalfa.

On Hoard's Dairyman farm, alfalfa is cured in cocks weighing from 70 to 80 pounds each. It is cut in the forenoon and raked up into windrows and put into cocks in the afternoon. The cocks are then covered with a quality of "A" sheeting, torn into strips 40 inches square; to each corner of the square or cap is tied a small weight which may be made of cement, or nuts weighing 4 ozs. may be used. These weights are attached to the corners of the cap to prevent the wind from blowing them off and to hold them firmly over the top of the cock of hay so that it will shed water. It will take from two to three days to cure it sufficiently in this manner. An hour before it is time to draw the hay to the barn the cap should be removed and the cock opened up to permit the air and the sun to take up the surplus moisture. Alfalfa cured in this way produces the very best quality of hay. If it rains the cocks do not become soaked and the sun does not destroy any of the nutrients.

When we come to consider the composition of alfalfa, we at once begin to realize its value to the dairy industry. On land that would yield fifty to sixty bushels of corn per acre, it is not unreasonable to expect it to produce from three to four tons of alfalfa hay. In four tons of alfalfa hay there are 4,000 lbs. digestible nutrients of which 880 lbs. are digestible protein.

Professor Fraser, of the Illinois Experiment Station, found by experience that alfalfa hay was practically equal to bran. The cows fed on alfalfa were in better physical condition than those receiving bran. Of course, he fed a very high grade of alfalfa hay. It was cut at the right time and cured properly. It should be observed that alfalfa hay is rich in the element protein and therefore supplements corn silage very well which is comparatively rich in the element carbohydrates. An acre of land that will produce fifty to sixty bushels of corn will yield in the neighborhood of ten tons of green corn per acre. In ten tons of corn silage there are 3440 lbs. of digestible nutrients of which 280 lbs. are digestible protein. It should be observed that the alfalfa produced 4,000 lbs. digestible nutrients of which 880 lbs. were digestible protein. For a moment let us consider these crops

with a few others. It requires pretty good land to produce 1½ tons of timothy hay per acre. In 1½ tons of timothy hay there are 1443 lbs. nutrients, and 84 lbs. digestible protein. It is not unreasonable to expect that an acre of alfalfa will produce 10 times more protein than an acre of timothy.

Perhaps it will be interesting to learn the kind of a ration that may be made of silage and alfalfa. It has been found that an animal fed nothing but these feeds will consume about 40 lbs. of silage daily and 16 lbs. of alfalfa hay. In the following, I tabulate the pounds of feed used, dry matter and digestible nutrients in them.

Name of Feed.	Lbs.	Dry Matter.	Protein Lbs.	Carbohydrates. Lbs.	Fat Lbs.
Silage..	40	10.6	.56	5.6	.28
Alfalfa	16	14.8	1.77	6.3	.10
Total nutrients....	.....	.....	2.33	11.9	.38

According to Professor Haecker's feeding tables, a cow producing 25 lbs. of 4 per cent milk requires 1.9 lbs. digestible protein, 12.82 lbs. digestible carbohydrates and .5 lb. digestible fat.

It will be noted that a ration of silage and alfalfa supplies more protein than necessary for 25 lbs. of 4 per cent milk and not quite as much carbohydrates or fat as the animal needs, but since protein will take the place of carbohydrates, the ration contains enough nutrients to produce 25 lbs. of 4 per cent milk.

There is no question when there is an abundance of grain at reasonable prices, that it pays to feed some when cows are producing 20 lbs. or more of milk per day, but when less than this is produced, it is very doubtful whether it pays to feed any concentrates when there is plenty of good silage and alfalfa at the farmer's command.

There is another point which we might consider. One acre of ground yielding four tons of alfalfa will support an animal with 16 lbs. a day for 500 days. In other words 1.37 acres of land on which is grown corn and alfalfa will produce enough feed to keep a cow 365 days; 1.37 acres of blue grass pasture supports an animal on the average but 78 days.

The severe drought of the past summer is not so long ago but that most of us remember the difficulty of supplying cows with succulent feed during that period, but farmers who had grown alfalfa and provided themselves with silage, did not notice the effects of the drought like those who were depending entirely upon pasture to feed their animals.

The question may be asked: Will cows do well if fed the entire year upon silage and alfalfa? To this it may be said that in experiments carried on by the Illinois Experiment Station cows fed entirely upon silage and alfalfa for a year were at the end of that itme in good physical condition and produced creditable yields of milk.

Cow No. 1 produced 8,735 lbs. of milk containing 351 lbs. of fat; she consumed 14,880 lbs. of silage and 1,672 lbs. of green crops and 6,396 lbs. of alfalfa. In other words for each 100 lbs. of milk produced she consumed 170 lbs. corn silage, 19 lbs. of green crops and 73 lbs. alfalfa hay. Cow No. 2 produced in one year 7,434 lbs. of milk containing 259 lbs. of fat. She ate 14,862 lbs. of silage, 1,612 lbs. green crops and 5,588 lbs. of alfalfa hay.

In comparing the relative value of timothy hay and alfalfa it was found that when milk was worth $1.30 per hundred and timothy hay valued at $10.00 per ton, that alfalfa was worth $20.86 per ton and gave a return per acre of $68.44 more than an acre of timothy.

In briefly summing up this subject, I can say:

First: There are no crops grown upon the farm more important to the dairy farmer than alfalfa and corn.

Second: Alfalfa will produce more digestible nutrients per acre than any other agricultural crop. A yield of 4 tons of alfalfa hay per acre produces 4,000 lbs. of digestible nutrients, 880 lbs. of which are digestible protein.

Third: Corn comes next to alfalfa in the production of nutrients for the cow. An acre yielding ten tons of green corn will produce 3,440 lbs. of digestible nutrients, 280 lbs. of which are digestible protein.

Fourth: No crops compliment each other better for feeding the dairy cow than silage and alfalfa. The silage furnishes succulence for the cow and a large amount of heat producing elements. Alfalfa provides the dry roughage; is rich in the element protein and mineral matter which are so important to the growing of animals and to cows producing milk.

