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G. H. GURLER, DEKALB

One of the Leading Creamerymen of Illinois, Director of Illinois
State Dairymen's Association and President of the
Association for Five Terms.

Twenty-Seventh Annual Report

of the Illinois State Dairymen's Association



*Convention held at Aurora, Illinois,
January 8th, 9th and 10th, 1901.*

Compiled by GEO. CAVEN, Secretary.

Stenographic Report by Miss E. Emma Newman.

LETTER OF TRANSMITTAL.

Office of Secretary

Illinois State Dairymen's Association.

Chicago, Ill., 1901.

To His Excellency Richard Yates, Governor of the State of Illinois:

I have the honor to submit the official report of the Illinois State Dairymen's Association, containing the addresses, papers, and discussions at its twenty-seventh annual meeting, held at Aurora, Illinois, Jan. 8, 9, and 10, 1901.

Respectfully,

GEO. CAVEN, Secretary.

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LIST OF OFFICERS, 1901.

President—

JOSEPH NEWMAN, Elgin.

Vice President—

J. R. BIDDULPH, Providence.

Directors—

GEO. H. GURLER, DeKalb.

JOSEPH NEWMAN, Elgin.

F. A. CARR, Aurora.

JOHN STEWART, Elburn.

IRVING NOWLAN, Toulon.

R. R. MURPHY, Garden Plain.

J. R. BIDDULPH, Providence.

Treasurer—

H. H. HOPKINS, Hinckley.

Secretary—

GEO. CAVEN, Chicago.

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By-Laws of the Illinois State Dairymen's Association.

OFFICERS.

Section 1. The officers of this Association shall consist of a President, Vice President, Secretary, Treasurer, and Board of Directors, composed of seven members, of whom the President and Vice President of the Association shall be members and the President ex-officio Chairman.

DUTIES OF PRESIDENT.

Sec. 2. The President shall preside at the meetings of the Association and of the Board of Directors. It shall be his duty, together with the Secretary and Board of Directors, to arrange a program and order of business for each regular annual meeting of the Association and of the Board of Directors, and upon the written request of five members of the Association it shall be his duty to call such special meetings. It shall be his further duty to call on the State Auditor of Public Accounts for his warrant on the State Treasurer, for the annual sum appropriated by the Legislature for the use of this Association, present the warrant to the Treasurer for payment and on receiving the money receipt for the same, which he shall pay over to the Treasurer of the Association, taking his receipt therefor.

DUTIES OF THE VICE PRESIDENT.

Sec. 3. In the absence of the President his duties shall devolve upon the Vice President.

DUTIES OF THE SECRETARY.

Sec. 4. The Secretary shall record the proceedings of the Association and of the Board of Directors. He shall keep a list of the members, collect all the moneys due the Association (other than the legislative appropriations), and shall record the amount with name and postoffice address of the person so paying, in a book to be kept for that purpose. He shall pay over all such moneys to the Treasurer, taking his receipt therefor. It shall also be his duty to assist in making the program for the annual meeting and at the close of the said meeting compile and prepare for publication all papers, essays, discussions, and other matter worthy of publication, at the earliest day possible, and shall perform such other duties pertaining to his office as shall be necessary.

DUTIES OF THE TREASURER.

Sec. 5. The Treasurer shall, before entering on the duties of his office, give a good and sufficient bond to the Directors of the Association, with one or more sureties, to be approved by the Board of Directors, which bond shall be conditioned for a faithful performance of the duties of his office. He shall account to the Association for all moneys received by him by virtue of said office and pay over the same as he shall be directed by the Board of Directors. No moneys shall be paid out by the Treasurer except upon an order from the Board, signed by the President and countersigned by the Secretary. The books of account of the Treasurer shall at all times be open to the inspection of the members of the Board of Directors, and he shall, at the expiration of his term of office, make a report to the Association of the conditions of its finances, and deliver to his successor the books of account together with all moneys and other property of the Association in his possession or custody.

DUTIES OF THE BOARD OF DIRECTORS.

Sec. 6. The Board of Directors shall have the general management and control of the property and affairs of the Association, subject to the By-Laws.

Four members of the Board shall constitute a quorum to do business.

The Board of Directors may adopt such rules and regulations as they shall deem advisable for their government, and may appoint such committees as they shall consider desirable.

They shall also make a biennial report to the Governor of the State of the expenditures of the money appropriated to the Association by the Legislature.

It shall be their further duty to decide the location, fix the date, and procure the place for holding the annual meeting of the Association, and arrange the program and order of business for the same.

ELECTION OF OFFICERS.

Sec. 7. The President, Vice President, and Board of Directors shall be elected annually by ballot at the first annual meeting of the Association.

The Treasurer and Secretary shall be elected by the Board of Directors.

The officers of the Association shall retain their offices until their successors are chosen and qualify.

A plurality vote shall elect.

Vacancies occurring shall be filled by the Board of Directors until the following annual election.

MEMBERSHIP.

Sec. 8. Any person may become a member of this Association by paying the Treasurer such membership fee as shall from time to time be prescribed by the Board of Directors.

QUORUM.

Sec. 9. Seven members of the Association shall constitute a quorum for the transaction of business, but a less number may adjourn.

ANNUAL ASSESSMENT.

Sec. 10. One month prior to the annual meeting in each year the Board of Directors shall fix the amount, if any which may be necessary to be paid by each member of the Association as an annual due.

Notice of such action must be sent to each member within ten days thereafter, and no member in default in payment thereof shall be entitled to the privileges of the Association.

AMENDMENT OF BY-LAWS.

Sec. 11. These By-Laws may be amended at any annual meeting by a vote of not less than two-thirds of the members present. Notice of the proposed amendment must be given in writing, and at a public meeting of the Association, at least one day before any action can be taken thereon.

PROCEEDINGS

OF THE

Twenty-Seventh Annual Meeting

OF THE

Illinois State Dairymen's Association

Held at Aurora, Ill., January 8, 9 and 10, 1901.

The Illinois State Dairymen's Association met in annual session in Sweet's Academy at Aurora January 8th, 1901, at 10 o'clock a. m.

President George H. Gurler in the chair.

I dislike to open the meeting with such a small attendance, but as long as we have a full program for this afternoon I guess we better commence. We will now listen to a prayer by Rev. O'Neil.

PRAYER.

REV. MR. O'NEIL.

Almighty, Ever Living God, because we believe in Thee, and that Thou art interested in men and dost condescend to take part in their affairs, we now call upon Thee for Thy blessing.

We thank Thee for Thy love; we thank Thee for the evidences of Thy love that Thou hast given us. We thank Thee for life, and health and home and country. We thank Thee for law and agency, and the manifold gifts of sunshine, rain, and of the seasons—for all that Thou hast bestowed upon us.

We are not unmindful of these past blessings, when we ask Thee to be still our guide. We are tempted men and tried and disappointed and discouraged and thwarted, and we ask Thy blessing. We have responsibilities to meet and duties to perform and obligations to discharge, and we ask Thy blessing.

We need sobriety and honesty and charity and wisdom and tact, and we ask Thy blessing.

Most Gracious Lord overshadow especially this Association. Be with the President and officers and every member. We ask Thee that Thou wilt remember the masses, the great mass of the citizens whom they represent. Remember with Thy favor their families; guide them in safety to their homes; in all our affairs let Thy will be done here as in heaven.

And now we pray that Thou wilt forgive us our tresspasses as we forgive those who trespass against us in the spirit of Jesus Christ. Amen.

ADDRESS OF WELCOME.

MAYOR HOWARD.

Mr. President, Visiting Delegates and Fellow Citizens:

I am sorry for the Association's interest that there are so few present at this time, because you all know that in numbers there is enthusiasm; in unity strength, and in opening this meeting this morning, if you had a full attendance, you would certainly go into the duties of the occasion with more interest, probably accomplish better results.

The conditions are such, the trains may be late, but I hope and trust that your future meetings will be well attended and great good accomplished to the interest of the State of Illinois.

I am not very well acquainted with the dairy interests, but I am a lover of good butter and milk, yet I am not what you call a farmer, nor am I very much interested in farming work only to such an extent as I

come in contact with the men who are interested in those things. For that reason I could give no interesting or beneficial speech, so will not bother you, but will let you get ready for the other meetings of the occasion, and I hope, Mr. President, that in your future gatherings that you will please mention, at one time or another, that the City of Aurora, the people, and myself bid you all a most cordial welcome and hope that their stay will be pleasant and prosperous with us. I thank you.

RESPONSE TO ADDRESS OF WELCOME.

SECRETARY GEORGE CAVEN.

Mr. President, Gentlemen:

In my work as Secretary of the Association it was largely my duty to prepare the program for this meeting, but I can honestly say that it was not a part of my plan that I should respond to Mayor Howard's address of welcome.

However, I am probably better acquainted with the spirit of welcome in Aurora to this convention than any other member, for the reason that I have spent numerous Saturday afternoons in preparation for this meeting, and have had the assistance of several of the citizens here who are directly interested in dairying. They have given their time and their work, and given it willingly and freely with the hope of making this meeting a success. But we have not had to ask assistance from men alone interested in dairying, but from leading merchants and officers of prominent corporations, and every request has been immediately granted. Indeed, those to whom we have gone for favors have appeared to be glad that we came to them and asked them for some favor in connection with this convention. Therefore, I know when Mayor Howard says we are welcome here in Aurora he not only speaks his own sentiments, but the sentiments of the citi-

zens of Aurora. I know, too, that he means when he says we are welcome here, that we are welcome to do what any other good citizen can do under the ordinances, and if it should happen that something would be done that might be not exactly what a citizen would do at home, I expect Mayor Howard would be exceptionally lenient.

We hope to make this convention a success and from all of the reports and inquiries that were had during the time of preparation, we conclude that this certainly would be as well attended as our convention was last year, and it was the largest we have had for a good many years.

The exhibit of butter is large and representative and is almost up to what it was last year. Although this morning's start is a little discouraging, still we did not expect very many in for the first session and we think surely that we are to have good crowded sessions beginning with this afternoon's meeting. Certainly we have a program that ought to attract the attention of all interested in dairying, and the evening session will be especially attractive to the citizens who may not feel any particular or direct interest in the dairy industry.

In reply to the Mayor's welcome, I wish in turn to just say that we welcome the public here; our meetings are free and open, and we hope to have such a convention that when it is over, the good we have done the dairying industry in this vicinity will be felt long after the convention is closed. I thank you.

By the President: I will now appoint a committee on resolutions:

Mr. M. H. Thompson of Elgin, chairman.

C. S. Kilbourne, Aurora.

George Caven, Chicago.

M. Long, Woodstock.

H. B. Gurler, DeKalb.

Moved to adjourn.

Adjourned until 1:30 p. m.

PRESIDENT'S ANNUAL ADDRESS.

G. H. GURLER, DE KALB.

Ladies and Geneltmen and Members of the Illinois State Dairymen's Association:

We have assembled in this, the beautiful city of Aurora, to hold the twenty-seventh annual meeting of the Illinois State Dairymen's Association.

We meet as it is, in the Fox River Valley, in the Elgin district, in the heart of the best dairy country in America.

You will bear me out in this statement, when I say that the Elgin market price for butter practically rules the price of butter for the United States.

And were it not for the nutritious grasses and feeds the soil produces, and the most excellent water that abounds in this locality the make of butter in the Elgin district would not be superior to butter made in other sections of this country, and could not control the price as it now does.

The valuation of the butter made in Elgin district reaches into the millions yearly.

The Illinois State Dairymen's Association embraces representatives of all branches of the dairy industry from the breeding and raising of the calf to the making and selling of the butter.

We have on our program for this meeting the very best talent in the different branches of the industry that this country affords. Men not only of State, but of National reputation. Dairymen in this locality can ill afford to miss this meeting.

The program has been arranged so as to have the subjects that were thought would most interest the dairymen at the time the dairymen could be present, as far as possible. The officers of this Association un-

derstand that it is impossible for a majority of the dairymen to get here early in the morning, or, that they must leave early in the afternoon.

The poultry business has been recognized on this program. The officers have been criticized for having papers on poultry, but still think it advisable to have a short paper and discussion on poultry. The magnitude of this business will astonish every one who is not informed on the subject. Butter and cheese makers have also been recognized on the program. It would please me to see a larger attendance of the butter and cheese makers present than at our previous meetings. I hope that each and every one of them will avail himself of this opportunity to attend.

Let us have free discussions on all subjects when an opportunity is given, much good comes from discussions; points are brought out which are overlooked by the speakers; many times ideas are exchanged which are of value to the audience. Let us all feel at home at this meeting, ask any and all questions that we see fit and derive the most benefit possible from the meeting.

The Illinois State Dairymen's Association meetings have been a success in the past—allowing me to be the judge. Much good has been derived from them. The State has been very liberal in its appropriations for this Association, for which we are grateful. We have 3,000 reports of our meetings published and distributed throughout the State.

We have become better acquainted with the directors of the State Farmer's Institute, and through them a large number of our reports have been placed in the hands of the farmers who would read and profit by them.

The glorious State of Illinois is a large one. The directors of this Association have held its meetings in the different parts of the State as they thought would do the most good, and receive the proper recognition from the State in the future as they have in the past.

There were 232 memberships last year. The greatest number in the history of the Association. We had the largest attendance of farmers at our last meeting that I have ever seen at a Dairy Association meeting

I hope that we may have equally as many at this meeting. Aurora is a railroad center; farmers can get here from every direction. This is a thickly settled dairy country and should support a State Dairy Association meeting.

Everyone that becomes a member will receive a report of this meeting when published, that will be well worth the price of membership, \$1.00, and also be helping the Association to defray expenses.

A large number of programs have been distributed through the State. I assume that the farmers have looked them over and selected the days to attend, when the subjects that will most interest them will be on the program. I don't consider that any farmer within the reach of this city can afford to miss this meeting. I hope that all the seats in this hall will be filled each session.

We have a large exhibit of butter and cheese in connection with this meeting. Those exhibiting the best in their various classes receive prizes. This tends to enlighten the manufacturers of the dairy products. The Elgin Board of Trade medal is a prize well worth working for, and whoever is fortunate enough to win it should be, and doubtless will, be proud of it.

I think that these exhibits should be encouraged. Illinois takes the lead in butter, and we must keep to the front in the art of butter making to hold the reputation we now have on Elgin butter.

This Association has given the manufacturers of dairy machinery supplies an opportunity for exhibiting their wares. The space now required for that exhibit takes the largest hall obtainable in the city where our meeting is held. The Dairy Association would hardly think that they could hold a meeting without an exhibit of dairy machinery of different makes and kinds that are used in the manufacture of dairy products. Butter color, salts, etc., should not be overlooked in this exhibit. These exhibits attract the attention of a large percentage of the people who attend the meetings.

The exhibits are made in the interests of the exhibitors and they expect to receive a recompense in a direct or indirect way for their time

and expense of the exhibit. I am quite in favor of encouraging the exhibitors at our State Dairy Association meetings so that the Dairymen that attend these meetings can see the latest improved machinery in the dairy line, in connection with the dairy meeting, which a majority of them would never see, were they not exhibited at the State Dairy Association meeting. It may be an incentive for some of them at least to get out of the old ruts they have been in for years, and adopt the latest developments in dairying.

I consider that the dairy lines or transportation companies have helped largely to develop the dairy industry of this country. We have new refrigerator car service quite satisfactory to the shipper. Our butter can be loaded in refrigerator cars in Nebraska, Minnesota, or Iowa, and come out in Boston or New York in as good condition as when loaded, in the hottest weather of the season. As the demand has increased for refrigerator service it has been furnished by the railroad companies.

Owing to the fact that the creamery managers in Illinois, the northern part especially, contract or sell their butter at Elgin Board of Trade prices, there is but a small percentage of the make of butter in Illinois sold by commission men. For that reason our Association meetings are not as well attended by the commission men, as the meetings of some of our sister states. We appreciate their presence, however, and they are always welcome.

Owing to the high price of beef for the past years, many farmers have sold their cows and heifers, I am sorry to say, instead of keeping and milking them. A dairy farmer is sure of money the year round, provided he gives his cows proper care and feed. Go where you will in a dairy district and you will find good houses, barns, and other out buildings, and also good fertile farms. Can you say that of the grain farms in Illinois? I say no. The cow is the most profitable stock on the farm without a doubt. The only drawback in dairy business at the present time is the scarcity of farm labor. Such has been the prosperity in this country the past year, that farm labor has not been obtainable to do the work. This in a measure accounts for the decrease in the production of butter in the past year throughout the United States.

With a continuation of good times, the people of this country will require more butter each year. Let us not look for prices so high that a man of moderate means will be unable to buy it. I think that we should have this object in view all the time. Cheap production of milk. Lessen the cost of production thus more profit to the producer.

We have on our program buttermakers, who will tell the audience how the milk is handled after reaching the creameries. I trust that we shall have a large audience of buttermakers. The time has come when the buttermaker not only wants to know the art of buttermaking, but should inform himself on all branches of dairying and farming, so that he may instruct his patrons if necessary, how to care for their milk; feed their cows a balanced ration, and be able to give them any information that they may want relative to the dairy business.

Illinois has now about completed one of the largest and best equipped agricultural colleges in America, and has men at the head of the several departments with sufficient brains to run them. Our young men will no longer have to go to other states to attend dairy schools. The National Dairy Union should be recognized by this Association for the work they have done in the interest of the dairy business, and against the great fraud, oleomargarine, or butterine.

Everyone here assembled that is connected with the dairy business, or interested in it, should write their senators at once asking them to support and vote for the Grout Bill.

It is a critical time just now. Let us all put our shoulders to the wheel and help the officers of the National Dairy Union get their bill through the Senate. "United we stand, divided we may fall." Should the bill pass the Senate and become a law, the dairy business of this country would improve. The competition the cow has had the past few years has discouraged her. Cottonseed oil, tallow and lard is too cheap production for her to compete with. She must have protection, or she will be driven out of business.

The secretary of this Association has made a good program. We now ask for the members hearty co-operation, and I trust that they will

feel enough interested to attend each session and help make the meeting a success.

In conclusion, let me say I hope that the people who attend this meeting will feel that their time has not been lost, and when we adjourn, they can go to their work with renewed vigor and assurance that they have been repaid for attending the twenty-seventh annual meeting of the Illinois State Dairy Association.