In short: Alfalfa and silage have a productive feeding value that cannot be excelled by any other combination of roughage grown on the farm.

Fifth: When alfalfa is used properly in a rotation, it is beneficial to the soil but it is a mistaken idea to think that the alfalfa plant enriches the soil. It must be fed to live stock on the farm if the greatest value is to be obtained as a soil improver.

DISCUSSION.

A Member: How is alfalfa for horse feed?

Mr. Glover: Horses may be fed alfalfa in limited amounts. In the West, livery horses, work horses, both farm and city, receive alfalfa hay entirely. But if you attempt to feed them as much alfalfa as you do timothy, you are apt to have kidney trouble.

Mr. Goodrich: My oldest son's horses have had no other roughage than alfalfa for as much as ten years and their grain is corn, and now the horses have all the alfalfa they want to eat.

Mr. Everett: I don't like the way the growing of alfalfa has been left before the farmers in this convention. The farmers of Rock county want to know how to grow alfalfa. They are not going to Kansas for soils or into the quarries for lime. They can do it without cost, right on their own farms. You can tell them how to do it without sending away for any special preparation for inoculating the soil.

Mr. Glover: I did speak of sweet clover. Undoubtedly there is soil right here that will grow alfalfa without doing anything to it.

When I speak about adding lime to your soil, I assume that the soil is acid and acid soil needs lime. I have simply mentioned what must be done to put the soil in the right condition for growing alfalfa. You can't grow alfalfa on land unless it is inoculated. I will qualify that. If your land is very rich in nitrogen the plant will live on the nitrogen that is in the soil, but to force the alfalfa to receive its nitrogen from the soil is not wise. You want the plant to bring the nitrogen out of the air and enrich the soil. If your land is not already inoculated, and you have sweet clover in your neighborhood, I would advise you to put four or five hundred pounds on an acre and disk it in just before seeding. I would not take the chances of trying to get along without inoculation, and I would not take the chances of the soil being sour.

A Member: How deep do you have to dig with the shovel to get the inoculation?

Mr. Glover: You can go down a foot, but if you take off the first six inches it will be better.

Mr. Emery: I know of a farm where the soil is clay loam, it has been well fertilized by barnyard manure. The young man, in sowing timothy and clover, has mixed in from year to year a small amount of alfalfa seed. This year being very dry I have observed on this field of about fifteen acres where there was only one crop taken off, that, in the latter part of the season all over this field were alfalfa plants from a foot to a foot and a half high,—scattered plants, not enough

to make a crop, but it was uniform and those plants were green and vigorous. Now, if I have stated the facts correctly, would you infer that if that field were sown to alfalfa that a good crop should be expected?

Mr. Glover: You might get a good crop. The practice of adding a little seed with clover for a year or two before you seed it entirely to alfalfa is a good one. In that way you get your ground inoculated, because these seeds carry some nitrogen gathering bacteria.

Mr. Dougan: We are trying out a little experiment at my place. We sowed one strip that was inoculated and another that wasn't. On the strip that we did not inoculate we could not find a single nodule. not one,—while on that which we did inoculate we could not find a plant that was not inoculated. I am trying an experiment for the University. I have put on lots of cow manure and it is doing all right but I am sure the land needs phosphorus. We have plants about two feet high but there are no nodules on the roots.

A Member: Which one of the crops do you use for seed?

A Member: Where is the best seed to be obtained for our use here?

Mr. Glover: Seed for this latitude should be secured from people growing seed in this latitude and it is desirable not to use seed grown upon irrigated land. Montana seed would be good where it is grown without being irrigated.

A Member: In feeding alfalfa hay wouldn't that inoculate the manure?

Mr. Glover: Yes. They don't know exactly how long the inoculation will stay in the ground, but it is safe to say four or five years.

Mr. Everett: The alfalfa seed should be submitted in all cases to the Wisconsin Agricultural Station. They will examine it without expense.

Adjourned to meet at 1:30 P. M.

Met at 1:30 P. M. Friday, Nov.17, 1911.

President Griswold in the chair.

TUBERCULIN AND ITS USES.

PROF. E. G. HASTINGS, COLLEGE OF AGRICULTURE, MADISON, WIS.

The tuberculin test has been in practical use for twenty years. During this interval thousands of herds have been examined for tuberculosis, and the practical value of the test has been shown in freeing many of these herds from this disease. By the aid of the test, countries have been able not only to stop the spread of tuberculosis, but even to diminish the amount of this most important disease among their herds. The other methods which have been and are still used to some extent for the diagnosis of tuberculosis in cattle are of minor significance when compared with the tuberculin test. It would not be too much to say that without it we should be practically helpless against the spread of tuberculosis in cattle.

It would seem that during the twenty years the test has been in practical use all of the important points concerning its application should have been learned. It is very certain, however, that we have yet much to learn about it. Important information has been gained concerning it in the last few years, and it is to this that I should like to call your attention to-day.

The breeder and dairyman has often been led to believe that the tuberculin test is an infallible means by which he can detect the presence of the disease in his herd; that by its use he can remove every tubercular animal from the herd and no healthy animal. Experience has shown otherwise. A frequent experience has been somewhat as follows: A herd of cattle was tested, and a considerable number of the animals were found to be diseased. These were removed, the stable was thoroughly disinfected, and a retest made within three to six months, at which time but one or two animals might react to the test. Another test was made a year thereafter and possibly a considerable number of reacting animals was then found. At another test a year later, tuberculosis might still be found to be present in the herd. In many cases the farmer became discouraged because of such results. He felt that it was impossible to free his herd from this disease, and he abandoned the idea of ever being able to obtain a healthy herd from the diseased foundation. In the past the blame for such results has been laid on inefficient testing or on faulty barn disinfection. Another experience which has been frequently brought to the attention of the sanitary authorities has been that a herd was tested, the reacting animals all removed, and soon thereafter, for some reason or other, one of the supposed all

healthy animals was killed and on examination found to be tubercular. This again has caused a certain distrust of the tuberculin test. Again, cattle have been removed from herds on account of having reacted to the tuberculin test, and on slaughter the lesions of the disease have not been found in their bodies. These things indicate that the tuberculin test has certain limitations which should be recognized by everyone who is using the test. If these limitations are recognized, I feel very certain that all will be better satisfied than when the test is considered to have no limitations.

Tuberculin is an extract of a specific pathogenic organism, the tubercle bacillus. In tuberculin are contained certain specific products which when injected into the body of a tubercular animal produce certain disturbances. One of these disturbances is a thermal one, the tuberculin causing more or less of a temporary fever, and, since the temperature of an animal is a thing that can be easily measured, this thermal reaction is what is used to detect whether the tuberculin has had a disturbing effect upon the body of the animal or not.

A very curious phenomenon has been noted within the last few years. It has been found that if an animal, such as a guinea pig, is injected with a very small amount (one-fifth of a drop) of blood serum from a different kind of animal, for example, a horse, and about ten days later the same guinea pig is given a larger dose (about 5cc.) serious disturbances follow within a few moments. The quantity of blood serum first injected produced absolutely no harmful effect. It has, however, sensitized the guinea pig, as it is called, and when the larger amount of blood serum is injected, which in the case of a guinea pig that had not received the small sensitizing dose would be without effect, it produces serious illness, often terminating in death within a few moments. It is believed that the reaction of tuberculin is allied to this phenomenon. The animal is sensitized to the products of the tuberculin bacillus by the growth of the organism within the body. When these specific products are introduced, they produce more or less of an effect. If a series of guinea pigs is injected with blood serum and after a definite time the animals are again injected with a larger dose, certain differences will be noted. One animal may die within a short time, another may show signs of serious illness but may recover, while another will show that the second dose has had a much smaller effect upon it. The same thing is true in the case of the injection of tuberculin into tubercular animals. The extent of the thermal reaction in tubercular animals may vary from 0° to 6° or 7° F.

The normal temperature of cattle varies widely, not only between different animals, but in the same animal, from day to day and hour to

hour. The tuberculin test consists of a comparison of temperatures taken before the injection of the tuberculin with those taken after the injection of tuberculin. We thus obtain an insight into the thermal reaction that has been caused by the tuberculin.

Table I.

Highest temperature before inoculation.	Highest temperature after inoculation.	Reaction.	Result.
102.2	102.6	0.4°	Healthy.
101.8	102.8	1.0	Healthy.
102.6	104.2	1.6	Healthy.
102.2	103.4	1.2	Healthy.
101.6	104.	2.4	Healthy.
102.6	103.8	1.2	Healthy.
102.3	104.6	2.3	Diseased.
102.4	104.8	2.4	Diseased.
102.5	103.	0.5	Diseased.
102.0	104.2	2.2	Diseased.
103.6	103.8	0.2	Diseased.
102.0	103.6	1.6	Diseased.
102.0	104.	2.0	Diseased.
102.4	102.8	0.4	Diseased.

Various methods of interpreting these temperature records have been proposed. It will be evident to anyone that if too low a standard be taken as indicating a reaction to the tuberculin we will be getting within the limits of variation of temperature of the healthy animal, and if all the animals that react according to this standard are removed we will be taking out probably all the diseased animals of the herds and a certain number of healthy animals as well. If a high standard is adopted we will take out only a portion of the diseased animals, since the variation in temperature of some of the diseased animals will not be sufficient to reach the standard adopted. The difficulty of interpreting temperature records is shown in table I, in which the highest temperature before injection and also the highest temperature after injection of a number of cattle is given. This work was carried out on a herd for experimental purposes, and the entire herd was killed and examined carefully after the tests had been made. It will be noted that there are differences between the highest and lowest temperatures in the case of diseased animals that are practically duplicated by variations in the temperatures of healthy animals. For instance, the last animal given in the table has not reacted to an extent that would condemn her by any method of interpretation yet proposed; yet she is found diseased on slaughter. Animal No. 5, showing a temperature of 104° after inoculation and a reaction of 2.4°, would be condemned by any method of interpreting temperature records, and yet this animal was found to be healthy on post mortem examination.

A prominent eastern veterinarian in the handling of a large herd, which it was desired to put on a healthy basis, has removed every animal that showed temperatures in excess of 102.8° after the injection of tuberculin; 40% of whose maximum temperature fell between 102.8° and 103.5° have shown lesions of tuberculosis on slaughter. It is easy to see that if 104° had been the standard which had been adopted as indicating tuberculosis that a considerable number of diseased animals would have been left in this herd.

In Holland statistics have been gathered concerning the accuracy of the tuberculin test in the case of varying amounts of thermal reaction. It has been shown that in the case of animals that showed a maximum temperature after injection of 105.8° and above, but two per cent showed no lesions of tuberculosis on slaughter; in the case of cattle showing a reaction between 104° and 105.8°, sixteen per cent showed no lesions; between 103° and 104,° thirty-eight per cent showed no lesions; in the case of the animals that had temperatures less than 103° after injection fifty-four per cent showed no lesions on slaughter. The trouble is due to the fact that the injection of tuberculin causes no definite degree of thermal reaction in the case of a tubercular animal.

The variation in the time at which the reaction fever appears also differs widely. It usually is to be noted within ten to sixteen hours after the injection of tuberculin, but sometimes it appears much later. The fever usually persists for a short period of time. In the case of some tubercular animals, the fever may persist for 36 to 40 hours. These things render more difficult the interpretation of temperature records, since, in the case of a persistent fever, it is often thought that the fever must be due to some other cause than the tuberculin.