ECONOMICAL MILK PRODUCTION.

PROF. T. L. HAECKER, MINNESOTA DAIRY SCHOOL, ST. ANTHONY PARK.

By the President: Ladies and Gentlemen, I have the honor of introducing to you Prof. T. L. Haecker.

Ladies and Gentlemen—I am glad to again have the privilege of meeting with the dairymen of Illinois. And yet I feel as though I owe you an apology for not having had any time to prepare myself for this talk. I could hardly see my way clear to leave my classes, but your secretary did not seem disposed to have it otherwise.

The little talk I am to give this afternoon is no set lecture and I hope as I go along, if a point is brought out upon which any person wishes further information, you will be free to speak up at once, and I will take pleasure in saying anything more in connection with it if I can.

We have been some nine years investigating milk production at the experiment station in Minnesota. We did this to ascertain what it would cost to produce milk and butter fat. In Minnesota we are chiefly engaged in butter production, consequently we have not paid as much attention to the profits in milk as we have in the production of butter fat, so the data I have is not strictly adapted to those who are simply dealing in milk or depend upon the pay from a given quantity of milk. Yet I

have done a little work in re-adjusting my data, and I hope I will be able to give you some information which will be beneficial.

The herd of cows at the station were selected by several persons, and it was therefore made up of representatives of several breeds of dairy cows, and some were fair representatives of the two beef breeds—short-horns and Angus. As a whole the herd would have been classed as a good one. They consumed on an average per head 878 pounds of barley, 358 pounds of ground corn, 1750 pounds bran, 500 pounds of oil meal, 1800 pounds of roots, 3500 pounds of ensilage, and one ton of hay, and were 130 days in pasture. Barley meal and corn meal were rated at \$14 per ton, bran \$11, oil meal \$26, ensilage and roots \$2, and \$3.20 for prairie hay and \$5.60 for timothy. The average cost for feed per head for the year was \$37.82.

The yield of milk ranged from 4526 pounds to 10,287 pounds, and averaged from the herd 6,408, costing for feed 61.1 cents for 100 pounds of milk. The average yield of butter ranged from 252 pounds to 476 pounds, and averaged 351 pounds. While the yield of milk and butter were entirely satisfactory, the cost of production was high. The cost for feed to produce a pound of butter was 10.6 cents, and the average price of butter at Elgin for that year (1893) was 29½ cents. The cost of feed could have been somewhat reduced, if food stuffs had been used which provided protein at least cost, but this factor was not considered, and if the feed had been charged at local market prices, instead of the amount actually paid for them in the city markets.

The herd was managed fairly well; strict regularity was observed as to time of feeding, watering, and milking. It is barely possible that more grain was fed than was actually necessary with a number of the cows, since going off feed was a frequent occurrence during the winter.

During the year 1894 only ten of the cows remained in the herd the entire year, as it was necessary to get rid of some on account of tuberculosis. There was much disturbance in the herd during the year on account of the tuberculin test, and certain changes were made. I was also away much of the time and each cow's needs were not watched as

carefully as was the case the year previous. The standard ration for that year was 6 parts bran, 4 of barley, 3 of corn and 1 of oil meal, although a portion of time wheat was substituted for barley and corn as an experiment. The yield for the herd this year ranged from 3,643 pounds of milk to 7,769 pounds and averaged 4,910 pounds, while the yield of butter ranged from 188 pounds to 355 pounds and averaged 272 pounds. The average cost for feed was \$29.72, the cost to produce 100 pounds of milk 60.5 cents and a pound of butter 10.9 cents. The average market price for butter at Elgin was 28 cents.

The chief cause of the low yield of the herd was due to the frequent changes that took place in the herd, though lighter feeding and feeding experiments had some bearing upon it. No attempt was made to produce milk at minimum cost by selecting feed that would provide protein at least cost. Wheat did not prove an economical feed for dairy cows, since its feeding value was only equal to corn and barley, pound for pound. Such food stuffs as corn, barley, and wheat have practically the same value for milk production, and that feed should be selected which is the cheapest per pound. Prairie hay and timothy have an equal feeding value, but they, like oats, are generally too expensive.

The following formulas give the proportions in which the different feeds were given when timothy was compared with prairie hay:

NUTRIENTS IN RATIONS COMPOSED OF GRAIN AND TIMOTHY.

FOOD.	Lbs.	D. M.	DIGESTIBLE.			Cost. Cents.
			Pro.	C-H.	Fat.	
Bran	6.17	5.53	.71	2.36	.22	3.39
Barley	3.08	2.72	.29	1.84	.06	2.15
Corn	3.08	2.72	.31	2.04	.09	2.15
Oil Meal	1.65	1.50	.45	.52	.12	2.14
Timothy	14.00	12.28	.44	6.32	.25	2.24
		24.75	2.20	13.08	.74	13.75

NUTRIENTS IN RATION WHEN COMPOSED OF GRAIN AND PRAIRIE HAY.

FOOD.	Lbs.	D. M.	DIGESTIBLE.			Cost. Cents.
			Pro.	C-H.	Fat.	
Bran.....	6.17	5.53	.71	2.36	.22	3.39
Barley.....	3.08	2.72	.29	1.84	.06	2.15
Corn.....	3.08	2.72	.31	2.04	.09	2.15
Oil Meal.....	1.65	1.50	.45	.52	.12	2.14
Prairie Hay.....	14.00	12.48	.33	5.72	.20	2.24
		24.95	2.09	12.48	.69	12.07

When ensilage was fed in addition to hay, the following formulas show the nutrients contained in the daily rations and the cost of same:
NUTRIENTS IN RATION COMPOSED OF GRAIN, ENSILAGE AND TIMOTHY.

FOOD.	Lbs.	D. M.	DIGESTIBLES			Cost. Cents.
			Pro.	C-H	Fat	
Bran.....	5.29	4.74	.61	2.02	.19	2.91
Barley.....	2.64	2.33	.25	1.58	.05	1.84
Corn.....	2.64	2.33	.27	1.75	.08	1.84
Linseed Meal.....	1.41	1.28	.38	.45	.10	1.83
Timothy.....	11.00	9.64	.35	4.96	.20	3.08
Ensilage.....	10.00	2.80	.11	1.32	.07	1.00
	32.98	23.12	1.97	12.08	.69	12.50

NUTRIENTS IN RATION COMPOSED OF GRAIN, PRAIRIE HAY AND ENSILAGE.

FOOD	Lbs.	D. M.	DIGESTIBLE.			Cost. Cents.
			Pro.	C-H	Fat	
Bran.....	5.29	4.74	.61	2.02	.19	2.91
Barley.....	2.64	2.33	.25	1.58	.05	1.84
Corn.....	2.64	2.33	.27	1.75	.08	1.84
Linseed Meal.....	1.41	1.28	.38	.45	.10	1.83
Prairie Hay.....	11.00	9.81	.26	4.50	.14	1.76
Ensilage.....	10.00	2.80	.11	1.32	.07	1.00
	32.98	23.29	1.88	11.63	.62	11.18

During the winter months, when these rations were given, the flow of milk was kept up satisfactorily, and if there had been no unusual disturbance in the herd the following spring, the yield would have been about the same as it was during the preceding year.

During the year 1895 there was a great change in the price of feed. From Jan. 1, 1895, until about midsummer, prices remained the same as they were in the fall of 1894, and were so charged to the herd; but in the fall of 1895 the supply of feed for the herd was purchased at the following prices: Bran \$6.50 per ton, oil meal \$14, barley 16 cents per bushel, oats 14 cents, prairie hay \$3, and ensilage from \$1 to \$1.60 per ton.

The conditions under which the herd was kept during the year were about the same as they were during the year 1893. There was no unusual disturbance and feeding and milking was carried on with strict regularity. The cow Houston, however, had a severe attack of mange, and on this account she probably did not do quite as well as she would have done had this not occurred.

To show the performance of each cow during the year, I will submit a table giving it in detail:

NAME.	Age.	Cost of Feed.	Pounds of Milk.	Per cent. Fat.	Pounds of Butter	Pounds of Fat.	Cost of 100 Lbs. Milk.	Cost of 1 lb. Butter.	Cost of 1 lb. of Butter.
Beckley 2d.....	3	\$25.19	4794.4	5.48	262.65	306.43	52.54	9.59	8.22
Belle.....	8	24.54	5762.9	4.23	243.91	284.56	42.58	10.06	8.62
Countess.....	10	33.84	11736.6	2.51	295.05	344.23	28.83	11.47	9.83
Ethel.....	5	25.21	5149.4	4.02	207.05	241.56	48.96	12.18	10.44
Houston.....	11	28.49	6700.7	5.17	346.65	404.43	42.52	8.22	7.04
Lou.....	8	30.32	9226.8	3.60	331.79	387.09	32.86	9.14	7.83
Lydia.....	5	32.79	7131.2	3.59	256.13	298.82	45.98	12.80	10.97
Olive.....	11	23.62	6748.1	4.10	276.94	223.10	35.00	8.53	7.31
Quidee.....	3	26.98	7645.1	3.49	266.75	311.21	35.29	10.11	8.67
Reddie 2d.....	3	24.37	5115.0	5.09	260.30	303.68	47.64	9.37	8.02
Sweet B.....	11	31.38	8426.7	4.98	419.93	489.92	37.24	7.47	6.41
Topsy.....	9	39.31	12524.8	3.79	474.96	554.12	31.39	8.28	7.09
Tricksey 2d....	2	24.09	5480.2	5.25	287.49	335.41	43.96	8.38	7.18
Average ...	..	\$28.47	7418.6	4.07	302.28	352.66	38.38	9.42	8.07

It will be seen that there is a great variation in the cost of producing a hundred pounds of milk. With one it cost 28.83 cents, while another charged 52.54 cents. But the one that produced it at least cost was a Holstein that gave milk containing only 2.51 per cent fat, which could not be sold in our state because it contained nearly 1 per cent below the minimum allowed by law, while the Jersey grade that charged 52.54 cents was farrow and was therefore not under normal conditions. The Holsteins, on the average, charged less to produce a given quantity than did any of the other breeds. The Guernseys also rank high as milk producers, and especially is this the case when quantity is taken into account. The Shorthorns, as a breed, are not economical milk producers, and it is only now and then that one is found to be an exception to this rule, and then it will be found that they are not typical shorthorns in conformation. If a cow of this breed proves satisfactory, both at the pail and churn, it will be found that she is roomy in body and light in her quarters, though the contrary may be shown by getting them in high condition before they come in or after the completion of a year of good work. But if their physical condition is shown when they have advanced to about the middle of their period of lactation, it will invariably reveal a cow of fair dairy form.

Returning to the record of the herd for the year 1895, we see that the average cost to maintain a cow that year was \$23.47, the yield of milk ranged from 4,794 pounds to 12,525, and averaged 7,418.6, and that the average cost to produce a hundred pounds of milk was 38.38 cents. Both the yield from the herd during the year and the cost of production were very satisfactory. The ration fed from the beginning of the year until the cows were turned to pasture was bran 6 parts, barley 4, corn 3, oil meal 1, timothy 16, and beets 10; but a portion of the herd received wheat in place of barley, pound for pound, and for a time the whole herd received bran 6, wheat 7, and oil meal 1 for the concentrates.

FOOD.	Lbs.	D. M.	DIGESTIBLE.			Cost.
			Pro.	C.-H.	Fat.	Cents.
Bran.....	6	5.46	.75	2.52	.21	3.30
Barley.....	4	3.63	.35	2.47	.07	2.80
Corn.....	3	2.70	.28	2.05	.09	2.10
Oil Meal.....	1	.94	.27	.38	.06	1.30
Timothy.....	16	14.12	.54	6.94	.20	4.50
Beets.....	10	1.35	.11	1.02	.01	1.00
		28.20	2.30	15.38	.63	15.00

In all our feeding experiments the indications are that pound for pound our farm grown grains will produce practically the same results except that oats seem to have a greater feeding value, due probably to its stimulating properties and it can be safely fed in larger quantities because of its narrow nutritive ration and being a loose meal when ground. It contains about 9 per cent more total digestible nutrients than bran, and when grown on certain soils in our northern latitude contains nearly as much available protein. From the 23d of November oats was substituted for corn, making the concentrates in the ration bran 6, barley 4, oats 3, and oil meal 1. This ration also was continued through the greater portion of the year 1896, with very gratifying results.

During the year 1896 no feeding experiments, in comparing different food stuffs, were carried on, and the results obtained in yield of milk and butter afford more useful data on cost of milk production than those already referred to. The herd was in excellent working condition, and the yield of milk and butter was practically the same as was the case the year previous.

RECORD OF THE HERD FOR THE YEAR 1896.

	Cost of Feed.	Pounds of Milk	Per Cent Fat	Pounds of Fat	Pounds of Butter	Cost of 100 Lbs Milk CENUS	Cost 1 Lb. Butt'r Fat CENTS	Cost 1 Lb. But'r CTS.
Countess.....	\$27.56	11412.5	2.57	293.45	242.36	24.15	9.39	8.05
Duchess.....	19.71	6901.9	5.00	344.75	402.22	28.56	5.72	4.90
Ethel.....	21.38	4099.8	4.12	168.89	197.04	52.15	12.66	10.85
Fairy.....	20.39	5844.1	3.98	232.73	271.52	34.89	8.76	7.51
Fortune.....	21.03	9111.5	4.64	422.56	492.99	23.08	4.98	4.27
Houston.....	21.38	8797.3	5.00	439.58	512.84	24.30	4.86	4.17
Ida.....	22.40	6714.4	3.84	257.65	300.59	33.36	8.69	7.45
Liggetta.....	23.31	6556.0	3.44	225.42	262.99	35.56	10.34	8.86
Lydia.....	23.07	8030.3	3.44	276.13	322.15	28.73	8.35	7.16
Olive.....	18.72	7005.1	4.06	284.23	331.60	26.72	6.59	5.65
Quidee.....	21.61	6652.8	3.60	239.66	279.60	32.48	9.02	7.73
Shortie.....	14.43	5139.9	4.70	241.82	282.12	28.07	5.97	5.11
Sweet Briar..	21.90	6364.6	5.00	318.42	371.49	34.40	6.88	5.90
Topsy.....	32.72	11726.2	3.81	446.19	520.56	27.90	7.33	6.29
Average..	22.12	7454.0	4.02	299.39	349.29	29.64	7.39	6.33

About half the dry matter in the rations was provided in the concentrates, which is very heavy feeding. The rations of grain ranged from 10 to 20 pounds per day. At the time I considered it excessive, but I have since for two consecutive years fed one part grain to two parts roughage, and am now satisfied that if nutriment in concentrates is cheaper than in roughage, a ration may be advantageously used which contains half the nutrients in the concentrates, and if the herd is handled skillfully, no injurious effects will follow.

Referring to the record of the herd, it will be seen that the cost of maintaining a cow for the year ranged from \$14.43 to \$32.72, and averaged \$22.12. Valuing milk at 75 cents per hundred pounds, the cow that cost \$14.43 for keep brought a profit of \$24.12, while the cow that cost \$32.72 for feed brought a net return of \$55.22. This year we had about the same variation in yield of milk from the different cows that was obtained the year previous, the range being from 4,099.8 pounds to 11,726.2, and averaged 7,454, being just a trifle more than was obtained

the year previous; but the average yield of butter was 349.29 pounds, or 3.37 pounds less. The cost to produce a hundred pounds of milk ranged from 23.08 cents to 52.15 cents, and averaged 29.64 cents. Arranging the cows in the order of cost of milk production, we have the following:

Cost of 100 Lbs. of Milk.	Per Cent Fat.	Breed.
23.08 cents.....	4.64.....	Jersey.
24.15 ".....	2.57.....	Holstein.
24.30 ".....	5.00.....	Jersey-Guernsey.
26.72 ".....	4.06.....	Grade Guernsey.
27.90 ".....	3.81.....	Grade Holstein.
28.07 ".....	4.70.....	Native.
28.56 ".....	5.00.....	Jersey.
28.73 ".....	3.44.....	Swiss.
32.48 ".....	3.60.....	Holstein.
33.36 ".....	3.84.....	Grade Shorthorn.
34.40 ".....	5.00.....	Guernsey.
34.89 ".....	3.98.....	Grade Shorthorn.
35.56 ".....	3.44.....	Grade Shorthorn.
52.15 ".....	4.12.....	Grade Shorthorn.

It appears from this and in fact all the accumulated data we have that the grade shorthorn cow cannot lay any claims to being an economical milk producer. Generally the Holstein ranks first, when quantity of milk only is considered; but with milk solids or butter fat as a basis, she falls below the Channel Island breeds. Her disposition and ability to hold her own among a lot of cows is a very strong point in her favor. Her roomy udder, large teats, and free milk characteristics make her a very satisfactory cow where large herds are kept for milk production only.

During the year 1897, the prices of all kinds of food stuffs were exceedingly low; in many localities in the northwest bran could not be sold at any price, and much was used for fuel to run the mills. On this account the record for that year has little value. So I will simply state that the herd yielded on an average 6,962 pounds of milk and 351 pounds of butter; that the cost of feed to produce a hundred pounds of milk was 27.34 cents and of a pound of butter 5.4 cents. The average cost to maintain the cows for the year was \$19.03.

The records thus far referred to give the cost of milk production for the calendar year. It may be interesting to some to take an average winter's work, beginning in the fall when the cows come in and ending at the time when they are turned out to pasture. The separate record for the winter is never averaged for the whole herd because the periods are not similar as to duration. The following list included all the cows in the herd during the winter of 1895-6, and gives the cost of 100 pounds of milk from the time each cow came in until she was turned into pasture, the average per cent of butter fat and her breeding:

AN ECONOMICAL MILK PRODUCER.