Another condition that complicates the testing of cattle for tuberculosis, and a condition that overlaps to some extent the one that has already been mentioned, is that in certain stages of the disease cattle do not react to tuberculin. There is always a considerable period between the time of infection and the period when the disease becomes established in the animal. This is known as the period of incubation. It is believed that it may in certain cases be two months in length. During this period animals do not react to the tuberculin.

As soon as infection occurs, a struggle ensues between the organism and the body of the animal and the protective agencies of the body of the animal are at once set to work. If the infection has not been too great, undoubtedly these often stop the spread of the disease before it has made any headway. Again, the disease may continue to constantly progress and may soon cause the death of the animal; or, after making a certain headway, the disease may go backward even to

the point of recovery or it may go backward to a certain degree, and there remain stationary until a temporary weakening of the animal through some cause or other enables it to gain headway again and to progress rapidly. These animals in which the disease has ceased to progress have been termed "ceased reactors" because it is believed that while the disease is dormant in the body of the animal it will not react to the test..

Table II.

May '05.	October '05.	September '06.	May '07.	October '07.	September '08.	Killed Oct. '08.
‡	‡	‡	‡	—	—	*
‡	‡	—	—	—	—	*
‡	‡	—	—	—	—	*
‡	‡	‡	—	—	—	*
‡	‡	—	—	—	—	0
‡	‡	—	—	—	‡	*
‡	‡	‡	—	—	‡	*

‡ = Reactors.
— = Non-reactors.
* Lesions.

In Table II are given some figures from Canadian experiments. It will be noted that in the first test which was made of these animals in May, 1905, all of them gave positive reactions. The same is true in October, while in September, 1906, four of the animals did not react. In May, 1907, but one of the animals reacted, while in October of the same year none reacted to the test. In September, 1908, the animals were again tested. Five did not react to the test and the remaining two gave positive reactions. The animals were all slaughtered in October, 1908, and lesions of tuberculosis were found in all cases except one, even though the animals had not reacted for three years previous to the time of slaughter. It is thus certain that the disease may remain dormant in the animal for at least three years and may then assume a progressive form.

Table III.

Date.	Animals tested.	Animals reacted.
July, 1904	96	31
January, 1905	65	8
July, 1905	57	15
January, 1905	42	15
July, 1906	27	3
January, 1907	24	2
July, 1907	22	1
January, 1908	21	1
August, 1908	20	1

Data along this line have been published by Dr. V. A. Moore of the Cornell Veterinary School. Those obtained from the study of a herd of cattle are given in Table III. A herd of 491 animals was tested and 96 did not react to the test. These non-reacting animals were removed and placed in quarters where there was no opportunity for infection to occur. Retests were made at intervals of six months with the results as shown. It will be seen that at each test one or more animals were found to be diseased, so that by the end of four years but 19 out of the original 96 had not reacted to the test. Possibly in certain cases the reactions were caused by reinfection from other animals in which the disease had progressed from the dormant stage to an open type between the successive tests. It is certain that a large part of the reactions obtained on the retests were due to the fact that at the time the previous tests were made the disease was in a dormant stage. Additional data might be presented along similar lines.

Such facts as these have led the live stock sanitarians to believe that the healthy herd, not the healthy individual animal, must be taken as the unit in fighting the spread of tuberculosis. This is emphasized in the report which was made last year by the commission appointed by the American Veterinary Association to study the subject of bovine tuberculosis, when they recommended that in the case of herds in which over 50% of the animals were found diseased on the first test the whole herd should be considered as diseased; that in the case of such herds it is not worth while to attempt to breed a healthy herd from this foundation by separating the herd into two parts—the reacting and the non-reacting animals—because a considerable portion of the non-reacting animals have the disease either in the incubation period or in a dormant form. In a herd of any size in which the disease has been present for any length of time, such animals are to be found, and their presence can only be detected by making frequent tests on the herd.

When the breeders realize the importance of this point in the spread of bovine tuberculosis, we shall not have a spectacle presented to us of a dispersion sale of a herd of pure bred animals in which shortly before the sale the tuberculin test showed 20% of the animals to be infected.

It seems to those best fitted to judge that if one wishes to be absolutely certain of purchasing a healthy animal he must buy his animals from herds that are known to be free from tuberculosis; that if he buys, even on the tuberculin test, from an infected herd he runs the chance of purchasing a diseased animal. In the case of herds that are not extensively diseased, in which but one or two reacting animals have

been found, conditions are very different, and it is a simple method to free such herds from tuberculosis.

The question which the breeder and dairyman must ask himself is; "Is the disease of bovine tuberculosis of sufficient sanitary and economic importance so that I can afford to fight it with a tool that has such limitations as the tuberculin test?" There is absolutely no doubt that the disease of bovine tuberculosis has a certain sanitary significance. It is believed that approximately 25% of tuberculosis in children under five years of age is due to infection from a bovine source.

It is impossible to present any figures that shall give a satisfactory picture of the economic importance of the disease. It has been estimated by the Bureau of Animal Industry of the U. S. Department of Agriculture that bovine tuberculosis costs this country $24,000,000.00 annually. It is very certain, however, that this is too low an estimate. If a farmer has a valuable dairy animal and he is forced to turn her off for beef because she loses the use of her udder through inflammation, he realizes that he has suffered an economic loss, a loss which is measured by the difference between what he obtained for her for beef and what she would have brought as a dairy animal. A large number of animals must be removed from our dairy herds on account of their having become unthrifty. These poor animals must be sold at a low value for beef. A large portion of these unthrifty animals are in this condition because they have tuberculosis in the advanced stages. It was recently asserted by a butcher who is killing for local consumption and whose supply comes largely from the dairy herds of the immediate locality that at least 50% of the animals slaughtered by him show lesions of tuberculosis. It seems quite probable that this same thing is true in many other sections of the country. In the case of tuberculosis the farmer fails to recognize the source of his loss. He thinks it is due to some inevitable condition, rather than to something which can be prevented.

It is believed by those best qualified to judge that the farmer should act in this manner: He should attempt to free his herd from tuberculosis, if it is already present therein, and to keep his herd free thereafter; and especially to keep it free if the disease is not yet present. It is believed that everyone who is interested in the breeding and handling of dairy cattle will be wise if he considers bovine tuberculosis as one of the most important sources of loss, and that he will be wise if he makes constant use of the tuberculin test, even though it has certain limitations.

DISCUSSION.

A Member: Professor, that first chart shows that the first and the last cow had the same temperature. Why did you condemn one cow and not the other?

Prof. Hastings: These animals were not condemned, the whole herd was slaughtered. The herd was all infected and the whole herd slaughtered. This last animal would always be looked upon as perfectly healthy from the standpoint of the tuberculin test. She may have been one of these animals that we call a ceased reactor, that is, where the disease is dormant in the system and the tuberculin did not cause any disturbance that we could detect, or she may be an animal in which the disease is progressing at the time the test is made, and the disturbance is not great enough to be detected.

A Member: Do you find many animals such as that one?

Prof. Hastings: It is absolutely impossible to collect figures on that except under such conditions as this, and yet we know they occur, for we get them in practical work now and then. Frequently a herd is tested and all reacting animals removed, and yet, an animal being killed afterwards for some reason, is found to be diseased. A farmer comes in and says, "I have had my herd tested. The test shows thus and so. I have been told if I tested my herd and took out the reacting animals it would all be over with, the rest would be all right." Of course some explanation must be advanced and often it is not very satisfactory because he has it firmly fixed in his mind that the tuberculin test is infallible.

A Member: Is it possible that if that cow had been given a double dose of tuberculin it would have been more satisfactory?

Prof. Hastings: Perhaps with such a cow it would; usually when an animal looks to be perfectly healthy we know of no reason why a double dose should be given.

A Member: How would you account for the fact that if a man had his cows tested and they proved all right, but a year later one should die; then he retests the herd and finds the remaining animals perfectly healthy.

Prof. Hastings: That first animal might have been in one or the other of the conditions I have mentioned. An animal may have become infected recently, you may test her and she does not react, and yet within a year from that time she may get into a diseased condition.

A Member: How could the disease be introduced where the herd has been tested and found perfectly healthy, before the retesting in a year?

Prof. Hastings: Conditions come in which you cannot understand. I tested a herd recently where that same thing happened; the fellow swore he had not bought a cow, had not fed mixed skim milk. He may have gotten it through infection from the factory. You cannot always explain these things.

A Member: Does the post-mortem always show that a cow has tuberculosis?

Prof. Hastings: Of course the best men may be fooled. We killed a cow at a farmer's course two years ago that we asserted at that time had tuberculosis, and when we examined her in the laboratory we found she did not have it at all. She had lumpy jaw.

A Member: Is any breed of cattle more susceptible to tuberculosis than another?

Prof. Hastings: I don't think so. It is simply a case of the cattle being brought into a place where they acquire the infection. Beef men like to say that dairy cattle are more delicate, and more likely to get it, but they all get it when they are exposed.

Mr. Glover: We would like to have Prof. Hastings state whether tuberculin in any way is injurious to animals.

Prof. Hastings: Not in the quantities that are ever used in the tuberculin test; it surely is not. It surely is not to the healthy animal, nor to the tuberculous animal either. If we would give a cow one hundred times the tuberculin that we do in the test, it is very liable to make the disease spread more rapidly, if she is tubercular.

Mr. Glover: It is not uncommon to hear that tuberculin causes tuberculosis.

Prof. Hastings: That is impossible, because the tuberculin does not contain any living germ of tuberculosis. It is not as likely to contain them as a globule of Rock river water, because we heat it up to the boiling point three or four hours; an instant is enough to destroy the tuberculin organism.

Besides the boiling, we put in half a per cent of carbolic acid, and that is enough to destroy the tuberculin organism.

Dead ones, like dead men, are pretty harmless.

Judge Rosa: Tuberculin, then, is a by-product of bacteria, rather than the bacteria itself?

Prof. Hastings: Yes.

A Member: Isn't it like any disease, in the air?

Prof. Hastings: No, you have to have infection. You can not have typhoid fever unless you get the organisms into your body. And it is the same thing with tuberculosis.

A Member: It is very susceptible to being killed if exposed to air and sunlight, is it not?

Prof. Hastings: Yes. You come into this room, and if material which contains the organism has been thrown on the floor, and we grind it into dust, we may breathe in the organism, but out in the open field we don't do that, because the opportunity for destroying it is too great.

Mr. Goodrich: Does the modern barn as built nowadays have a tendency to create disease among animals more than the old-fashioned way of having them around a straw stack in a shed.

Prof. Hastings: Well, personally I don't think it has. If we have what we sometimes call a modern barn, one that is air-tight, I have no doubt, but what it tends to weaken the animal. If we have the really modern barn I think it is a good deal better for the cattle than if they ran around the straw stack.

Prof. Hastings: I don't think there is any doubt about that. I read about a creamery where a fellow had a two-inch pipe for a ventilator and he thought that was a fine idea. He could not get air through that to ventilate a henhouse with one hen in it.

Mr. Glover: It might be added here, that no matter how well the barn is ventilated and lighted, if there are diseased animals in a herd the healthy cows next to them are apt to get the disease. But where the barn is well ventilated and lighted, the chance of spreading the disease is less than in the poorly ventilated and lighted barn. It may be said, that in the poorly ventilated and lighted barn there is no danger of an animal getting tuberculosis, unless the germ is present. There is no such thing as spontaneous generation of life. On the other hand, in a good lighted and well ventilated barn there is danger of spreading tuberculosis if the tubercular germ is present, but not as much danger as in the poorly lighted barn.

Prof. Hastings: The disease spreads out-of-doors. It used to be asserted that it was not found among our range cattle, among cows kept outside, but it does spread among them with wonderful rapidity for the reason of their contact, and the habit of licking one another. If you have a tuberculous cow, and another cow comes along and licks her, there is an opportunity for it to spread no matter under what conditions the cattle are kept.