Cost of Milk Production.	Per Cent Fat.	Breed.
21.98 cents.	2.52	Holstein.
24.22 "	4.95	Jersey-Guernsey.
24.61 "	4.58	Jersey.
25.56 "	3.92	Grade Guernsey.
26.45 "	3.20	Swiss.
26.48 "	3.74	Holstein.
28.99 "	3.60	Holstein.
29.07 "	3.57	Grade Shorthorn.
31.24 "	3.53	Holstein.
32.75 "	4.83	Guernsey.
32.93 "	3.92	Grade Shorthorn.
33.12 "	5.27	Grade Guernsey.
33.15 "	3.80	Grade Shorthorn.
34.72 "	4.87	Jersey.
34.95 "	4.76	Jersey.
35.09 "	4.20	Grade Shorthorn.
35.15 "	5.14	Guernsey.
36.13 "	3.66	Grade Shorthorn.
36.78 "	4.37	Jersey-Guernsey.
40.12 "	4.48	Grade Shorthorn.
40.21 "	4.44	Grade Shorthorn.
41.52 "	4.77	Grade Shorthorn.

It appears from this table that milk is produced nearly as cheaply in winter as during the summer months when cows come in fresh in the fall. By this method the largest flow is also secured when milk brings a higher price than can be obtained during the summer months.

To obtain a full flow of milk cows should be allowed at least eight weeks of rest to recuperate, and if they are very spare at the close of their period of lactation, they should receive some bran and oil meal for a time,

but care should be taken not to get them in too high condition lest they have caked udder or an attack of milk fever. During the week immediately preceding calving some roots or other succulent food should be given to keep the bowels loose. Immediately after calving, when cows are copious milkers, it is not safe to draw all the milk from the udder, for it frequently happens that by emptying the udder of a large mess of milk there will be caused a sudden collapse by the attack of paralysis. During the first week, the grain ration should be light and gradually increase, so she is on full feed in the course of three or four weeks. Under proper management a cow will generally continue to increase in her flow of milk for from three to four weeks. If she is not skillfully handled the flow will increase for only about ten days or two weeks. Much depends upon the relation between the cow and the milker; the greater the attachment of the cow to her milker the more satisfactory the return. Few cows ever produce their highest possible yield, simply because of a lack of understanding of how a cow should be treated. Kindness and gentleness are as important factors as good feeding. Comfortable quarters and regularity, both in feeding and milking, are requisites to secure contentment, which after all is the one thing necessary to obtain a maximum flow.

In our work, it is necessary to maintain a fixed relation between the grain and roughage; but in practical feeding a cow should be fed meal in proportion to her flow of milk and given at least some roughage ad lib. In a general way one pound of mixed meal for three pounds of milk yielded will be ample to maintain the flow. Some cows need more roughage in proportion to grain than others, and on this account they should have all the coarse feed they will eat; but no more should be given than they will eat up clean, and they should be fed only twice a day.

While our feeding standards have been very helpful, they have also led astray most of our dairymen who are trying to adopt better methods of feeding. Arbitrarily fixing the daily allowance at 2.5 of digestible protein has caused an enormous loss to dairymen, because but few ordinary cows—and nearly all our cows are such—can make use of so much protein. This seems indicated by our records.

Table giving nutrients consumed daily and milk and butter fat produced: :

NAME.	Dry Matter per 1000 lw	D. M.	Digestable.			Av. Daily Yield.	
			Pro.	C. H.	Fat.	Milk.	Butter Fat.
Beckley 2 . . .	24.33	21.16	1.68	11.22	.50	13.17	.73
Countess . . .	24.47	28.80	2.36	15.36	.70	43.55	1.03
Houston	27.82	25.26	2.13	13.46	.63	25.99	1.38
Lou	24.34	27.02	2.20	14.33	.66	33.58	1.20
Olive	26.68	21.13	1.69	11.02	.52	21.66	.93
Reddie	27.14	20.63	1.66	10.92	.50	15.25	.78
Belle	21.48	20.47	1.76	10.76	.50	19.73	.83
Lydia	25.15	27.42	2.23	14.30	.68	27.90	1.01
Quidee	25.72	22.92	1.87	11.95	.55	27.05	.96
Sweet Briar	25.38	26.98	2.22	14.09	.67	25.80	1.37
Topsy	27.75	31.91	2.60	16.65	.79	40.04	1.54
Tricksey	25.17	18.83	1.51	9.85	.46	16.02	.87
Total . . . . .	.....	292.53	23.91	153.91	7.16	309.74	12.63
Average . . . . .	.....	24.38	1.99	12.82	.59	25.81	1.05

The herd consumed daily on an average 1.99 pounds of digestible protein and yielded 25.81 pounds of milk, while the generally accepted standard fixes 2.5 pounds of protein as the amount needed to produce 22 pounds of milk. The cow Countess yielded 43.55 pounds daily, with only 2.36 pounds of digestible protein. The standard also fixes 3.3 pounds of protein as the amount needed daily for 27.5 pounds of milk, while the cow Topsy yielded 40 pounds of milk daily, testing 3.85 per cent fat, with only 2.6 pounds of protein. Where the standard fails to state the kind of milk, it is fair to assume that average milk is meant, and Topsy's milk just meets this requirement, and she is just unscientific enough to require only 2.04 pounds of protein for 27.5 pounds of milk, while the standard says she needs 3.3 pounds.

Houston consumed daily 2.13 pounds of protein and produced 25.99 pounds of milk daily, testing 5.3 per cent fat, and on this basis she required only 2.24 pounds of protein to produce 27.5 pounds of milk, while

the standard fixes 3.3 pounds as the amount required for 27.5 of ordinary milk. We might take the records of the other mature cows in the herd that were not making gain in weight, and show that either our cows or the scientists are wrong, and where there is such a discrepancy between the calculations of the scientist and the performance of the cows, I am inclined to side with the cows.

It is claimed that a cow requires .7 of a pound of protein daily for body maintenance per thousand pounds live weight, and if this is correct—and I am inclined to the belief that it is—our records indicate that after deducting the amount of protein needed daily for body maintenance, the protein required to produce a pound of milk is as follows:

Milk containing	2.5	per cent.	fat.	.035	of protein.
"	"	3.	"	"	"
"	"	3.5	"	"	"
"	"	4.	"	"	"
"	"	4.5	"	"	"
"	"	5.	"	"	"
"	"	5.5	"	"	"
"	"	6.	"	"	"

With such a standard all that is necessary to determine the amount of protein needed by a cow, to maintain her flow, is to ascertain the amount and quality of milk yielded daily and multiply the yield of milk by the amount of protein needed to produce a pound of milk of that quality, and add to this that needed for body maintenance. As an illustration, let us suppose that a cow weighs 800 pounds and yields daily 20 pounds of milk testing 4 per cent fat. She needs daily .56 of a pound of protein for body maintenance and $.047 \times 20$ equals .94 plus .56 equals 1.50 pounds of protein required daily to maintain a body weighing 800 pounds, and producing 20 pounds of 4 per cent milk. If she is giving milk testing 5 per cent fat, she will need $.055 \times 20$ equals 1.10 plus .56, or 1.66 pounds of protein.

Again let us apply this standard to the cow Sweet Briar, that yielded 25.8 pounds of milk testing 5.3 per cent fat. She weighed 1060 pounds, and required, therefore, .74 of a pound of protein daily for maintaining her body. To produce a pound of milk testing 5.3 per cent fat requires .0574

of protein. Multiplying this by 25.8 gives us 1.47, the amount of protein needed for the 25.8 pounds of milk, and adding to this .74, the amount needed for body maintenance, we find she requires in her daily ration 2.22 pounds of protein.

The coefficients given as the amount of protein required for a pound of milk of a specified quality is what our cows received, but it may not be the minimum amount required. But enough data has been obtained to show that cows do not need as much protein as has been taught and is generally supposed. Some of the cows in the list received more protein than they seemed to need for the work they were doing, and consequently that provided in excess of the amount needed was wasted or converted into body fat. For a few weeks during the beginning of her period of lactation, it is well to give a cow a little more than the yield would call for, to give her an opportunity to increase her flow, but after she has been in milk a couple of months, the ration should be adjusted to the amount and kind of milk she is giving.

Our herd is not doing as well this winter, as it has done heretofore. We are having a great many visiting delegations, and the feed does not seem to contain the usual amount of nutriment. The warm, moist fall seems to have caused this, and then the fodder corn became very moldy and musty. Our grain mixture during the month of January was five parts corn meal, five parts bran and two parts gluten meal. Some of the heifers are getting six pounds of this mixture, some of the cows are getting seven pounds, some eight, and a few nine pounds. The average for the herd is eight pounds. They also receive in weight as much cut corn fodder as they do grain and three times as much ensilage. That is, a cow that receives eight pounds of grain, gets eight pounds of fodder corn and twenty-four pounds of ensilage.

The feed cost to produce a hundred pounds of milk from the cows under experiment is 37.6 cents.

Q. How large a herd?

Prof. Haecker: Thirty cows are in the experiment. There are about forty cows in the herd, but some are dry and others are strippers.

I would like to inquire how our cost compares with that in the Elgin district?

The President. Those rising to ask questions will please give the reporter their names first.

Prof. Haecker: I would like some light on this point. I would like to know if our cows are doing as well as they are in this locality?

Mr. Belden: I think Mr. Mason of Elgin could answer that question.

Mr. Monrad: You say 37.6 cents per hundred pounds?

A. Yes sir.

Q. Have you figured in the cost of feeding those dry cows? Is it not fair when we talk of the cost of milk we produce on the farm to count the cost of feeding all the naimals we feed?

Prof. Haecker: I think it quite safe to let the value of the calf the cow drops offset that.

Q. What are you feeding the the ten cows?

A. They are receiving ensilage and fodder cord about the same as the thirty, and in addition about two pounds of the grain mixture. If we charge the total cost of feed for the forty cows against the milk given by the thirty it will bring the cost of producing 100 pounds of milk to 49.8 cents.

Q. What kind of grain is it you are feeding?

A. We are feeding a mixture composed of five pounds each of ground corn and bran and two pounds of gluten meal. They also receive as much fodder corn as grain and three times as much ensilage.

Q. What gluten meal do you use?

A. New process gluten meal, containing about 40 per cent protein.

Q. That is a large per cent of protein, is it not?

A. Yes. It contains only about three per cent fat, while that made heretofore contained about twelve per cent.

Q. Can you give us any information as to which is the most economical to buy, gluten feed that contains about 20 per cent protein or gluten meal with 40 per cent protein?

A. That depends somewhat upon the supply of carbo-hydrates. If you have corn you can secure the carbo-hydrates more cheaply with that, and you should buy the meal that furnishes the protein the cheapest.

Mr. Monrad: Don't that depend on the price?

A. At present prices we get portein at less cost in gluten meal than we do in gluten feed, and carbo-hydrates cost less in corn than they do in gluten feed. Prices in our concentrated milk feeds are being more and more guaged by the amount of protein they contain.

Q. It seems that the protein food contains is all all that is talked about.

A. They are on the right track, and a farmer ought to be willing to pay according to the protein. There is no farmer in Illinois who cannot provide carbo-hydrates enough from his farm, and all he needs is gluten meal to balance the ration, and enough bran to loosen it. It might answer to feed gluten meal and corn meal if the mixed meal is fed with the roughage, but without such mixing I would not advise feeding a ration composed wholly of corn meal and gluten meal. And there is another point. We are feeding our cows in the Elgin district the corn planted for roughage and corn for corbo-hydrates and buying gluten meal for the protein, and we are not getting enough bone making material in the milk to make good calves and keep our cows in good condition, and in order to have the cows bring good, strong calves it will be necessary to feed some ration that contains more ash, the bone making material.

Mr. Judd: Along this Fox River here, they are not allowed to feed any linseed meal or gluten meal. What can you substitute to make a balanced ration?

A. I would tell those condensing people they could not have my milk. You farmers should get together and market your own milk.

Q. What did you say about that mixture?

A. I make a mixture of five pounds or parts of bran, five pounds of corn, and two parts of gluten meal. I am not feeding my cows twelve

pounds. That is why I term parts to show in what proportion these grains are mixed.

Q. A day's ration?

A. Yes sir. Our ration varies from five to nine pounds of meal per day. I have not got a cow in the herd that is receiving over nine pounds of meal per day, and those that are giving a small yield of very rich milk are getting from six to seven, and the very highest is nine pounds of meal per day. I am inclined to the opinion that we are very near to the minimum supply of protein, probably not, but the close of this season's work will tell.

Mr. Newman: You answered Mr. Judd perhaps rightly, but we in the Elgin district find it very difficult to market our own milk. Can you not tell us something to take the place of gluten meal?

A. Will they object to cotton seed meal?

Q. Yes sir.

A. Do they object to feeding oil meal?

Q. Yes sir.

A. Can you afford to feed one-third corn and two-thirds bran?

Q. That is what we are feeding.

A. That is your only remedy. You are perfectly safe in making that combination, and I believe it will give the cow enough protein so she will give a normal yield of milk.

Q. Drop a portion of the bran and put in oats, or is that too expensive?

A. Oats is as good as bran and possibly a little better, but protein in it is generally more expensive than it is in meal containing a larger percentage of protein.

Q. You said you increased the butter fat as you increase the protein.

A. No sir, we cannot change the butter fat materially, but cows yielding milk containing a high per cent of butter fat require less protein to a pound of butter fat than do cows giving milk containing a medium or low per cent of butter fat. After making allowance for food of main-

tenance, a cow giving 4 per cent milk requires one pound of available protein for 22 pounds of milk containing .88 of a pound of butter fat, while a cow giving milk containing 5.3 per cent butter fat returns .92 of a pound of butter fat to one pound of available protein. But cows will make such returns when they are fed only up to their limit of production. When a cow for some reason has fallen below her normal flow there is little if any use in giving her more protein than she needs for the decreased yield, for she will not, as a rule, respond to a larger ration. A cow should be fed according to the quantity and quality of the work she is doing.

Q. What would you think of a set of 100 cows that consume a ton of grain a day, half and half corn and bran? What do you think of that for a ration? What do you think of that to make milk of?

A. That would ruin mine.

Mr. Goodrich: I can hardly keep still when you talk of feeding. This gentleman has put that question of 20 younds of corn and bran. Now, he does not say anything about what other feeds are used; that makes all the difference in the world; what the other feed is. I must tell you a little bit of a story to illustrate it. I have spent nearly fourteen years in talking with farmers in the Farmers' Institute in Wisconsin and other states, and I am asked almost every day what is the best kind of grain to feed a cow. I tell them I don't know, and then they want to know what I am talking about feed for all over the country. I say I don't know because I don't know what other feed they have. Not long ago there were two men, I will call their names. Horace and Louis. Horace says he don't know what kind of grain to feed a cow. Louis says, "But I know." Horace says, "What is it?" It is corn meal. Well, I say I don't believe you. I believe you are lying. Well, I know better. I followed your plan and dropped off the other feeds, and then went right down by corn meal. You are telling a story. I took your feed and changed from corn meal, and my cows did not do so well. I says, "Now, Horace, what are you feeding besides your corn meal?" "Why, hay of course. "But what kind of hay? You know to have alfalfa and

clover you should have about eight pounds of corn meal and I run that through a feed cutter and put the corn meal on. You see the alfalfa and clover has about 10 per cent digestible protein, which would make two pounds in there, and the rest had about 6-10 protein, making 2.6.10 of protein a day. The other man said he was feeding timothy hay and corn fodder; said it was good timothy hay. He always waited until there was some substance in it. When I feed meal and bran, and when I change to corn meal they come down. Timothy hay and corn fodder had less than 3 per cent of protein, hardly enough protein to sustain life. That is just all there was about it. The cow must have the protein to have the casein; must get it out of the corn fodder or something, I don't care what, just so she gets it.

Q. I would like to inquire what he was feeding them?

A. Corn fodder and Hungarian hay.

Prof. Haecker: In connection with corn fodder and timothy hay, I do not know as the two parts of bran and one part of corn would more than furnish the protein. You feed 20 pounds?

A. Yes sir.

Mr. Gurler: About what state of maturity would you harvest corn for silage?

A. We generally harvest it—we let it stand as long as we can and not let it get caught with the frosts. We plant about the middle of June, and then harvest from the 5th to the 10th of September.

Q. What condition will the corn be in. How far developed in the ears?

A. Not to have any ears at all. If any at that time about the latter part of the milk stage. It may be that if we had let this corn grow a little longer the analysis would show that it contained a larger percentage of nutriment, but our herd responds better to corn planted late about the middle of June, and cut between the 5th and 10th of September. A year ago now I had fed from the beginning of fall to the close of the first week in January corn fodder that contained no ears. It was planted on the 13th of June and harvested about the 10th of September. At

that time the lower leaves were beginning to turn yellow. We put this corn into large shocks and fed from the field as we needed it. At the close of the first week of January we fed corn planted thinner; this happened because the seed was not good, only about 60 per cent of the seed germinating, and nearly every stalk contained a nubbin of corn. The cows received the second week of January just as much by weight of the corn that contained ears, and by the close of the week we saw a marked shrinkage in the herd, save one, and that one gained, but did not gain as much as she did the week previous, when she was fed on the corn containing no ears. We have on several occasions had such marked illustrations of the value of fodder corn containing no ears, and planted this late in the season and cut early.

Q. What kind was it?

A. The Dent corn. We could not follow that method if we used corn received from Illinois or Iowa.

Q. How close do you plant it?

A. In drills. The kernels are from two to four inches apart. Each row is composed of two drills six inches apart, and the rows are forty-four inches apart. It requires about 60 pounds of seed to the acre. With us corn planted in this way yields about one-third more available nutriment per acre than is secured by planting the corn in hills. The large corn planted close yields the best.

Mr. Gurler: What large kind?

A. That produced from southern grown seed.

Q. I would like to ask about the palatability of this corn.

A. All kinds of stock are exceedingly fond of it; if run through a cutter they will eat it all, and if fed whole, only the coarsest portion of the stalk will be left. In higher latitudes, where the stalks are fine, they eat it all. It also seems more easily digested than ordinary corn stover.

Q. How many tons to the acre?

A. Our experiments in that direction show some very peculiar things.

No matter when we plant our corn, be it the middle of May, June, or as late as the 13th of July, the yield of corn fodder is practically about seven or eight tons of cured fodder per acre.

Q. How do you plant it?

A. With an ordinary grain drill.

Mr. Marvey: Will you tell whether you feed that corn foddered whole or run it through a shredder or cutter?

A. We cut the fodder. We do it because we have to weigh it out to the cow, and we keep an exact account of the amount fed to the cows. There are dairymen who have followed our method of planting corn and they are feeding it without cutting. There is scarcely any loss, provided it is planted thickly and late.