The Auditing Committee submitted the following report, which was adopted:

Beloit, Wis., Nov. 17, '11.

Wisconsin Dairymen's Association,

Gentlemen:—Your auditing committee has gone over the accounts and examined the books and found them correct to date.

H. C. SEARLES,
ROY HARRIS,
EDWARD SALMON,
Auditing Committee.

REPORT ON COW JUDGING CONTEST

A new feature was introduced in the convention this year. About eighty boys, the large majority of them farmers' sons, took part in the Boys' Cow Judging Contest. Mr. F. H. Scribner of the Dairy Division lectured to these young men on Thursday morning, describing some of the fundamental points of a dairy cow. The next day the judging took place in a large barn. Everyone of these young men was very much interested in this work, and we believe that the lessons they received there will never be forgotten.

Mr. Scribner: Well, we had lots of fun in looking over the boy's papers, and even more fun in looking over the men's papers. I tell you some of those boys are pretty wide awake fellows. Of course these boys are all strangers to us. In the test for boys Frank Eddy has first place; that is, he did the best placing of the animals, although his reasons were not quite as good as they might have been. Robert Plumb takes second place. His reasons were splendid. It was remarkable to me how well he had remembered what we had told him. I will read you his reasons.

FIRST.

I placed D first because there were so many good points about her. She had a wide nose, large nostrils, bright eyes, wide head, a big barrel, a straight back. She was long between her hip and pin bones. Her udder covered much space on her body. It was square and the teats were large and well placed. When I felt of her milk veins I made my decision. They were large, soft, very crooked and the milk wells were larger than on any of the other cows. Her hip bones are wide. The pin bones are wide and nearly on a level with the hip bones. She is not so fat but what there is room between her hams for a large bag.

SECOND.

I didn't think A was as good as D because her milk veins were not large or crooked and her bag did not hang as well. She was a well built cow in most every respect; big barrel, a good looking head, wedge shaped shoulders and a good heart cavity, a straight back and backbone free from meat. Her hair laid flat.

THIRD.

I placed B under A because she did not have the working capacity that A has. She is a well shaped cow, with a wide nose, large nostrils, thin neck, thin at top of her shoulders. Her backbone is free from meat. She has a good bag, with teats well placed. Her thin hams give room for the udder. Her milk veins were not as large or crooked as those on A.

FOURTH.

I have placed E under B because of her poor bag and small teats. She would be a hard milker. Her barrel was not as large as B's. She had a good head but her nose was not as wide as B's. Her back was not as straight as B's but it was quite free from meat.

Mr. Everett: That boy is a coming president of the Dairymen's Association.

The Chairman: We have had lectures from professors, talks from men in different walks of life while we have been here, and we have with us now a man fresh from the farm, who is, with his own hands, working on the farm and making good on a farm not so very far from here, Milton Junction. Mr. Kammer will tell you what he is doing on his little farm.

MY METHODS OF DAIRY FARMING, OR ANOTHER YEAR'S EXPERIENCE.

By Wm. Kammer, Milton Junction.

Ladies and Gentlemen:—

I started farming 9 years ago this coming March. I never farmed it before, and so I had to learn everything about it and to learn it I subscribed for a good farm paper from which I learned what I know. I have nearly 40 acres. I want to keep all the cows my farm will feed. The first two years I could not make my cows do as well as I thought

they ought to do. I then subscribed for Hoard's Dairyman which taught me how to take care of cows. At first I had some pasture for my cows but it wouldn't keep my cows in feed all summer and land being very high I considered it very dear feed. I then tried to raise the feed and feed it to my cows in the yard all summer, but I found that I could not have feed at all times for my cows in the summer. I read a good deal in the papers about silos and alfalfa and I built a silo 14x28 and sowed some alfalfa. Then I could feed my cows all right.

I keep thirteen milch cows and one bull and six calves. I have three horses and about 100 chickens. For cash crops I raise three or four acres of sugar beets for the sugar factory, two acres of early potatoes and some rutabagas and late potatoes enough for our own use, and the rest of the land in alfalfa and corn. I raise these crops because I can have feed for my cows from the same land the same year. The sugar beets leave the tops and the early potatoes can be harvested early enough to plant the land to corn. Then how I feed my cows in summer, after the corn is put in the silo, I fit up some of the land and sow it to rye which will make early feed in spring. Then in the spring as early as possible I sow oats and peas on the land which had sugar beets the year before. That makes very good feed for my cows. After the oats and peas are off I have sown rutabagas and if the weather isn't favorable I sow it to millet or corn. In that way I have plenty of feed with my alfalfa and silage all summer. I take good care of my cows, handle them gently and raise my calves as well as I know how. I want them to grow big and strong.

I always fattened about twenty hogs every year except this last year when corn was too high in price to make money in hogs. I feed my skim milk to my calves and the rest to my cows. I manage to have my cows all come fresh in the fall. I can take care of them better in that way. I have a good warm barn with the King ventilation system and plenty of windows.

DISCUSSION.

Mr. Glover: Mr. Kammer, what kind of corn do you plant for your silo?

Mr. Kammer: I generally put the corn in early for my silo, and I have the kind of early strawberry corn, mixed red and white. Sometimes I use flint corn, but I like the other better. I like my corn to ripen so there will be something to it. I don't like immature stuff.

Mr. Glover: Do you think flint corn is good for silage?

Mr. Kammer: It is all right; it makes fine feed, but not enough of it. I like something that will grow a great big stalk and fill up the silo.

A Member: What do you get out of your cows, approximately, your returns per year?

Mr. Kammer: They will average me anyway $90 apiece.

A Member: How much butter fat?

Mr. Kammer: Why, we have three and four hundred pounds from some of them.

A Member: What do you do with your milk?

Mr. Kammer: I separate it and send the cream to the creamery.

Member: Your herd averages better than three hundred pounds of fat then.

Mr. Kammer: They average about three hundred and fifty or three hundred and seventy-five.