Mr. Gurler: If you had field corn that was well eared to put in the silo, what state of maturity would you harvest it?

A. In the dough state. In that way I would get this maximum amount of nutriment I spoke of, and being in silage form succulent.

Q. More palatable?

A. Yes sir.

Q. I can't get the cow to do her best if she does not like her food.

A. Last spring there were only two weeks that the cows could get grass. To show you how far ensilage will go, I will state that we cut nine acres of corn that was fairly well matured, carrying ears, and it was the same kind of corn that I fed from and after the second week in January. After putting nine acres in the silo, I covered it with cheese-cloth, and on top put some of this later planted corn, so during the fall, while the fodder corn was curing, we fed silage. When the fodder corn was cured we commenced feeding it, and continued it until May 7th, when the cows were turned to pasture. The silage left in the silo was what grew on the nine acres, and we commenced feeding it to about thirty cows in milk on the 21st of May. The nine acres provided all the forage needed for the cows, fourteen steers coming 2 years in the fall, 13 yearlings, some ten calves and 2 bulls until the new crop was ready for the silo the first week in September. Before cutting the new crop and running it into the silo, we removed and weighed what was left in the silo, and there was 1,800 pounds, about half of it good enough to be fed to milch cows.

Mr. Wright: What kind of beets would you raise for food?

A. Beets are rather expensive to raise. They are, however, good milk food, and if I were to raise any, I would choose the mangle.

Q. I took my milk to the condensing factory. I found I could not afford to take my milk there, with the restrictions, and make a living, and I did not propose to live to be 60 or 70 years old, and at the end of my life be where I was when I was 20 years old. I was driven from the condensing factory. I commenced selecting my cows and experimenting on feed, and have been at it the last eight or nine years, and beets were very satisfactory to me. If I had no beets I would feed oil meal, but as I have beets, I use them.

A. What grain do you use?

Q. Corn on the farm and bran I get. Would beets furnish protein?

A. Not very much.

Q. Any value in the cob for feed?

A. A very little, but not enough to pay for what a cow gets out of it. It is as good as a loosener, if you feed corn meal.

Q. Do you consider cob of any value for grinding?

A. Not if you have bran.

Prof. Henry statement (Wisconsin Experiment Station) was that corn and cob meal is worth as much as a 100 to feed as clear corn meal to cattle.

A. To cows or steers?

Q. Either one, because of its better digestion and loosening up more.

A. I don't think so, if we feed bran with corn meal.

Q. I have been in the habit of grinding the corn in the cob. My ration is this: I commence first one-half of corn and oats ground with the cob; with two bags of that put one bag of meal; about 11 pounds of that a day, and the ration of beets once a day, and as much corn fodder through the day as they want, and at night a ration of this: Good hay cut early.

Q. Are yours large cows?

A. Yes sir.

Q. Do they get fat under such feeding?

A. No sir; I am ashamed they are so thin.

Q. What kind of hay?

A. I prefer clover, but for the last two or three years my clover has been a failure. I cut timothy as soon as it starts to turn.

Mr. Newman: We do not want our record to stand as it does on the value of this ration. Mr. Mason says he is feeding 20 pounds of oats and bran to the cow. We can't afford to feed a balanced ration unless we take in oil meal or gluten meal. Is the gluten meal with the corn meal and bran more expensive than the corn meal alone?

A. A given weight of the corn, bran, and gluten meal costs more than the same weight of corn and bran; but the former ration is the cheaper milk food. How much do you pay for bran?

Q. Fourteen dollars.

A. The gluten meal costs \$26.00. As a milk food a pound of gluten meal is equal to two and a half to three pounds of bran. I am surprised that the condensing factory objects to the use of gluten meal.

Q. We are too.

A. It seems to me a ruinous practice to feed cows 20 pounds of a mixture of bran and corn meal. It is extravagant feeding and is injurious to cows. Ten pounds would be ample. I am not feeding a single cow ten pounds of meal a day, and I believe I am producing milk as cheaply as any of you, considering quality.

We are not working with exactly the same end in view. It is my aim to so feed that I get the largest yield during the maximum lifetime of a cow. You seem to pay little heed to the length of time the cow remains useful in the dairy. You stuff her with grain, and when she gets fat she goes to the butcher. My cows work in the dairy from 12 to 15 years. Your system may be the most profitable under your conditions; yet I have some doubts on that point. It may not be best for you to rear the heifer calves, but I believe it would be fully as profitable to buy heifers 2 to 3 years old and by careful feeding keep them in the dairy eight or

ten years. This would do away with the wholesale cow killing that is going on in the Elgin district.

Mr. Newman: We have a paper on this program giving us these very subjects, and I expect we will hear how to make first-class milk and large quantities of it, and how he has not had to use his farm yet and leave the vicinity.

DAIRY COWS AND HOW TO CARE FOR THEM TO GET THE BEST RESULTS.

C. P. GOODRICH, FT. ATCHISON, WIS.

Mr. President, Ladies and Gentlemen:

I have the privilege once more of talking about a dairy cow. I always feel good talking about the dairy cow, that is, if they like to hear me. When I talk to an audience that don't like a dairy cow, that hates the sight of one, I can tell by the way they look. But I have got into a different kind of an audience here and I know it.

The most profitable dairy cow is that that can consume and digest and turn into milk a large amount of food, saving only just enough for herself to sustain her own life and strength.

Cows in their original natural state were just like other animals. The cow produced just milk enough to sustain the young, that's nature. She gives milk just as long as the young require it—which is only six or seven months—that's nature. Then she ceases giving milk, and if she had sufficient food, she began to lay on flesh ready for some future time, or if short of food, then partial starvation. So you see, the cow, by nature, is made to give milk and make meat.

But man took hold of the cow. One set of men saw her capacity for giving milk, and that milk was good human food, and they undertook to

improve her in that respect. Now you know we can do almost anything with domestic animals.

They selected the cows that would produce the most milk and fed them so as to produce the most milk possible. They got sires of the best milk producing families and raised the calves from these cows and these sires, and then tested the cows. When these heifers came to giving milk, they rejected the poorest and kept the best, so that one generation after another kept on improving in their milking qualities, and during the later years they have improved faster. When they got the Babcock test and used the scale they could tell just how much she produced and how much butter fat. Nowadays, instead of a cow giving milk just enough to keep a calf for six months, will keep two or three calves, and will continue on giving milk nearly through the whole year.

Another set of men undertook to improve the meat-making qualities of the cow. They selected those that would put on flesh the fastest with a good amount of food, and put on the meat in places where the cuts were worth the most. Now they have got splendid beef animals, and splendid dairy animals.

Now, the question is, can you tell one from the other by the looks? Original state from the same stock. I know that there are some men who say there is no such thing as the dairy form.

About thirty years ago I started in to improve my herd of cows. I weighed the milk and tested it as best I could under the conditions at that time. Skimmed off the cream and churned it into butter, and found out how much each cow made in a year. There was a gradual increase in the production right along. I paid no attention to the looks of the animal. I shut my eyes completely to that. The cow that would produce the most was the best cow, and she was the handsomest cow in my eyes. "Handsome is as handsome does" was my motto.

When I got a herd that was a well producing herd, then what did I see? They were all of one form. They had certain characteristics. They were not all one color. Some were brown and some gray and various colors, but they all had a peculiarity of form. I called that a dairy form.

Here two years ago, one of the professors from the Wisconsin Experiment Station came to Fort Atkinson. He looked over the herd of cows. Afterwards he said: "This is the most surprising sight I have ever seen; they look as if they were all cast in one mould." That is the dairy form.

I have been studying for a great many years the form of the dairy cow. I have spent a good share of my time in the stables, and I find pretty good company there, too. Sometimes men come to my house and say to my wife, "Is Goodrich at home?" She tells them they will probably find me in the cow stable, that is where he finds his most congenial society. I was learning all the time. You will find that form running through all good herds.

I am not saying a single word about breed. It is the form that indicates the dairy cow. The work that an animal or a man is put to has something to do with the shaping of him. I am not shaped like every other man. The work that the cow has been doing has fashioned her into shape—been doing it for generations.

In 1893 we had a dairy contest here at Chicago at the World's Fair. There were prizes offered for the breed that would produce the greatest net profit. They were all determined to make the best showing. The Jersey men spent \$30,000 in finding the 25 cows that were going to be entered in that contest. They got one from Texas, another from Maine; they came from all over. The superintendent, Mr. Fuller, heard that there was a cow that would produce 800 or 1000 pounds of butter a year, and he would go and see the cow. If he thought that she was worth, then the cow was tested, and this was all done a year before, so they could be fresh at the time the Fair commenced. Fifty cows of that breed were brought to Chicago, and then they were tested again, and they kept the twenty-five best.

The other men followed the same idea and plan. I tell you it was a great sight. I believe it could not be beat. I was there and spent quite a little time, and I says, "There is your chance, a chance you will never have again in your life to study the dairy cow." And I want to tell you

today that I spent more time in those stables than in looking over all the rest of that great show. Some said I was a fool, and it was true, but I staid there just the same. I took my camp stool and would sit down by some cow that I thought was almost perfection. There was that one, Brown Bessie, and I studied her over and looked her over and over, and then after spending several hours in the different stables I would think it was my duty to see something else and then go. I started several times to go to the north end of that park, but I never got there but once and then only for a little while. Those cows would pull me right back. I had a sight I never shall see again. There was a cow that was better than all the rest. So we called her the Worlds Champion, Brown Bessie.

(Interrupted to allow the Committee on resolutions to report.)

Mr. M. H. Thompson, Chairman of Committee on resolutions reports as follows:

Mr. President: We were appointed only just before your adjournment this morning and have not had time to prepare a complete report, but have agreed upon a report to Washington.

"Whereas, The bill recently passed by the lower house of Congress, known as the Grout Bill, and now pending in the Senate, is of vital interest to the dairymen of the northwest, especially to dairymen of Illinois; therefore,

"Resolved, That the Illinois State Dairy Association, now assembled in annual session, earnestly request our representatives in the Upper House of Congress to use every honorable effort in their power to the end that the bill, as passed by the Lower House, pass the Senate and become a law."

Moved and seconded that the resolution be adopted.

Carried unanimously.

I think I got to that interesting point where I was studying Brown Bessie. I will tell you how I studied her. I would look at her for some minutes, and then shut my eyes to see if I could see her. I practiced that when I was learning Sunday school lessons, and it came in good that time. Then I would open my eyes and look at her again, and then shut

my eyes again, and I practiced that until I got her so photographed on my brain that I have seen Brown Bessie ever since, whether asleep or awake. She had the quality that we call a stayer. She was on the Fair ground there nearly six months and making more butter at the end than she was a few weeks after they commenced; made three pounds of butter a day. So I called her as nearly perfect a dairy form as can be had. The Jerseys were all splendid animals. The Guernseys were all good; Short Horns were magnificent dairy cows. There was a Kittie Clay. For three, four, five, and even nine generations of the Clay family have all Kitties.

How did that come about? In 1797, 104 years ago, Mr. Clay, one of the ancestors of Henry Clay, imported from England for milking Short Horns such as they had there. That family has been bred in dairy lines. But do you think they were beef animals. What would you give for a steer? Isn't worth any more than one of the scrawniest kind. But they are splendid dairy animals and had the dairy form. But they got a few Short Horns that were not splendid dairy animals. A Michigan man was superintendent of the Short horn herd and a good talker. He said to me several times, "Now, Goodrich, we are going to show you that the Short Horns are something for the dairy. We will hold you fellows a pretty close run." They would if they had had dairy Short Horns. He said, pointing to "Marchoiness," "There's a cow that I believe is going to beat the whole crowd." The cow had a splendid udder and gave the most milk on the ground, and making at that time almost as much butter as any of them. I told him if that cow was going to win in a long contest, then all my study of the dairy cow has gone for naught. She began to drop in her milk. She ate a lot of feed, but kept going down in milk, and at the end weighed more then 200 pounds heavier than when she started in. She was true to her natural instincts as shown by her form; she could not keep giving milk, but made fat.

Any questions when I get through, please ask me, but you know I am not like Prof. Haecker here. He could catch on and go ahead. I can't, I am getting old.

The first thing to look at is the cow's head. She's got to have a good head, or she can't be a very big producer. Broad between the eyes, with a large brain, and a mild, intelligent eye. This milk production is the result of nervous energy, and it takes a strong brain to make a strong spinal cord clear through the column.

When satisfied with the head, I look at her jaw to see if it is strong and muscular. Then I look at the depth through the body. The next thing to see if she has large capacity for handling and digesting the great amount of food that her strong jaws are able to eat. Then I see that she is well cut up under the throat; that she has a slim neck, and then see that she is thick through, has good large heart room. Brown Bessie you could almost put your fingers under her shoulders between there (indicating chart) and her neck. Then I look to see that she has a good and strong bony structure, all around the strong spinal column; that the back bone is strong. Then see that the ribs are wide apart—the sections of the bones are wide apart for the reason that the nerves come from the spinal cord through the section of the backbone and go down here to make milk, and for the nerves to come out there, there must be a space. This openness goes clear to the end of the tail in some cows. Brown Bessie's comes below the point of the hock. No more bones there, but open. I see that she is thick through here where the organs of maturity are. The point of her hip is down there, her back-side is between her hips. In a beef animal you can lay a stick on to one point of one hip to the other and just touch the top of the backbone.

Then I follow on further to see that instead of being rounded out here, she is cut out. You come behind her and her thighs are thin, and then above the udder is a sort of a valley, a wide opening groove, and then in front of the hind legs it arches up. What for? So as to give room for the great, magnificent udder she has got to have to be a good producer.

Here is another thing—the milk veins. The blood comes through the inside down to the udder in its work of making milk and returns from the udder back to the heart to the milk veins, and here is an opening through the chest up to the heart. If the milk veins are large and

active, the cow is at that time giving a lot of milk. You can't always tell by just looking at the milk veins. If they feel like rubber tuges they are active, and if dry a heifer never gives milk. By feeling of these milk wells to see how large these openings are, then the inference is that there will be large milk veins.

I haven't said anything about the udder particularly. The udder, as I said, a cow must have a good udder to do good work. But I want to say to you that more men have been fooled by a great big udder than anything else.

When a man goes out to buy a cow—and of course the man selling says it is the best cow he has—and she has a great big udder and gives a great big amount of milk, he thinks that is enough and looks no futher. But I will look and see if she has got the machinery to fill the udder. If she hasn't got the machinery to fill it, then I don't want her. Look and see that the udder runs well back, so that the connection between the udder and the body is long. I look to see that she has four good tits well apart. But some of the biggest producers in the country haven't got symmetrical udders. Burns got from two Guernsey cows 912½ pounds of butter by actual test under the supervision of the Experiment Station. Lilla Ita gave 828. Of course they were cared for, but Lilla Ella, the one that produced the most, had a very deficient front udder. I happened to be the judge at the Wisconsin State Fair when those heifers were 2 years old. Of course I gave Lilla Ella the first and Lilla Ita the second. When I placed those ribbons on, I heard a man behind me say, "The old man has made a mistake this time." His companion asked him why, and he said he ought to have put the first ribbon on the other cow. That cow's front udder was very deficient, but she had udder enough to do a whole lot of business; udder enough to handle the milk for 912 pounds of butter in a year, but it didn't make any difference about that imperfection. If there had been another cow with a perfect udder I would not have given her the ribbon.

You may have the best formed cow in the world, and the best bred one, but unless she is fed right, you are not going to get milk out of her.

But you may have the best bred and best fed cow, and then not get much milk out of her. She has got to be taken care of. To do her best she must be absolutely comfortable all the time. She must have a good comfortable stable with a good bed. You don't know how it makes me feel to see cows lay down on a hard floor and no straw. I always feel as though it makes my bones ache. They want a good bed, a good made up bed. See that it is level. Then what? If well fed and otherwise handled right, she will be chewing her cud and making milk. In the summer time too they have got to be comfortable to do well. Then along in the fall, when the cold, stormy weather comes, it makes my heart ache to see cows out in the cold.

I will tell you what happened on my place one time. I had one of my boys, about 21 years of age, running the farm. Well he thought he was running it, but the old man was there. He was getting the proceeds. Now, of course, the young fellow had been well instructed in these things. We had 20 cows giving milk and they were making just 28 pounds of butter a day right along. In October, kept the cows in the stables night, because it was uncomfortable outdoors. One morning the boy turned out the cows and pretty soon it commenced one of those drizzling rains. We were in the house, could not work. I wondered if he was thinking of the cows. "It is rather bad for the cows," I said to him. "I guess it will clear up pretty quick," he said. I said no more, but it kept on that slow rain. Every little while he would mention that he thought it wasn't going to rain much longer. As sorry as I felt for the cows, I really hoped it would rain all day just so he would learn a lesson. It turned out that way, and what was the consequence. The butter dropped right down from 28 pounds to 25 pounds. There was a chance for him to figure at 30 cents a pound. They never was brought back and never could be. Do the best he could, didn't turn them out any more, but only got to 26 pounds a day, and that was all he could do. There is no use in telling how much was lost. Suppose he had gone on and left them out another day, there would have been another drop. And then suppose added to that some of the milkers raised a row in the

stable; there would have been a bigger shrinkage than ever. At the end of the year we would have been saying that dairying dont pay any-way.

Cows must be used with the utmost kindness. You have no idea of the power of kindness over the brute. It is just as great over the brute as over the horse. In fact you can't get along without kindness, and do well. There is no cow on earth that will do her best for a man that she hates. If the man hates the cow the feeling is reciprocated. They must love him or they will not do their best for him.

I have written instructions how to milk; how to take hold of the tit, which to milk first, the front or the hind ones. There is no use talking any such thing. All you want is to best please the cow, you will get the milk quicker. Don't keep on stripping when you have got the milk. You must milk at regular times, and it is a poor thing to change milkers. Milk in regular order.

Here is a row of cows and you have been in the habit of commencing at this end of the row. If you will notice that about the time you have got done milking this cow the milk is commencing to drop from the next one. She is expecting to be milked and is ready. Don't miss her and go to another, because if you do you won't get as much, and what you do get won't test so high. I have seen that tried and been telling that to an audience and a man got up and said, "I do that very thing and I was testing the milk and I didn't know what in the deuce ailed it." That is a fact. If a cow is chased by dogs or anything else, you decrease the flow as well as the butter fat.