A Member: What breed is your herd?

Mr. Kammer: Jerseys. I have two full blood heifers and a full blood bull. I have some good grade cows.

The Chairman: Then you get eleven or twelve hundred dollars out of your herd?

Mr. Kammer: Yes, I do. Sixteen hundred dollars from nine cows year before last.

A Member: Do you have any success growing alfalfa?

Mr. Kammer: Yes, very good.

A Member: How do you prepare the ground and how much seed?

Mr. Kammer: I work it up as good as I can, plow in the fall, good and deep, eight or ten inches. I have three horses, but one is an old horse, and I put them all on and I got a little plow and it is all my horses can do to work that so deep that way. It makes a small furrow but pretty good work. I fertilize it up in the spring good, both ways, work it as much as I can, and then sow about twenty to twenty-five pounds of seed to the acre.

A Member: When do you sow it?

Mr. Kammer: As early as I can get it on the land. The earlier the better. I always had the best luck when I sowed real early. I sow it with oats, but I cut them for hay when they are in the milk. I don't raise any grain at all. I don't like to thrash. If I raise four or five acres of grain it costs me just as much as if I had a lot, and it takes me all summer to change work with my neighbors for that little bit and I quit that.

Judge Rosa: How much do you get out of your farm?

Mr. Kammer: Oh, I don't know. Somewhere along nearly three thousand dollars, all right.

Judge Rosa: Off thirty acres?

Mr. Kammer: Yes.

A Member: In hot weather during the summer, do you keep your cows in the barn or out in the yard?

Mr. Kammer: I have a shed in the yard. They stay under that, and if it is bad I put them in the barn. I put gunny-sacks on the windows to make it dark. I got a nice barn, a warm barn, well ventilated with the King system of ventilation, plenty of windows.

A Member: In this cold weather do you keep them in the barn all the time?

Mr. Kammer: Always: Only let them out to drink. I give them a drink of water after they get through eating in the morning, then about four o'clock I feed and milk them and after milking I let them out again.

A Member: Do you do that on a real cold day?

Mr. Kammer: Always, except in real stormy weather.

A Member: Do you cut your rye or pasture it?

Mr. Kammer: Last year I cut it, but I like pasturing better. I tried cutting it last year to see if I could make it better that way. It seemed to me they ruined so much when they pastured it, but I got better returns when I pastured it.

A Member: When you pasture your rye and it is wet weather, don't you think it spoils your land, the cattle walking on it?

Mr. Kammer: No, I never see any difference. I sow the rye awful thick, two bushels to the acre, and there is a regular sod there. Around August and the first part of September, the rye gets an awful start.

A Member: If you seed your alfalfa with rye, does not the feeding of it destroy the seeding?

Mr. Kammer: I don't sow anything in that.

Judge Rosa: The alfalfa is the only hay you have.

Mr. Kammer: That is all I have. I wouldn't have anything else.

A Member: Have you ever had your cows tested?

Mr. Kammer: Yes, last winter, and one reacted.

A Member: What did you do?

Mr. Kammer: I kept her in a separate place. It was a three-year-old. I kept her in a box stall with the horses, and in six months tested her again and she reacted again, and I sent her away.

A Member: Do you belong to a test association, that tests for butter fat?

Mr. Kammer: Yes.

The Chairman: That testing association has been a help to you, has it?

Mr. Kammer: Yes, it is an awful good thing. I could do the testing myself, but don't do it half the time. You miss three or four times or even twice in a year it is no good; that is the trouble.

A Member: How many cows do you think you can keep on that thirty acres?

Mr. Kammer: I think I can keep twenty. I have room for sixteen in my barn and I raise all the young stock every year.

A Member: Could you have told which your best cows were if you had not had the test?

Mr. Kammer: No, I could not. Sometimes a cow gives an awful lot of milk and if you didn't test her you would not know a thing about her. Three years ago the butter maker showed me how to test, and I went down there and I had one cow that gave 11,000 pounds of milk that year, and she tested 3.8. Not bad, you know, but I found there were others that didn't give as much and that beat her.

A Member: What would you call a bad cow?

Mr. Kammer: I don't like to have them give less than 300 pounds of butter fat. I would like to have cows that give 500 pounds of butter fat, that is what I am working for, and I think I will get them. I don't think it is hard to get them. I have gained every year now, so far.

A Member: Do you gain on the same cows?

Mr. Kammer: Yes. That cow that tested 3.8, she has a heifer now that tests over 5 all the time.

A Member: You can't improve the same cow?

Mr. Kammer: Oh, no, they stay the same. They give me more milk if I feed them good, but I can't get the test better.

A Member: Did you have any silage saved for summer feed?

Mr. Kammer: I always had plenty for summer all through. That silage just about runs me through.

A Member: Did you just feed silage and alfalfa?

Mr. Kammer: I feed them mornings and nights silage and I have lots of roots; I feed them carrots and sugar beets. I feed them a few roots after the silage, and then they get corn fodder whatever they eat up clean, and then at night I give them silage and hay. I give them about four pounds of bran, just now, a day.

A Member: Do you feed largely of bran during the winter time?

Mr. Kammer: Well, a good deal. Just now I am feeding hay. I had bad luck this year. It grew moldy; I had to put it in pretty green. My corn didn't come up until sometime in August and I thought it wouldn't make much of a crop. I worked it up well, run over with my wheel barrow seeder and sowed it again with millet and got a nice crop off it.

A Member: Didn't you have trouble curing it?

Mr. Kammer: Yes, awful, but I had hay caps. I set it up in pretty good piles and throwed them over, and it snowed and rained on it and everything else, but it never affected it any. It was quite green when I hauled it in. I stored it in the barn and fed it off all right.

A Member. Do you save your hay under hay caps?

Mr. Kammer: All my alfalfa. You wouldn't think that a little piece of cloth would save a pile of hay that way. Mine are a little too small.

A Member: Don't the rain go through them?