Q. What is the idea of the voice you speak to a cow?

A. Speak to a cow kindly; there is something soothing in a good natured voice. They know it just as well as can be, especially if you are in the habit of getting mad. If you swear at a cow you don't get much milk.

Q. I would like to know if it is possible to speak in that way when your cow has kicked you over?

A. Do you suppose a cow would kick such a man over?

Q. Yes sir.

A. They don't kick me, and a man asked me that question once. Suppoe she should kick the hired man." I told him just what would happen. That hired man would leave my premises just as quickly as he could get out of the way. No men can milk my cows that the cows hate so badly that they kick them. You may think that is pretty strong, but the man has got to like the cows. If they cannot be conquered by kindness they can't by harshness. They should be treated like human beings.

The most particular time is when the heifer comes in with her first calf. Many a good heifer, well bred and well fed, has been spoiled the first year. I will tell you how I have done. Some cows are so stolid that it makes no difference, but they are not worth anything anyhow. I will tell you how my way of doing is. I am going to have that heifer in a box stall and keep her tame and gentle. Some morning go and find a calf there. That heifer will look at the calf and then look up at you. She is trying to say, "Don't you hurt my baby." After a little soothing she gets over that. I give her half a pail full of warm water and I have the box stall with a board seven or eight inches from the bottom then another board six or eight inches above that, and so on. I go over in the stall and quietly push the calf under the bottom board. I am not going to let her have the calf any longer than possible. Now then, her calf is just outside. While she is looking at the calf I am petting her, and pretty soon I take hold of the udder, and she hardly knows whether I am her calf or the other fellow, and that is the way it goes, and I manage to take the place of the calf in the affection of the cow, and the calf is right outside and I can take the calf away and she gives down her milk just as well as before she had the calf.

One time I had a heifer, and thought it would be very nice and called her Brownie. But I didn't manage just right with her. I let her have her calf for three days, and when I took the calf away she didn't give down freely. I thought my lady would be ready next time. The next milking was the same thing. I had to let her have her calf. The calf took one side and we went in partnership. I thought we could join

forces that way and run the calf out, but it was never a success. That cow would have spoiled if not letting her milk down free, and her milk did not hold out. I took to feeding her so as to take her attention. That is not the best way, but it did better with her. Finally we had a little Dutch boy, 16 or 17 years old. He came to my place and he did love cows, and when he came out there and talked to Brownie, the cow fell in love with him and he milked her for two years, and she was by far the best producer I had. She would always come up to him and love him. After being there for two years he went to Minnesota. He stayed there about nine months, but he was so homesick for those cows he couldn't stand it. He came home and didn't even stop at his father's house, but came right over to my farm and rushed out to see the cows. Brownie mooded and you ought to see the animals rub down his cheeks. You never never saw a man so affectionate over anything in your life. She was just the same cow with him she always was. He governer her by kindness and got the good will of the cow.

I am going to tell you one thing more. One time, several years ago, I was way out west in Nebraska driving in a buggy with a young man, near the close of a June day. We were just passing a sod house. There was a girl coming out of the door, apparently about 16 years old. She was dressed neat and clean, although she had bare feet. She had a nice bright pail in her hand. She looked way off west where there was a large herd of cattle, 500 or 600, and as she looked over she cried, "Come Sukey, Come Sukey!" I said to the young man, "Hold on." We went to one side of the road, and I took out a map pretending to look at it, but the young man was looking at the girl I think. When the girl called that way I saw a Jersey turn and travel right to her as rapidly as she could walk. When she came up she mooded just like when a cow talks to a calf. She patted the cow and said "You good Sukey," and she put her arms around her neck, and pretty soon the cow turned herself around and she sat down and commenced to milk. At first it went ting, ting, and then pr-r-r, and pretty soon the froth was running over the pail, and when the milking was finished she patted Sukey and the cow started off

about two rods and then looked back and moored, and the girl said "Good-by Sukey" and off she went. "There's a dairy maid for you," I said, and he said, "You bet. I thought there was a little choking in his voice. They are some years older now, and are partners in the dairy business, and have a nice family, and they have got the best herd of Jerseys in the state of Nebraska.

DISCUSSION.

Mr. Wright: I wish you would emphasize the kindness to dairy cows. In October I wanted another hand very badly, and in fact I could hardly get along without another hand. I was in Elgin one morning and a young man got off the car. The first question he asked me was, "Do you know of anybody who wants a hand," and I told him I wanted one. "Can you milk?" "Yes sir." "Where have you been at work?" "In Iowa." "I am a herder, am a cattle herder." I asked him what he wanted. He told me. He got in my wagon and went home with me. He had not been with me two or three days when I told my wife I would have to get rid of him. He would spoil every cow in the stable. As soon as he went in the stable the cows would begin to step around and try to get out of his way. And one night I told him he had better hunt another place. I told him I didn't think he was doing justice to my cows and would spoil every cow he milked. I told him we were not getting all the milk we were entitled to. He said what he didn't get at night he would get in the morning. I let him have two or three of the gentlest cows and in a few days they would not let him come near them. I went to the worst one of the herd and I said "Nora, stand over." She stood over. She never stirred while I was milking her. That is the experience I have with milkers.

Adjourned until 7:30 p. m.

Tuesday, January 8th, 7:30 p. m.

President in the chair. Convention called to order.

Music—Song by the Hon. Jules Lumbard, "The Old Sexton." **Re-**
sponded to an encore.

Reading—By Miss Anna Bauman, "The One-Legged Goose." **Re-**
sponded to an encore.

Sing—By the Illinois Quartette. Responded to an encore.

ADDRESS BY J. H. MONRAD.

ASSISTANT FOOD COMMISSIONER, CHICAGO, ILL.

Mr. President, allow me to thank you for the time you have given me on this program. Mr. Jones was unable to come, and yesterday he came down and informed me I should attend this convention, so I have prepared in a hurry this short paper.

Mr. President, Ladies and Gentlemen:

It seems as if fate is against the State Food Commissioner, as, at the last moment, he notified me to express his regret at not being able to attend your meeting, his duties calling him elsewhere. And it seems as if fate is against your Association when it again saddles me on your meeting, like the "Old Man of the Sea." As for myself, I am most happy in having the chance of meeting you again.

It is just fifteen years ago when I had the pleasure of attending your meeting in this very city, and while there has been considerable progress in the Dairy Science since that time, I regret to say that we have not kept step with it in the general practice, neither in the creameries nor

among the milk producers. While we have only just started the work of inspection, the reports received show this sufficiently even if I had not been aware of it before.

Creamery men do not seem to understand the value of ventilation so as to dry up quickly the floors, the ceilings, and utensils. Nor do they always value light enough, forgetting that light not only kills undesirable spores, but enables the buttermaker to see the dirt. Nor do they seem to value paint enough, forgetting the moral effect of a neat appearing creamery inside and outside, not only on the buttermaker but on the patrons.

Milk producers do not seem to understand the value of stable ventilation, drainage, light, and whitewash, carding and brushing the cows and aerating the milk. Ay! even the need of cooling and thorough cleanliness is hardly understood, the consequence is that they easily succumb to the arguments of the slick talking agents of preservatives and are induced to use these as a remedy for neglect of cleanliness, and are thus led to be accessories before the fact in child murder. While the State Food Commission disapproves the use of preservatives (other than salt, vinegar, and alcohol), it is especially down on their use in milk and cream used so much by infants and invalids.

As I notice many present this evening who are not directly interested in the Dairy work, I presume you expect me, as Mr. Jones' assistant, to make a few remarks as regards the State Food Law and its enforcement.

While a great deal of good has been done in the way of enforcing the use of more honest labels, I regret to say that in many ways the law has been ineffective and will remain ineffective until it is modified. Indeed, I may say that Commissioner Jones has prepared amendments which will be presented in the coming session, and I hope you will all urge your Representative to support them.

But this is not all that is needed in order to enforce the laws. We must have the hearty support and co-operation of the public spirited citizens who will not grudge a little time and trouble. Let me illustrate. One of our inspectors, a citizen of this fine city, got on the track of a most

glaring and audacious fraud perpetrated right here. An agent, it seems, went round and took orders for fine creamery butter at a low price "because he had an uncle in the business." The stuff delivered by another man turned out to be oleomargarine, with stencil, without stamp, so that he violated not only the State, but also the Federal law. Yet, when our inspector tried to get private citizens to help him prove the case no one would volunteer. This makes it not only more difficult for us to secure evidence to protect you against fraud, but gives the defendants' lawyers a pretext to accuse our inspectors of "wanting to catch" their client, which he would not have if private citizens volunteered their aid.

Nor is it only by helping us in getting evidence that the citizens should protect themselves, but also by paying reasonable attention to market values. If, as for instance, they were to notice the wholesale price of extra butter to be twenty-four cents, they may reasonably expect to be defrauded if anyone offers it at retail at less than twenty-seven to thirty cents.

The work of enforcing any Food Law must, of a necessity, be more or less educational. That is the history of nearly all commissions.

The standard of honesty varies just as much as the standard of cleanliness, according to our education. And yet that is "no reason why all means should be fair in love, war, and horse dealing" any more than in any other business. We should try to be honest in one and all.

To illustrate why education is needed so as to get a uniform standard of honesty and cleanliness, let me give an example of the latter. Some thirty years ago in Sweden I rented a farm, engaging the farmer as foreman and all the help as well. There were two girls who both were as smart as smart could be at any rough work from loading hay or manure to shearing a sheep or helping butcher a hog. One of these I selected to keep my house and cook my meals. After vainly trying to induce her to wash the glassware, etc., properly, I took a tumbler and held it up between her and the light saying, "Why Lena, can't you see that this is not clean?" "No! Boohoo! No! I cleaned it all right; boohoo!"

The condition of the tumbler was like a Chicago window not cleaned

for two weeks, or—dare I say it—like the average window in our average creamery. The girl was honest and willing enough, but her standard of cleanliness was not quite up to the mark.

And so it is with the standard of honesty. It is very difficult to enforce any law of a higher standard than that of the average people, and for that reason I appeal to the citizens for their hearty support of the Food Commission.

You will, later on, hear a paper on "Chicago Milk Market" by Dr. Eaton, State Analyst and expert chemist, who, in St. Paul and Chicago, has given considerable thought to the subject of marketing milk. He has during the past year, analyzed some seven hundred samples of various food products.

While, as I said heretofore, our work has been chiefly educational, we have also secured several convictions and have several other cases pending and shall be only too glad to receive pointers as to violators of the law which will be used without disclosing the names of our informants, unless indeed they are patriotic enough to volunteer their evidence in court.

Those interested in our work will be able to get a copy of the Annual Report, now in the Printer's hand, by writing to our Chicago office, 1623 Manhattan building.

And now, Mr. President, allow me to thank you and the members of this Association for your kind welcome.

If there are any questions as to the Food Laws, or regarding our work, I should be most happy to answer them.

Mr. Long: Has the anti-color law of Illinois been repealed?

A. It has not. The National Dairy Union took a case and got it as far as Judge Hanecy's court. He adjudged it unconstitutional. We had two color cases, and to our surprise, really before the lawyers knew where they were, these people preferred to plead guilty and pay the fine. The next day we had six more color cases, and they had one of the best lawyers, and he raised a question before the judge that he had no jurisdiction,

and the judge refused to take any action in the matter. We appealed the cases and we hope to bring them up in the higher courts.

Mr. Coolidge: Would it be proper for you to state something of the nature of those amendments that are to be brought before the legislature on the Pure Food Law?

A. The main thing is a clause which we have in the oleomargarine law, that "No person shall by himself, his agents, or employes," etc. This makes the storekeeper responsible for his clerk.

We had a case against a very prominent grocer on the North side whose clerk was caught selling colored distilled vinegar for pure cider. The facts were not denied. We had absolute proofs. And to my great astonishment this so-called respectable merchant said: "We did not give instructions to our clerks to sell it that way," and the court upheld them and declared them not guilty.

Another one is, the present law does not allow the commissioner to employ legal help, outside of the State's attorney's office. If any of you gentlemen would go up and visit the State's Attorney in his office one day, or even one hour, you would be impressed with the knowledge that we stand a very small chance of getting before a jury, when there are eight hundred or a thousand cases before ours. They are crowded so that it is virtually impossible to do all the work. We have been put off from time to time. We are now compelled to make a criminal case, set into motion the grand jury, and then take the case before that jury, and why? Because a man has been caught selling a pint of colored distilled vinegar as cider. It is absurd for a first offense to make him pay a fine of fifty dollars and make a criminal of him, instead of taking him before a justice of the peace and fining him five dollars for a first offense. The second offense should be a criminal offense. That is what we are trying to have changed.

I may say to the creamery men present that at my suggestion we are going to try and make it compulsory by law to register and fill in the blanks reports sent out to them. Out of six hundred sent out, we received only one hundred and twelve replies. The law should compel the

filling of those blanks, and I know that it can be made the means of valuable education to the creamery man and the dairy farmers.

Singing—By the Illinois Quartette. Responded to an encore.

Colored specialties. Responded to an encore.

ADDRESS BY A. B. HOSTETTER.

SECRETARY ILLILNOIS FARMERS' INSTITUTE.

Mr. President, Ladies and Gentle men:

If the remarks to you are worthy of a title, I will call them "Looking Backward." I thought it might be interesting to you, being the dawn of a new century, to call your attention to a few facts which will illustrate some of the conditions which have existed in Illinois during the last century, which will never recur, and which will only be known hereafter in the annals of history.

When the century, which has just passed, was yet in her teens, Illinois was practically a wild and unsettled territory, with the exception of a few settlements along the Ohio and Mississippi rivers and a few trappers; it was uninhabited by white people.

A traveler, or rather an explorer, about the beginning of the last century, wrote back to his friends in New England as follows: That the territory bordering on the Rock and Fox rivers was habitable; that these rivers were navigable, Rock river as far as some point in Wisconsin, and Fox river as far as Fox lake. He told them that any people who were willing to face the hardships of a pioneer life for two or three generations, could find in the territory drained by these rivers, natural advantages almost equal to New England. As for the rest of Illinois, it was a great waste of barren land. That is was as flat as a pancake; rich in grass, where gnats were as big as toads, and where there were

buffaloes and rattlesnakes, the one with dreadful face and the other with dreadful sounding tail.

When the last vestige of the Indian tribes had been driven across the Mississippi to return no more for ever, and the people began to come from the east to make their homes in Illinois, then the early settlers came mostly overland in wagons. Generally these wagons were drawn by oxen, and frequently the oxen were the offspring of the family cow which followed the wagon and furnished the main food supply for the support of the family while on their journey westward.

They did not anchor until they found some timbered spot and water around. Thus it was that the first homes in Illinois and the first dairies were located by running waters, and were of the type described by Whitcomb Riley as being "Out at Old Aunt Mary's." The family cow filled an important place in the history of the State. As the settlement grew, whether on the farm or in the village, or in the town, they always kept a cow or two. In fact, for a number of years, the larger number of cows were owned in the town.

The Illinois towns were not laid out and built as Boston was, on each side of the cow paths, yet the cow paths in Illinois were important factors leading as they did from the settlements to the prairie pastures. They were the thoroughfares by which strangers found settlements and by which visitors took their departure.

As the country became more settled, and the farms were cultivated, and the farms began to encroach upon the common pasture, then the cow, especially the town cow, became a factor in State politics, and laws were proposed and enacted either for her protection or her restraint. Many an aspiring candidate for legislative honors attained victory or met his Waterloo, according to the side of the fence on which he stood in respect to the rights of the town cow.

Long after the common pastures were things of the past, the town cow claimed the right of eminent domain and continued to pasture on the highways. But the town master, who began early to make the road beds, shortened the pastures of the highways and compelled the town cow to

invent schemes for overcoming the barriers of a legal fence that she might satisfy her appetite on crops grown for other purposes.

Such schemes and conduct on the part of the said town cow led to innumerable lawsuits in the lower courts, and made young attorneys to prosper financially. The old brindle cow with the crumpled horn became an expert in opening gates and in picking out the finest garden patch. She not only tossed the dog and worried the cat, but she shook the whole town, and took pride in leading the whole town herd into all sorts of trouble. She created neighbor quarrels and slanders and tears and profanity. As the State grew in popularity and resources, the villages became towns and the towns great cities, and in this process of development the town cow, as Ex-President Cleveland would say, went into innocuous desuetude.

In the establishment of dairies and creameries the country and city storekeepers endured trials and tribulations. To handle their customers, and at the same time handle their dairy products required on the part of the store keepers a degree of diplomacy, which, were he living today, would justly give him a seat in an International Peace Conference.

In the first Illinois State Fair which was held near Springfield in 1853, according to reports of the Agricultural Society, no dairy cattle were exhibited, but premiums were given on the best butter made in thirty days. They put a limit of thirty days to gather the cream. The first premium was a diploma and the second and third \$10 each. The Committee reported in writing that the dairy household and general farm products exhibited, with a few notable exceptions, were uninteresting and discreditable to the regions which produced them.

In 1854, the State Fair offered premiums for the best fifty pounds of butter made in May and June, butter to be exhibited in October. At this fair of 1854 the committee on milch cows expressed their unbounded surprise and deep regret that at such a splendid exhibition, one milch cow, solitary and alone, should be presented for premium. The cow in question named White, according to statement, fed on grass alone, yielded sufficient milk in ten days of the dry month of August to make $17\frac{1}{2}$

pounds of excellent butter, which appeared on the fair ground in October in good condition. The marvelous preservation was due, no doubt, to the fact that bacteria had not been discovered, or possibly the bacteria had not learned at that date that they could live in butter and propagate. From this statement it must appear that if the early settlers had had the skill of the modern dairyman to breed dairy cattle on dairy lines, we might have today in Illinois a breed of the lineal descendants of these pioneer cows, and from their keeping products would excel the later breeds.

Men on this Committee were wise in their generation for they complimented very highly and gave a premium to a team of five yoke of oxen. A remarkably strong team, and the committee suggested "the propriety of using more oxen and less horse labor on the farm." Think of this in Illinois as late of 1854.

Another remarkable exhibit at this State Fair in 1854 and the only dairy implement on exhibition was a thermometer churn. Just what it was like we were unable to learn, but it never came into use, for the buttermakers of that period knew well enough that without such contrivances that sometimes the cream needed warm water to make the butter come, and sometimes cold water, and if the churn had been bewitched, or the cows bewitched, that neither hot nor cold water would have any effect, and if the cream itself was bewitched and would grow and grow as it was churned until the churn was full even to running over, that a good churn was worth more than all the thermometers in the market.

There were, however, all through these years some good buttermakers, good housekeepers, who, in spite of all their unfavorable environments, knew how to do the right thing at the right time to accomplish the desired end. These few kept alive a taste for good butter, and the demand was always greater than the supply.

The rapid growth of Chicago and the natural advantages of northern Illinois and southern Wisconsin invited the practical dairyman from eastern states and stimulated investment in dairy farms and herds. These men realized the value of good dairy products, and the drag upon the market of inferior stock. They believed in co-operation and the education of

those in the dairy business from start to finish. They therefore early in the '70's organized the Illinois State Dairymen's Association and began at once a campaign of education. From the birth of this Association to the present time there has been continuous growth and development along dairy lines in Illinois. I had intended to give some facts regarding the early history of this Association, but could not find in Springfield any copies of the early reports, and I would suggest that if any member, or any officer of this Association has a set of the Illinois Dairy Association reports to spare that they send them to the Illinois State Historical Library at Springfield. They would be taken care of by the State and become a valuable part of the State's history.

The most of you are familiar with the Illinois State Dairymen's Association. They have demonstrated the necessity, the utility, and possibility of education along practical dairy lines. You know how, by the annual exhibits of dairy product and the careful scoring of the same, the butter and cheese has been improved. The dairymen inaugurated the idea of educating by public discussion and a comparison of experiences, which plan is now so general and beneficially used in the Institutes of the State along other agricultural lines. The influence of this Association has raised the business standard of the dairyman himself and made him a better citizen. It has called to its assistance the Professors of the Universities and brought them into closer touch with the industrial classes. It has brought the discoveries of the chemist, biologist, bacteriologist, and botanist to the farmer and dairymen and adapted them to his comprehension and use. It has encouraged and taught the cattle breeder to breed for special purposes, and demonstrated the value of a balanced ration in economical feeding. It has been the pioneer to introduce the silo and silage, thereby utilizing the entire corn plant to the best advantages.

It has also relieved the housewife of the arduous labor of caring for the milk and made farm life more attractive and enjoyable. The Dairymen's Association has helped scientific investigation, and put into common use and daily conversation, terms which a few years ago were heard

only in the colleges. These terms are not always understood, as for instance, I heard an Irishman say to his friend, "Don't drink that water, it has microbes in it." "Well, and what are microbes?" "Sure they are bugs," says the amateur scientist. "But I don't see any bugs." "Well, they are there, but you have to have glasses to see them. In Germany they call them germs; in France they call them parasites, and in Ireland they call them mike-robos."

We have named but a few things that the Dairymen's Association has helped to accomplish, and the wonder of it is that it has all been brought about within the last quarter of the last century.

The chemist tells us that the elements which compose dairy products come from the sunshine and the air, and in selling his products the dairyman is not selling of his soil fertility. This is why the dairy farms, although many of them are the oldest farms in the state, are yet the most productive and are constantly gaining in soil fertility. This is also why there is more sunshine in the dairyman's home and a better and more attractive air about it than found in the generality of farm homes.

We live in an age of investigation and experimentation and our great progress has been due almost entirely to the discoveries of the scientist. The things that have been helpful to dairymen, like the Babcock test, the cream separator, the cream ripener, etc., were all developed in the laboratory by men skilled in scientific investigation. The colleges and the universities should have full credit for the good work they have done. But we cannot overlook the fact, that the same spirit of investigation and experimentation, and the same degree of intelligence which has given us the good things, has also given us the adulterations, imitations, and frauds that are in vogue. We need therefore to appeal to those who are interested in the higher education for a corresponding higher moral business standard. But I have faith in the integrity of the masses of the American people, and believe eventually the right will prevail.

What the next twenty-five years has in store for us no man can tell. Eye hath not seen, nor ear heard, nor heart conceived of the things that may take place. It behooves this Association, however, as the sponsor

and instructor of the everyday farmer and dairyman, to try in the school of practical experience the results and reports of the experiment stations before advocating them as good methods for the dairymen to follow

Some English professors have been experimenting to ascertain the influence of music upon the dairy cow, for the purpose of increasing the butter fat in her milk, and they are about convinced that when the music and the temperament of the cow are brought into perfect harmony, the butter fat is perceptibly increased. If this be true, it will make radical changes in their methods. The dairy maid will be again restored in the dairy industry in a new role. It will open up a new field for the young lady. They will be able to contribute to the profits as well as the pleasures of the family. The piano will be set up in the barn as well as in the parlor, and the sweet girl graduate will discourse sweet strains, and will play serenades, nocturnes, sonatas, and concertos during milking time.

Before putting this idea into general practice, I would suggest that it be tried moderately at first and see what effect it has upon the cows.

Joseph Wink, in Baltimore American, warns you of some of the possibilities, in the following lines:

The meek and lowly Alderney,
The sad-eyed Jersey too,
The Holstein, with her stocky shape
With musically "moo."
The other breeds of cattle, and
The ordinary cow
Will listen with attention, for
We'll milk to music now.
We'll play old Schubert's "Serenade,"
Likewise the "Maiden's Dream,"
And every cow in all the herd
Will furnish us ice cream.
The band will strike up "Dixie Land"
Ere that tune is commenced
The cows will give us milk for war—
And that will be condensed.
Or, if we play a lullaby,
'Twill soon be understood
And all the kine will let us have
The best of baby food.
And when we play some drinking songs
In one melodious bunch,

We hope the cows will see the point
And serve us with milk punch.
But we'll keep clear of rag-time songs
And Streets-of-Cairo airs,
Likewise of Midway interludes
And similar affairs.
We will not play the ancient tunes,
Nor others of that ilk—
For the cows will be confused
And all give buttermilk.

Mr. Monrad: I wish to heartily approve of Mr. Hostetter's idea, that the Secretary be instructed to turn over copies of the reports which we have. When I was secretary, I was instructed to try and get as many copies together as possible, and through the kindness of the editor of the Farmer's Review and Mrs. Kelley, I secured a good many of them, but not all. These were turned over to Secretary Caven and he has complained to me that he had nowhere to keep them safely. I think it is an excellent proposition to place them in the Historical Library in Springfield. If Mr. Hostetter will make it a motion.

Motion made as suggested, that the Secretary be instructed to deposit these volumes in the Illinois State Historical Library in Springfield for safe keeping.

Moved and seconded.

There were two years that we had no State appropriation and I think that Mrs. Kelley has the reports of those two conventions in the manuscript, but they never have been written up. There is a chance for some liberal-minded member to have them typewritten and put in along with the other reports.

The President: Are you ready for the question. All in favor of the motion say "I."

It is carried.

Mr. Thompson of Elgin has shown me the fourth report of this Association. It is quite a curiosity I assure you.

Committee on Nominations—M. Long, H. H. Hopkins, J. H. Coolidge, J. G. Soverhill, W. J. Fraser.

Committee on Membership—A. J. Sherer, F. A. Carr, Irvin Noian,
Joseph Newman, J. H. Biddulph.

Reading—By Miss Anna Bauman.

Moved and seconded we adjourn. Carried.





DAIRY HERD AND BARN, YORK, ENGLAND.



MILK DEPOT, BATH, ENGLAND.

DAIRIES OF EUROPE.

One of the most entertaining and instructive numbers on the program was a lecture by Prof. W. J. Fraser of the University of Illinois on the "Dairies of Europe," or rather those of England, Holland and Denmark. This lecture cannot be satisfactorily given here for its distinguishing feature was the stereopticon views illustrating the points visited. The views were from photographs taken by Prof. Fraser during his trip and were over one hundred in number. A few are given here—just enough to show the character of the lecture on the point of illustration. The professor's remarks were largely references to the views, but omitting those, what he said is here given as well as it could be reported.

ENGLAND.

"I want to tell you tonight of a little trip I took across the water that you may know something of dairying in the countries of England, Holland and Denmark.

"Dairy methods and practice in these several countries differ very materially in many particulars and are all quite unlike our own.

"We first visited the beautiful old country of England. The principal characteristics of English dairying are, that nearly all the milk is produced by dairy shorthorns and not by cattle of a strictly dairy class. The larger part of the butter is made in dairies instead of creameries, and that they make sweet cream butter.

"We crossed the Atlantic on the Campania of the Cunard line, landing in the harbor at Liverpool. From there we took the train for a day's ride to the City of Bath in southwestern England.



CHEDDAR CLIFFS—CHEDDAR, ENGLAND—WHERE CHEDDAR CHEESE WAS FIRST MADE.



COWS IN PASTURE, HOLLAND.

"The landscape of England, with its beautiful and neatly kept hedge rows, slightly undulating fields dotted over with trees, and almost invariably filled with good stock, makes the most beautiful country the agriculturist could imagine.

"The typical farm cottage is very substantially built, yet great attention is paid to the artistic. The cottage is usually covered with beautiful vines.

"We met Mr. Smith, a most delightful old Scotch farmer, who lived in one of these typical farm houses.

"The kind of cart the English farmer uses has usually a double seat to carry four people.

"The English roads are finely macadamized and with beautiful trees and hedge rows on either side.

"You see cows and calves in nearly every pasture.

"We visited the show of the Bath and West of England Society, which show was held at Bath, and is second in England only to the Royal, and as it is in the dairy section of England, had a better dairy exhibit than the Royal. We viewed from the amphitheatre the parade of stock in the show ring of Guernseys and Jerseys. The dairy breeds were well represented by the Guernseys and Jerseys.

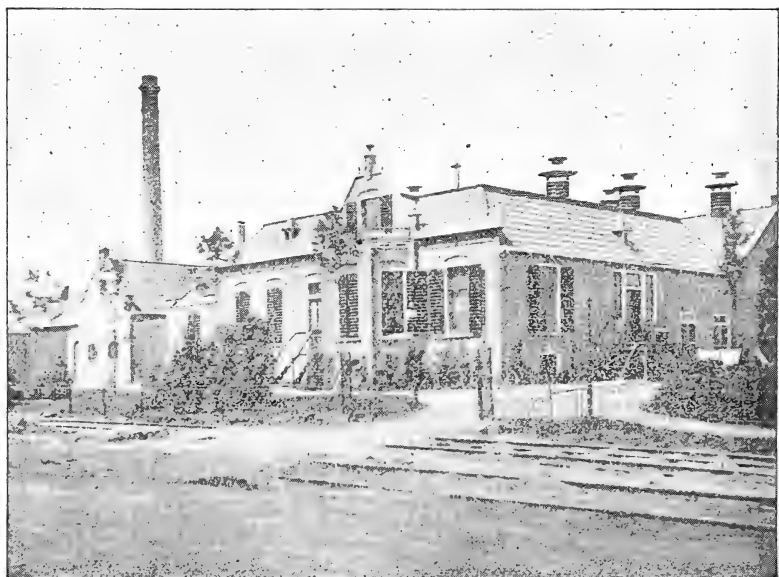
"We saw there a milking contest in progress at the Bath show. These are quite prominent features, participated in only by dairy maids. Each maid milks three cows and the premiums are awarded on rapidity, manner, and cleanness of milking. We might well take a lesson of our English brothers in this, as the milking is an all-important part of dairying. As is usual, there were exhibits of the different firms handling dairy utensils and supplies.

"We also visited the dairy hall, where the dairy contests took place in the different dairy operations and where instruction was given in dairy methods at different times of the day. In one of these contests thirty-seven dairy maids competed in butter making. As much of the butter of England is made in private dairies this work is very popular.

"The Butter exhibit was one of the most beautiful displays of butter I ever saw. The tables had been covered with soil and sown thickly



CHEESE MARKET, ALLMAAR, HOLLAND.
60,000 Edam Cheese Piled on the Pavement.



Creamery and Cheese Factory, Seeuwarden, Holland—Cost, \$50,000.

with grass seed about ten days previous to the show. You can imagine the pleasing contrast of the yellow butter in the green grass. There was a good exhibit of cheese, showing the several different sizes and shapes.

"We then left the show and visited one of the milk supply plants in the city. They showed us the cooler over which the pasteurized milk is passed to reduce its temperature. Also their milk churns and delivery carts on which they are hung. They are an odd sight. These delivery carts with churns and equipment of pails. They handle and deliver their milk entirely different from what we do.

"The British dairy school at Reading, England, is the best dairy school in that country and they have a very fine building and equipment.

"We next visited the show of the Royal Agricultural society, which is the finest annual agricultural show in the world, and alone is worth to American agricultural students a trip across the water to see. Their exhibits are all arranged in avenues and at this show there were about a dozen."

Among the English views shown were English landscape views, including pasture views; a typical farm cottage; barns and herds of a Scotch farmer; English cart for delivering milk; typical English road; cows and calves in pasture; Guernsey and Jersey herds; view of a milking contest participated in by dairy maids; exhibits of dairy utensils; scenes taken at the Bath agricultural show; British dairy school; row of cattle sheds; several first prize cows and heifers; barns and house near York; hay barracks; interior of cow stable—feeding alley; interior cow stable—tables to hold two, sides whitewashed; view of herd and barns; the typical dairy cow of England—the Short Horns.

HOLLAND.

"On the evening of July 3d we sailed from Edinburg, Scotland for Holland. After spending the Fourth on the North Sea we entered the mouth of the Maas river at two o'clock on the morning of July 5th, and by the dim light of the early dawn we got our first view of Holland with its canals and level fields as we steamed slowly up the river to Rotter-



No. 1—Front View Holland Country House and Stables Under One Roof.



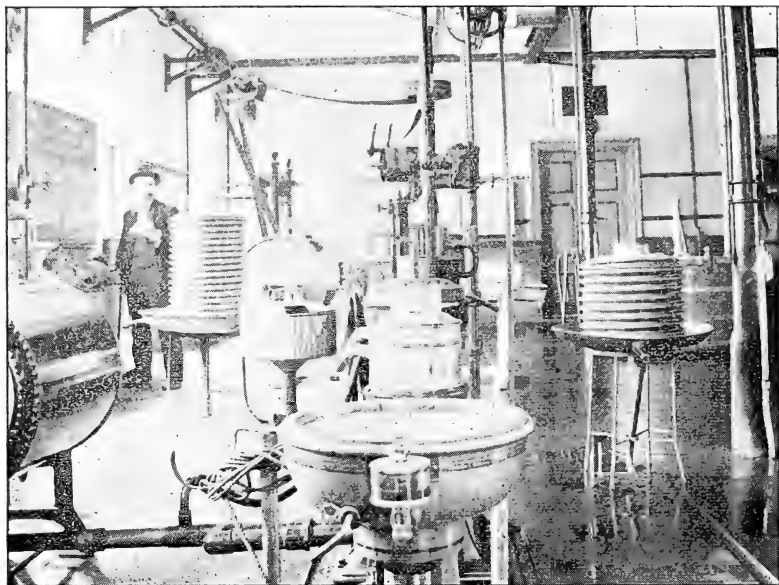
No. 2—Interior Cow Stable, Holland.

dam, about twenty miles from the mouth. Here we made our first acquaintance with the Dutch customs and with the chief product for which Holland is noted—cheese. We paid a visit to the commission firm of Leaming & Sons, which is one of the largest firms dealing in cheese in Holland. They have a very fine building and shelving capacity for storing 600 tons of Edam and Ganda cheese. Mr. Leaming, although a very busy man, showed us every attention and gave us much valuable information about cheese. We were allowed to sample cheese of every description; some were made to the queen's taste and others skims were so hard and tough it was almost impossible to get the tryer into them. He showed us Edams ranging in price from 7 cents to 20 cents per pound.

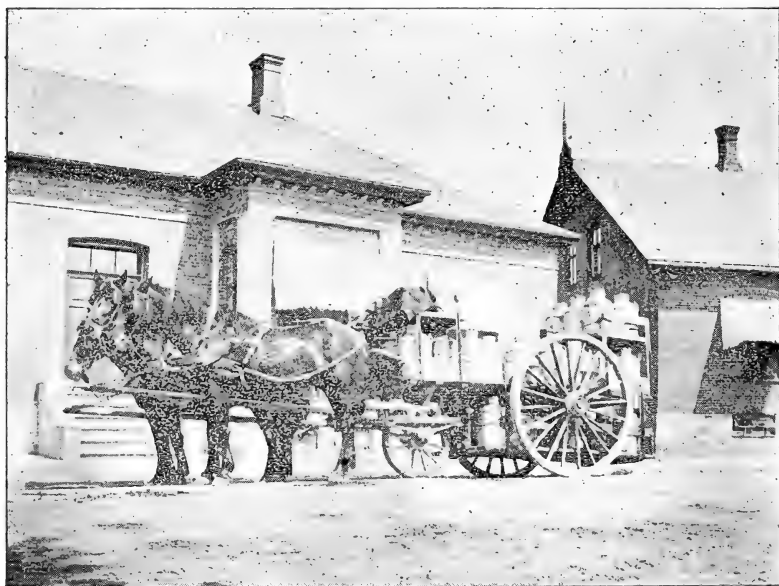
“Holland has been famed for her dairy cattle for centuries, and indeed, deserves her reputation. Numerous as were the sheep on the Cheviot hills of Scotland even more numerous seem the black and white cows in the pastures of Holland. Herds of dairy cattle were on every hand. There is little grain farming, or mixed husbandry, and almost no stock of any kind excepting dairy cattle are to be seen in Holland. The caring for the cows, gathering food for them, and the manufacture and sale of the product occupy the attention of the people to a degree difficult to comprehend by one who has not been among them.

“I cannot do better to show the esteem in which the Dutch hold their cattle than to quote from the lady traveler, Eleanor H. Patterson: ‘The two lions represented upon the heraldic shield of the Netherlands might well be replaced by two black and white Holstein-Friesian cows, for the masses of the people worship cows. Cows they watch sometimes with more care than they give their own children; cows they nurse through sickness; cows they save their money to buy, and of cows they talk while awake and dream of while asleep. Children are brought up with the parental reverence for cows, and no member of the human family is thought too good to sleep under the same roof with the beloved kine.’