Mr. Kammer: No. The last crop of alfalfa I made, we had an awfully heavy rain and it came out perfectly dry and nice. Some of it that didn't have any caps came out pretty well soaked.

A Member: How did you leave it lying under those caps?

Mr. Kammer: It is according to the weather. If it is good weather three or four days is enough. Just turn it over and haul in.

A Member: After you turn it over you don't need the hay caps again?

Mr. Kammer: No, I haul it in as fast as I turn it over. If the sun dries it off too much the leaves fall off. I like to get it when it is a little moist, soft, like. You can cure alfalfa hay a great deal easier than you can clover, I always think.

A Member: Did you ever have any trouble keeping your silage in the summer?

Mr. Kammer: No, never had any trouble.

Mr. Glover: We have the young men who were fortunate enough to win in the Cow Judging Contest. We are all well pleased with the way the boys took hold of this work and we would like to have these young men step forward so this crowd can see them, and we shall be glad to remember them in a more substantial way when our treasurer gets home. I wish on behalf of the Wisconsin Dairymen's Association to congratulate you all.

A Member: Are these practical farm boys?

Mr. Glover: The boy that won first is a farm boy.

Now, we want the men in the aged judging contest to come forward. Mr. Nelson is first and we would like a speech from him.

Mr. Nelson: I just put the cows down, that was all. I couldn't make a speech.

Mr. Scribner: What were your reasons for placing the first cow first? Why did you think she was a better cow than any other cow in that ring?

Mr. Nelson: Because her physical development showed her strong constitution. She had a large barrel to hold and assimilate her feed and she had a good head, good countenance, broad muzzle, bright eye,

full forehead, and her udder well placed. Teats well placed on her udder. Generally a fine contour to my idea.

Mr. Scribner: If she had been fresh there would have been no question at all in your mind?—There was none as it was?

Mr. Nelson: Not in the least.

The Chariman: This closes our program. We are glad to have met you, we are glad to have seen and known you, and had this social time together, and we hope that it has been of some use and some profit to you.

Now, we will stand adjourned.

SECRETARY'S REPORT FOR 1911.

To the President and Members of the Wisconsin Dairymen's Association:

I have the honor to submit the following report of the expenditures concerning the period from adjournment of our convention at Neenah, February 8, 9 and 10, 1911, to the present time.

Convention expenses		$ 323.22
H. C. Searles, Superintending Cow Testing Association. Salary	$900.00	
Expenses	742.03	1,642.03
Creamery Package Mfg. Co. Supplies		137.96
Traveling and sundry expenses of testers		
C. E. M. Beyries	$ 1.70	
John H. Clark	2.00	
Nelson H. Ouimette	13.83	17.83
Walter Dombrak, supplies		3.60
H. K. Loomis, stamps		.50
W. D. Hoard & Sons Company, printing		78.90
Secretary,		
Salary	$250.00	
Office, expenses	9.84	259.84
Total		$2,463.48

Respectfully submitted,

A. J. GLOVER.

TREASURER'S REPORT.

Mr. President and Members of the Association:

The following itemized report is made showing the source from which all moneys paid into the treasurer's hands were received and the disbursements paid on orders from the Secretary which I hold as vouchers.

Receipts.

1911.		
Feb. 11	Balance in hands of treasurer	$705 89
	Memberships	201 00
Mar. 16	From state treasurer	1,000 00
Aug. 5	From state treasurer	1,000 00
		$2,906 89

Disbursements.

Feb. 11	F. H. Scribner, taking cow census	$49 56
	H. K. Loomis, hotel bills, Neenah	50 00
	H. K. Loomis, convention expenses	8 14
	W. A. Clark, convention expenses	9 72
	C. P. Goodrich, convention expenses	3 95
	A. J. Glover, convention expenses	4 69
25	H. C. Griswold, convention expenses	8 66
	H. C. Everett, convention expenses	6 12
	R. M. Reynolds, convention expenses	14 25
	Andrew Boss, convention expenses	15 46
	E. H. Farrington, convention exp	4 56
	M. L. Wells, convention expenses	1 50
	Wm. Kammer, convention expenses	4 55
	C. E. Beyries, convention exp	1 70
Mar. 6	H. C. Searles, salary and expenses	169 79
9	Mrs. A. L. Kelly, reporter	128 00
15	H. K. Loomis, postage	50
Apr. 13	H. C. Searles, salary and expenses	198 99
	Cornish, Curtis & Green, supplies	78 15
May 6	H. C. Searles, salary and expenses	181 31
	Fargo Creamery Co., supplies	7 55
	Creamery Package Co., supplies	21 10
June 12	H. C. Searles, salary and expenses	186 39
	Creamery Package Co., supplies	5 16
	John H. Clark, repairs on tester	2 00
	Roy T. Harris, expenses attending Neenah convention	5 06
July 5	H. C. Searles, salary and expenses	187 02
	Creamery Package Co., supplies	4 30
Aug. 5	W. D. Hoard Co., printing	18 25
	H. C. Searles, salary and expenses	177 32
	Creamery Package Co., supplies	1 05
	Creamery Package Co., supplies	6 80

Sept. 9	W. D. Hoard Co., printing.....	60 65	
	Nelson H. Quimette, traveling exp..	6 97	
	H. C. Searles, salary and expenses..	187 06	
Oct. 4	H. C. Searles, salary and expenses..	176 51	
	Creamery Package Co., supplies....	7 35	
8	Nelson Ouimette	3 64	
Nov. 6	H. C. Searles, salary and expenses..	177 64	
10	Creamery Package Co., supplies....	6 50	
	Nelson H. Ouimette, traveling exp..	3 22	
	Walter Dombrak, supplies.....	3 60	
20	A. J. Glover, salary and office exp...	259 84	
Dec. 5	A. D. DeLand, expenses attending Neenah convention	3 00	
	Balance in hands of treasurer.....	440 31	
			$2,906 89

H. K. LOOMIS.