“Holland is a country usually ignored by tourists, yet full of dairy interests, instructive sights and quaint old customs.



Interior of Portion of Swedish Dairy School Near Malmö, Sweden.



DANISH MILK HAULER.

"Here is a country where the land is worth from \$500 to \$1000 per acre, yet these people produce butter and cheese and place it upon the European markets in successful competition with that produced on lands less than a tenth their value. With this fact staring us in the face it looks as though we might learn some lessons from them in economic production, notwithstanding the fact that they live in their cow stables, mow their grass by hand, and wear wooden shoes.

"Their success lies in their economic methods, the character of the cattle they keep, and the excellent care they give them."

The views from Holland were:

Typical Holland scene, showing canals and level fields; canal in Rotterdam; front view Holland house and barn under same roof, as is customary in North Holland; Holland cow-stable; interior same stable; cows being milked in pasture; sitting room same stable, showing table chairs, pitcher and glasses where we were treated to milk; typical view of house and stable, showing surroundings; typical view of canals and mills, showing how numerous they are; farmer's wagon bringing milk into Amsterdam, no shafts to wagon, haul milk frequently in wooden kegs; kind of bottles used for milk; milk delivery in Amsterdam; dog cart frequently seen on the roads of Holland, and in this sort of cart a large part of the products are hauled to town; wooden shoes on driver, kind commonly worn by farm laborers; creamery and cheese factory, cost \$50,000; tank in which cream is ripened—these tanks are about six feet deep, are raised and carried to churns by craine; cheese shown in neat room; milk tanks in cheese room; Edam and Ganda cheese dresses; Edam cheese market at Elkmar on market day; farmers bring cheese to this market every week or every two weeks and sell to commission buyers; cheese market; canal in Elkmar, showing cheese market—house in distance where cheese are weighed.

DENMARK.

"We next visit the little country of Denmark which we can scarcely realize is only one-fourth the size of our State of Illinois, yet this little

country produces annually 170,000,000 pounds of butter, 100,000,000 of which are exported. It not only exports this enormous amount, but has a world wide reputation of making the best butter of any country on the globe.

"We ask, how can little Denmark with the average price of land at \$600 per acre capture the English butter market from the United States. The answer is simply this. They send men over and study the English market, find out the kind of butter that England wants, and then go home and make that kind instead of doing as the Yankee—try to educate the Englishman's appetite up to filled cheese.

"The second reason is, that they co-operate and help each other in every possible manner, in place of the practice the American farmers indulge in—pulling in as many directions as there are men in the community. The Danes have co-operative slaughter houses, co-operative egg sale houses, and co-operative creameries.

"The third reason of their success is that they just go about it and do things with good honest hard work and always produce a uniform product.

"The Danish government appropriates \$14,000 annually to the dairy school simply for the scoring of butter. Eight hundred and twenty factories and dairies send in a cask of butter whenever called upon to be scored. This is done every two weeks, about 100 casks coming from as many creameries. These are scored by nine judges and scores published and also sent to butter makers so that each can see where his butter is lacking and remedy it. This does a great deal toward producing a uniform product throughout the country."

Among the Danish views were the following: Road in Denmark, showing manner of raising trees and harvesting the lumber; cottage Denmark, Prof. Henry sitting on step, showing whitewashed dwelling and shed, thatched roof with cross sticks on ridge and storks nest on corner; barn on large farm, thatched roof, and stork nest in wagon wheel; other side of court showing horse barn; corrugated iron roof over barnyard, very cheaply constructed and having no supports; one side of cow stable

containing 250 cows; cow stable at Danish Agricultural School, Odensie; cows, same school; cows belonging to Agricultural College of Malmo, Sweden. This college was milking 150 Holstein, thirty Short Horns, and had stable only half full; enough more dry cows and heifers in pasture to fill stable and a large number of calves. No college in this country can make anything like such a showing as this. Dairy room, same college. They have as fine a dairy building and equipment as I have ever seen at any place. Hauling milk in three wheeled wagons.



WEDNESDAY MORNING, JAN. 9, 1901.

Convention called to order. President in the chair.

POULTRY ON THE DAIRY FARM.

BY F. M. MUNGER, DE KALB ILL.

Just why the majority of dairymen do not make poultry pay is not a very hard problem to solve. The failure arises mainly either from indifference or ignorance of the needs of poultry for profit.

Now, would any common-sense dairyman start the business with milch cows that in their prime would only turn out 75 pounds of butter per year, and expect them to rustle around the straw stack for feed, and be sheltered from the blasts of winter's snows around the corner of the barn, and make dairying pay? We should say, No.

Now, the twentieth century hen will improve the 150 eggs record, and 200 eggs per year or over will be the mark. Even greater records than this have been obtained already by the hustling American hen, and 217 eggs per year from the thoroughbred White Wyandotte is only parallel with the enterprising dairyman's cow, the Jersey, that turns out 500 pounds of butter per year.

BREEDS.

In respect to breeds we have a few words to say. Most people have their fancy about breeds, but all breeds are not the most profitable.

We are having many inquiries from those who would like to know if standard bred poultry can be raised on a farm with profit? We know of no place where the profit can be as great, provided right management prevails.

The man who is raising poultry for both eggs and meat will find the solid white varieties have an advantage in their favor as egg producers, and the White Wyandotte as a winter egg producer will equal any breed and surpass many. To be sure the advantage is slight in market, but the up-to-date poultryman catches every plum that drops.

The barred Plymouth Rock can hardly be beat for an all around breed, as table-birds and egg producers, but the White Wyandottes are still better producers of large eggs in winter.

The lazy hen is not profitable any more than the lazy man or woman. It is, however, a trial to the poultryman to keep hens active in winter; the tendencies are entirely towards sluggishness, but no animal can maintain health without exercise, and the question arises, which is the surest way to induce poultry to hustle and exercise? First, we must not feed too heavily, or make it too easy for the birds to get their food. They will not work unless obliged to, and in this way are not unlike members of the human family. We should give the birds their food so that they would have to scratch for it. Let them out of their houses as often as the weather permits. The profit in winter depends much, if not altogether, upon their being kept warm, well housed, and receive proper care.

HOUSING.

In wintry weather, poultry must have regular systematic care and housing if they are to be a source of profit. If their houses are roomy, warm, and comfortable, they certainly will be a great source of profit, with the price of eggs that always prevails in winter. If their house is not warm, then bank it well with hay, straw, and fodder, so easily obtained on a farm, and that can be so quickly applied.

The simplest poultry house is the best. We will suppose you want to winter fifty heads. Build a house 9x20. Use 2x4 for top and bottom.

Twelve foot common boards will work right for the sides; cut them into seven and five foot pieces; nail the seven foot pieces on the south side or front, and the five foot pieces on the north side. Your 12 foot boards will cut right for the ends, the slope varying the length of each piece. Good ten foot boards will make a good roof if covered with felt, well tarred, and overhead inside should be lined with cheap boards, and the sides well covered with tar felt paper.

Perches, drop boards, and neat boxes can be arranged as suits you best, only allow the fowls the full floor space. Put a board partition in the center with a well fitted door, as part of the house must be for a scratching shed. Chaff, hay, or clean straw, six inches deep, will be needed to scatter the grain rations in. The house must be tight at back and sides, as drafts of air, even in warm weather, will do damage. Fowls will not thrive when drafts of air come on them at night.

The building site is of much importance. It should be well drained, sheltered from west and northwest winds and have a decided slope to the south. Time was when all the glass that could be got into the front or south side of a hen house was thought necessary, but now it has been proved a mistake, and windows for lighting only have been found the better plan. The house must be dust dry, warm, well ventilated, and kept scrupulously clean if you expect hens to do well in egg-production in winter, and for this not only housing but the right kind of

FEED

will be required for profit. One great reason why many do not succeed with poultry is because they do not know how to feed them as they should. Large fowls require different management from small ones. They are naturally inclined to be inactive, and unless you feed them in a manner to make them active, they will not keep in good laying condition.

Leghorns are not likely to get over-fat and quit laying. A Leghorn will leave corn on the ground and chase after a grasshopper, or hunt for a bug or worm, while the larger bird will fill up on corn and stand around waiting for more.

A lazy man who simply throws lots of corn to his poultry winter and summer, will not get eggs in winter, and only a few in summer. Learn to manage each breed to the best advantage, and then you will not condemn all breeds as being worthless and not paying for their feed.

Clover provides the hen with a much-needed substance, and, is as much an egg-producing material as it is a producer of milk. It supplies hens with substances that are lacking in their general for for heating. It is rich in nitrogen and mineral matter, and contains lime in soluble form for ready use. Chopped clover scalded may be given every other day to good advantage, and chopped vegetables will not serve as a substitute.

Meat rations of some nature must be provided and green bone, if good health and plenty of eggs in winter are to be produced. On the average farm, there is much that goes to waste that should be utilized for poultry, that would lessen the feed bill and increase the profits.

It seems almost needless to say that grit and water must be plentifully supplied. They are as necessary as food if you expect winter eggs, and winter eggs are a luxury when they bring you from 25 to 50 cents per dozen, as they generally do.

When traveling through the country one will see large fine barns, and good buildings for storing machines and for stock; all are good except the poultry house, and the "biddies" have nothing but a little eight-by-ten leaky board roof affair, not fit for a hog, and yet many farmers depend upon the chickens supplying their tables, and buying many other things about the house, and they neglect the hen shamefully. No wonder they get no winter eggs.

The common scrub hen often does her duty in supplying eggs for the farmer, coffee, sugar, and other luxuries, but the thorough-bred fowl will bring greater profit than mongrels, and why should not the farmer have them?

In closing, we would say that the dairy farm is just the place to succeed in profitable poultry business, and if the dairymen fails to succeed, we have given you the reasons, and the sooner he gives as good care to his thoroughbred fowls as he does to his dairy cows, he will reap larger profits with less expense and trouble.

BUILDING UP A DAIRY HERD.

PROF. FRASER FOR PROF. KENNEDY OF URBANA, ILL.

Ladies and Gentlemen:

As I am on the program again today I will endeavor to make my remarks as short as possible, although I think this is one of the most important subjects on the program, the establishing of the dairy herd and doing it properly.

Dairymen do not realize, I think, the great differences in cows. That is one of the most important things of cows, in establishing a dairy herd and so I have a few figures from some grade cows we have at the university that I would like to show you first.

We had three grade cows and we fed them for a week or two to see how much they would consume naturally. Rose and Nora consumed about alike, and the other one only ate two-thirds as much. It is not frequent that two cows will consume the same amount of food, although for the two or three weeks these cows did.

	ROSE		NORA			Ratio N-R	MAUD			
	Milk lbs.	Fat lbs.	lbs.	Milk Ratio N-R	Fat lbs.		lbs.	Milk Ratio M-R	Fat lbs.	Ratio M-R
4 wk. E. June 26	1207	55	871	1.4	29	1.9	665	1.8	27	2.0
11 " " Sept. 11	3081	136	2322	1.3	82	1.7	1783	1.8	68	2.0
11 " " Nov. 27	2336	123	1759	1.3	71	1.7	1284	1.8	62	2.0
5 " " Jan. 1	768	40	566	1.4	24	1.7	455	1.7	22	2.0
Total	7392	354	5518		206		4187		179	

Q. Were the cows the same weight?

A. They did not differ very much.

Q. What breed?

A. Grade cows.

Q. What kind of grade?

A. The dairy type, no beef qualities about them at all.

Q. What we call native cows?

A. Yes, that might be. Some of them had some Holstein in them. They were all red cows, solid red. I do not know the breed and could not find out about that.

In a period of 31 weeks the totals are shown. They run very nearly the same for the 31 weeks. The cow Rose gave 7892 pounds of milk and 354 of butter fat. This is butter fat and not butter, and the milk was tested right along so that it was not estimated at all. All the milk was weighed and tested.

The cow Nora gave 5513 pounds of milk and 313 of butter fat.

You will notice that Rose and Nora got the same amount of feed. They ate exactly the same kind of food and the same amount and yet Rose produced 354 pounds of butter fat, Nora 313 pounds and Maud only 179 pounds. You might think that this cow was the more economical butter producer at first thought than the cow Maud, but when taking into consideration the amount of feed, Maud made butter more economical than this one did.

In comparing these two cows which the greatest difference is between I think Nora gave 1 pound and Rose gave $1\frac{3}{4}$ pounds. Nora was a very fair cow, 206 pounds of butter fat in 31 weeks, probably 250 pounds or more in the course of a year, which would be considered a good cow.

If she is paying expenses you will readily see what you get from the cow Rose. You would get three-fourths of a pound more profit.

Mr. Hostetter: What was their personal appearance?

A. Wait a minute, Mr. Hostetter, I will show you the pictures later.

In the ratio of the milk you will see that when Rose gave one Maud gave $1\frac{3}{4}$. You cannot depend solely upon the amount of the milk that they give, but show the amount of butter fat that is in it.

In comparing these two, Maud with Rose and Nora with Rose, we have to take into consideration the amount of food consumed. If a cow is a small eater and produces as much butter fat she will be more economical.

Mr. Gurler: You speak of taking into consideration the grade of

milk and butter fat. In my experience in laboring with my creamery patrons, they are altogether too liable to run away with the test of their milk. They will try that alone when we test the individual cow and want to multiply that with the amount of milk; compare their test and talk about what their dairy test is, the percentage of fat. It is along the same line of thought but taking hold of the other horn. They run away with one thing when they should compare them.

A. In order to take the butter fat you can't take the test alone or the butter fat alone.

Mr. Soverhill: Did Nora put her feed into fat instead of going to milk.

A. No, but very little more than Rose did.

Mr. Gurler: Where did that extra feed go to that Rose made so much more?

A. No, I cannot tell you. Simply the cow is not so efficient either in digestion or manufacture of milk. Concerning the blood is a question I am not able to answer.

Mr. Hostetter: If Nora would have had less meat, she would have given the same quantity of milk?

A. That is a very difficult question to answer. She was not fed more than she would eat naturally. Nothing was done to stimulate their appetites.

Mr. Gurler: That shows the need of knowing our individual cows.

A. That is the point I am trying to bring out, the uncertainty of cows.

Mr. Mason: What was the ration those cows used while doing that work?

A. I can't tell you. They were fed—the ration was changed at different times, and I have not that with me. They were fed clover hay and corn silage and corn meal or meal bran and gluten meal.

Q. The proportion?

A. No, I am not discussing feeding. The point is the difference between the cows, and as long as they were fed the same the feeding does not cut much figure as long as fed separate rations.

This is the cow Rose (shows picture of Rose), the best cow. You will notice she is a dairy cow all over, if we know anything about the dairy form. She is no beef cow. She is a spare cow and a very good cow, if you know what a cow ought to be like—deep through the chest and thick through the chest, and she is a cow of very great constitution and has very fair development of udder.

Nora (shows picture) is not nearly so good and like the cow, not nearly as deep through her, and has not got as good a development of udder as we would expect from the amount of milk she gave.

Maud (shows picture), she is not of the beef type you will notice. Not inclined to beef at all, but a spare cow. That is a mistake that is frequently made, comparing beef cows to the dairy cows and it is unjust to the dairy cow. Take cows that do not have a tendency to beef and compare them with beef cattle and of course they do not compare favorably in size.

It is the object of these experiments to show the efficiency of dairy cows and compare them.

Mr. Hostetter: Now those horns may cut more of a figure. Did the cows all run together?

A. They were not out more than an hour or two each. Rose with horns is a very quiet, gentle cow. That would not cut much figure with the feeding, and also only out an hour or two and were allowed to lie down in the barn.

Mr. Gurler: Where were they fed?

A. Always fed in the barn and watered in the barn.

Q. Do those cuts represent the animals themselves?

A. They represent the animals exactly. They were taken from photographs.

Mr. Cooper: I presume those cows were all mature cows and were all fresh about the same time?

A. That is a very important thing. The cow Nora and Maud calved only one day apart, and Rose six weeks previously, and this test did not commence until ten days after calving. This matter of the period

of lactation would be in favor of the last two cows and against Rose, as she had been in longer.

Mr. Wright: Did you notice any difference in the appetites of the cows Rose and Nora. Whether Nora was hard to feed, or the next cow Maud was rather a delicate eater, didn't care whether she ate or not. Did you notice any difference while feeding?

A. The cow Maud was not nearly so good an eater as Nora. Rose and Nora had appetites as nearly equal as possible. They ate the same amount right along. That is a very important thing.

That cow Maud there looks as though she was a little thin.

A. She only ate two-thirds as much as the other two.

Q. That would have a natural effect upon the cow for production?

A. Yes, and yet it was more economical than the cow Nora.

Q. You say she produced butter fat more economically than the others?

A. Not than Rose.

Q. Than some of the others? How much more economical? There are several things aside from the feeding. The care is a factor and all other expenses which come in, were they sufficient to overcome the economy of this cow over one who produces more?

A. That is a matter which would differ in different instances, depending upon the cost of the care. Take with the first of these two, Rose and Nora, the care was equal and the feeding was equal, and yet one produced $1\frac{3}{4}$ butter fat, while the other was 1. The object is the difference in efficiency of cows. It depends upon the cost.

Q. What proportion of economy over some of the others is this cow.

A. I am not able to answer that question, I have not found out the expense of keeping. This is on the difference in the efficiency of cows.

Another point which is practiced largely in the northern part of Illinois is buying cows from the west and different places, and keeping them only as long as they give milk and then selling them. If you get a first class cow, which we have but a very few, you don't get the progeny from those. All of the best cows should be bred, and all the calves raised in

order to keep us in a good supply of dairy cows. The cows that are shipped in from the west are very often not profitable, and even the best judges of cows are going to get fooled occasionally. Probably once out of five time at least.

We have some cows at the university which are shallow and are fair butter producers, and the only way to determine the efficiency of the cows is to weigh the milk and test it once in three months, or as frequently as you can.

The thing, it seems to me, in this region of the country in establishing the herd is to test the cows at least once in three months. Take a composite sample, put in a little preservative, and at the end of a week test it; multiply by the per cent of butter fat. That takes a great deal of time for the average farmer and dairyman, and he will not take time to do it.

After you have gotten the best cows selected in this way, then breed from the best, and don't sell them as soon as dry, and let them go to the butcher. Good cows are scarce and progeny should be raised from the best.

The next point is in the selection of a sire. A great many people use the bull that is the most handy, or, if going to buy, are governed by the price. This is very bad practice.

Get a pure bred bull—a pure bred registered sire. I think it is seldom the dairy cow should be bred to anything else. Pedigree counts for more in the dairy sire than all other classes of animals. You can't see in the dairy bull the thing for which to pay. The beef, you can tell from the form of the bull whether you got good animal for the block or not. It is the same in sheep and hogs and horses. If you get an animal that has been bred from good cows of many generations, you are apt to get good ones.

The bull is half the herd. You can have cows that have been bred from anything, and a pure bred registered sire from good cattle, he should be more than half the herd. They have the characteristics thoroughly mixed, more so than the cows have. So the important thing is to get a good sire, and one from a good strain of milkers.

Another thing, not to breed too young. A mistake is made among dairymen of crowding breeding among young cattle. There is a great desire to have heifers in the shouldering that calf young. A heifer should not be fresh until she is at least two and a half years old and bulls also. That is then too young.

A great deal depends upon the care and feed. But it seems to me the matter of breeding is not nearly so well looked after, especially in Illinois, as the matter of the care and feeding of the dairy cattle.

Mr. Mason: What is the fair yield of 100 cows raised that way?

A. Butter fat?

Q. No sir, milk.

A. That depends on the kinds of cows you are keeping, and also upon what you are doing with the milk. Jersey cows and selling milk to the creamery and to the test of 5 per cent are different from Holsteins testing $3\frac{1}{2}$ per cent; a cow ought to give 6,000 pounds of milk a year and 250 pounds of butter fat.

Q. But take this cow, Nora, if she is only paying expenses then you are doing your work for nothing, where are all your profits coming out of, loss? You may be making some profit on these two cows, but you would be better off if this cow would die and leave the other two for the profits.

Q. Mr. Wilson: You got to speaking of a good sire, you do not state the breed?

A. I do not believe in entering into breeds here. We have several dairy breeds; that is a matter of fancy, and the purpose for which they are kept. That a breed that a man likes best. If he likes Jerseys and has no Holsteins, let him breed good Jerseys.

Q. In the country I come from it is largely a corn country and very poor milk country. We established a creamery there and our patrons mostly run to the Short Horns, and it was hard to convince them that anything else was profitable. With the average farmer there they think the milking herd of Short Horns is more profitable than any other herd of dairy type animal. Take the Holsteins or the Jerseys—now the claim is made that they have Short Horns cattle pretty good thorough bred

sires, and that they make more money out of them and raise their calves than they can out of the other dairy type milkers.

A. That of course is rather a hard question to answer, because it depends upon the means and inclinations very largely. If a man is a general farmer and wants to raise steers too, I am not sure but that the general purpose cattle are the best thing he perhaps can have. All are excellent milkers among Short Horns. The dairy cattle of England are Short Horns almost entirely. Very few cattle that are anything else produce milk in England. They prefer to buy milking Short Horns for their dairy. They can get more for the cows when they sell them.

Mr. Gurler: Are not the Short Horns in England better than ours?

A. Yes, sir, very good milkers indeed. I cannot give you any figures now, but at the Agricultural College in Sweden they had thirty Short Horns that were milking an average of 250 pounds of butter fat a year. That was very good for milking Short Horns and for beef purposes too.

Mr. Grout: You take the Short Horns of England they are a better class of cattle than the Short Horns here.

A. The cattle of England on the whole are much better than they are here. A good many Short Horns in this country are not grade Short Horns, but are simply scrubs. When it comes to the beef Short Horns they are just as good as they are here. Nearly all the Short Horns here are beef. In England two-thirds are milking Short Horns.

Q. Do you know what the milking qualities of the Short Horns are developed as in England, does it affect the beef qualities.

A. Yes, sir, to some extent. You cannot get a Short Horn dairy cow and a Short Horn beef cow in the same animal. A few years ago in the University, we had a Short Horn cow that was a very excellent beef animal, and at the same time she was nearly as good as a butter producer as we have had there among the dairy breed, and she was a typical beef animal. When she gave a heavy flow of milk she run down, but when she dried up she fleshed.

Mr. Stewart: What kind of breed of steers? You don't find any of our men willing to tell that; they don't like to tell that. In regard to the

cattle of England, of the milking cows, are you not very well aware that you can't raise a beef and milk cow at the same time. Is it not a fact you can spoil a calf the first summer, and spoil a milk cow. The distinct breed in England where you get a good milk cow, you don't get the beef cow. She develops in different ways from the first six months—she changes. If you feed her right, she will develop into either a good milk cow after the first six months, or a beef animal. I found this summer in Aberdcen beef had become so high that they were selling cows for \$165 when they were fat, and were taking milk cows and were making them into beef and selling them.

A. I agree with Mr. Stewart, but I do not think the dairymen make a mistake in thinking you have got to keep a calf thin to make a good dairy cow of her. It may be the matter can be overdone, but at the present time it is too little feeding rather than too much.

HIGH GRADE MILK.

BY H. B. GURLER, DE KALB, ILL.

Mr. President, Ladies and Gentlemen:

I wish to tell you that this is not a question of my own selecting. The president and secretary have had the fixing up of this matter for me, and I don't know whether I feel quite at home. It is in my line, but at the same time I feel a little delicate about talking about it. I do not like to be blowing my own horn, and telling what I am doing myself. Let me tell you here, if you want to ask any questions, don't hesitate to break in any time.

High grade milk. We will suppose, in the first place, that our cows are all right. That is a subject there is no end to. You will find that Mr. Grout here will lead off on to the beef animal; he ought to know better.

One of the first essentials is, we must have sound food. Now don't forget that. You cannot feed mouldy hay, decayed sileage, or musty corn fodder, and, by the way, I know of great loss by moisture right here in Illinois, and feeding it mouldy. That is just as bad as decayed sileage. Mouldy hay out of the bottom of the mow. You are not going to make high grade milk out of that.

Now, any food that has an odor of anything that you notice around the stable, you must keep it away from the cows at milking time, because the milk will absorb the odor. You may take a vessel with milk in it and set it in the silo for an hour, and your take and warm it up, and you can tell by the odor from it where that milk has been exposed. I remember at the Vermont Dairy School, we detected in the milk that was coming in some eight miles from the country, we detected the hog pen. By warming that milk up 110 or 120 degrees we could tell by the odor. There were two or three students there whose noses were delicate enough to detect the hog pen in that milk. I went to the management and I said to them: "You can't expect us to make first class butter with milk of that kind; if you are going to hold us responsible for the quality of goods, you must furnish us with good milk." They found out that the man cooled his milk in a vat in a room 50 feet from the hog pen, and had the window down, and the milk absorbed the odors from the hog pen, but the man never suspected it. He stopped it right away though. I mention these things to show you the dangers that you are hardly able to realize.

I remember in Pennsylvania once, we set a sample out in the pen where a calf was feeding on grain food. I wish I could tell you some of the remarks that went round the class when that milk was brought in. They were certainly forcible. We all remembered the odor; every student that had been in that calf pen knew where the milk had been.

We don't realize these points. It is hard to appreciate the fact that milk will absorb these odors so readily. I want to impress this on your mind. It is one of the essentials of making high grade milk, and from high grade milk we make all fine goods. It is necessary for butter and cheese makers. We cannot make the very best butter with faulty milk.

If we had perfect milk we would have to have a new score card. I wish sometimes I had milk enough out of Clover Farm to make butter of, to see what I could do, but the fact is I do not have enough to supply my customers.

Now with feeding silage. I think wherever there is any odor in the milk, any way that you can detect that silage is anywhere in the vicinity—sound silage—that the milk absorbs it after it is taken from the cow. I am positive of that. I have followed it for four months. When I first commenced shipping my certified milk to Chicago I did not dare to feed silage. I did not know how it would do for milk for consumption. So the first winter I fed the cows that were producing milk for this enterprise dry food, and the balance of the herd I fed silage.

Afterwards, I had a sample of this milk brought daily from these two stables to my home, and had it put on the table marked so that I knew which was which, to see if my family could detect the difference, but they could not. I put my wife and daughter on their metal and wanted to know which was which, and they passed judgment. There was scarcely a time all winter that the silage milk didn't come out ahead. I don't think it was over two or three times that they detected the difference in all the four months, and then they picked out the dry feed for the better milk of the two. This was as practicable as possible to do with silage. There is more danger in feeding it. Now I am getting to my subject.

Some of the essential points for producing high grade milk are ventilating, sanitary conditions, light. Every cow stable should have a system of ventilation. There is just as much necessity for it as having our own dwellings ventilated, because they are more compact. Most of our houses could do without as much ventilation as we get, because the doors are opened quite frequently and the air gets in in that way, but the cow's stable is filled up usually. The idea of filling up the stable with only area enough for the cow to stand is all wrong; it wants to be thrown overboard immediately. Just build a stable so you have enough room for your cows and have a system of ventilation and you will have air all the time. One of the nicest compliments was from Dr. Franklin, who told a lady

friend of his that he could blindfold her and she would never suspect she was in a cow stable. Now you know you can go in a stable and spend only fifteen minutes and when you go back in the house you folks will tell you where you have been. The air from the cow stable will load your clothes with that aroma—that is too nice a word—and what is the effect on the milk? It will absorb as quickly as your clothing will. You never will get high grade milk under those conditions.

The milk as comes from the cow first is poisoned by the impure air and filth. We consume more filth in our milk than any other article of food. I have a good many people who come to the farm who don't like milk. They could not eat milk, and I would get them to take a little and before they left could drink two or three glasses and enjoy it.

A lady from Iowa came and asked me if I could tell my milk from other milk. I told her some of the little babes seem to be able to tell it. They put a sick babe on my milk, and when it got better they gave it ordinary milk, and the babe objected to it. I am not saying this to blow my own horn. You don't realize this important point. I am learning all the time, and have to keep on studying or some young fellow will get past me. When I get to that point and should get half way down, you know you might as well drop out. I don't know whether it is desirable to explain my system of ventilation or not. It is Prof. King's idea. As far as I know he was given credit for it.

Well, the fresh air is taken into the building by flues in the wall. (Illustrates by paper and board). Those flues are at the level of the floor opening inside at the ceiling. We would have two flues for taking impure air out. One in this corner and one in that corner. Those flues would open down to within a foot and a half of the floor, and they go to the highest point of the roof. When that stable is shut up you will find that there is a circulation going on all the while. You can hold a handkerchief near those flues and it will blow in the air.

Mr. Mason: Don't it cool the temperature.

A. Yes, sir, but I use artificial heat. I believe it is a mighty sight cheaper to do that than to let the cow suffer with cold.

Mr. Willson: Did you ever come in contact with Usher's system of ventilation. Brings in the air in the tube and the temperature will not change in the coldest weather.

A. Where does he draw his impure out?

Mr. Willson: At the same place, at the bottom I think. The cold air to come in the top. The temperature is uniform you understand. That system prevents you losing any air.

A. That is all right to get rid of the hot air if you have ventilation opening outdoors, but you don't want your hot air to get out. The bad air is at the floor where you want to take it out.

As to question of the care of cows, I don't know as I need to talk about that. There was enough said here yesterday by Mr. Goodrich along that line. Those that heard Mr. Goodrich—I thought it was one of the nicest things along that line. There has got to be the right feeling between the cow and the person caring for the cow to get the best results. The cow that has been treated poorly will not do her best, and, on the other hand the cow that has been treated properly will give us the best kind of milk. If the cow is aggravated or chased by dogs, I'd hate terribly to feed any babes with milk that a cow gave that had been chased by dogs. We know it affects the flow of milk and the fat in the milk, and we know also—the mothers will appreciate this better than the men will—many times the poor little kids will be suffering from what isn't their fault at all and probably the mother's fault. They have to do work and get themselves all out of condition and the babe has to suffer for it; and it is the same with the cow. They must be looked after; we have to be careful not to get the cows out of condition.

In the spring when the weather is bad I will not let them out to exceed an hour, watching them all the while that their bowels don't become too loose. I can feed a sow food that will set her pigs scouring in great shape and not affect the mother at all. I have done that very thing. If that is so with the young pigs it would be so with the young children. They are all animals and we must look after these things. I tell you we have not been doing thinking enough along this line. Many are so sit-

uated that they work their muscles so hard, and when it comes to thinking could not do it, would rather sleep instead, and there is no question but what we have done too much of that. Many of us can remember when a little way out from Fox river land was so cheap we didn't want to buy it, but the change has come and now it is worth \$75 and \$100 an acre. We need to put more brain work and less muscles on the farms now.

Now I will take up this question of milking. How many farmers, when they quit their work on the farm and go to milking, think of cleaning their hands, no matter what they have been doing. What would we think if our wives would go out and get milk and then go in and go into the cooking without washing their hands.

I remember one time when I was fixing up a skimming station. The woman would start out in the morning, in the latter part of May, to milk the cows. The cow was not clean at that time of the year. She came in and never stopped to wash her hands and went to getting breakfast in the condition that she had finished milking; put her hands into the food. After that I ate potatoes with the skins on and eggs in the shell, and I haven't got a weak stomach either. But what I wish to impress on your minds is the fact that we have no business to milk without cleaning our hands, and also the udder of the cow. I don't expect we are all going to make high grade milk for babies and invalids, but do, for pitie's sakes, improve on what many of us are doing. It would take but a few minutes to clean the udders with a sponge and a little warm water and have things respectable. There is no need of being so confounded filthy as we are. The trouble is, the men who are doing this dirty work don't get where we can get at them.

Now I will tell you a little of my own experience. Last August I got a letter from abroad requesting me to send some milk. The idea of me sending milk across the Atlantic with any expectation of getting it there sweet. I put it up the evening of August 29th, milk taken without any especial care, took the milk as it came in for the milk bottles, not knowing what cows it come from. When I got ready I took samples of milk right from those bottling machines and put them into cases and they

went to cooling. There is where the extra work come in, in cooling of the milk as rapidly as possible. The next morning it was packed and shipped by express to New York; then it was put on board a vessel in the refrigerator and started for Paris, reaching there Sept. 15th. The professor wrote me that the milk reached there Sept. 15 in fine condition. They found it acid on the 19th, but just when between the 15th and the 19th it turned I don't know. Well, now that milk was not pasteurized, sterilized, or embalmed. I just want to show you what can be done with milk by the proper sanitary conditions and cooling it rapidly, as soon as possible after milking.

I was led to go into this enterprise by financial men. The first thing was to have the tuberculine test. Then we had the cows in the stable where we kept them lined up on the gutter. That is the first essential point, so that the droppings go in to the gutter, and if they get dirty we cleanse them off with warm water and a sponge. The stables are scrubbed out every day; we have cement floors. Cleanse them every day, and I mean just what I say; we do not skip one day in the year.

When we come to the milking time, the milkers have to cleanse their hands and put themselves in proper condition and put on white suits. The first few streams from each teat are discarded—that which reaches out in the channel. We milk through absorbent strainers fastened to the top of the pail, and pail being emptied so that it is not exposed to the atmosphere of the stable at all. This milk is taken to the milk room and put through a centrifugal separator, and the principal object of this is to hold the milk with the percentage of fat. As the cream and skim milk run out of the two tubes we allow them to run back together, and as they do we catch out one or the other. This milk goes over a cooler and then goes through the bottling machine, and the metal seals are put on and they are put in the cases and shipped in ice sufficient to take it through.

Prof. Fraser: Q. I inferred from his first remarks that he was carrying the idea that the milk was tainted from the atmosphere, and that the atmosphere was impregnated from the vile odors of impure food and not going through the cow.

A. It may be odor from sound food that the milk will absorb and be objectionable.

Q. What I want to get at is this, is the milk tainted from the food the cow eats?

A. I don't think any sound food that a cow consumes taints the milk through the cow. The taint comes from the outside after the milk is taken from the cow.

Q. In feeding silage—the condensing factory refused the milk—now it does not spoil the milk. If the air takes it up after it comes from the cow, that milk is spoiled by the atmosphere in the barn.

Mr. Dietz: I wish you would tell us how you get the laborers to observe these rules?

A. I have had a world of trouble this last year to get good help. I have not figured in dollars and cents, but it is hard to get. I have had to make frequent changes, and you know it is not to the interest of the cow. Once in a great while you will find a man so constituted that he can milk a row of cows and get better results than the man that had been milking there. I have done that, but they are very very scarce that will do that.

Mr. Mason: What portion of the day do you turn them out and for how long?

A. It depends on the weather. We let the cow pretty nearly have her own way in that. If it is pleasant we let them stay out several hours, but if it is bad stormy weather, just long enough to put the stable in condition. I let the cow have her own way about that. Sometimes the cow will stay out when it is better for her to be in, but that usually depends on the comforts in the stalls in the barn.

M. Harvey: What special kind of breed?

A. The good individual cow is good enough for me. I have all sorts of blood in my stable. Jerseys, Guernseys, Short Horns, but it is the individuality of the animal. If I didn't have enough to see to, I should take up some dairy breed and breed registered cattle, but have all I can look after, to attend to my speciality of milk, so I cannot do that.

Q. Do I understand from this gentleman here who spoke that the

milk was not hurt from anything the cow ate, but by the odor that came to the milk after.

A. In any sound food.

Q. I want to know if brewers' grain would not affect the milk?

A. Any poor food would.

Prof. Fraser: That was not my idea. It might put your cow in an abnormal condition and an abnormal condition would make poor milk.

Mr. Gurler: Ensilage is a moist food and more apt to decay. There is no system about it. They will leave some parts of it exposed and that will decay and then there will be trouble. In the use of the silo, it must be taken care of. We can make better flavored butter with silage than anything else.

Q. Mr. Wright: How about wild onions and such things for our cows?

A. Oh, you know more about that than I do.

CARE AND HANDLING MILK ON THE FARM.

BY PROF. OSCAR ERF, UNIVERSITY OF ILLINOIS.

Mr. President, Ladies and Gentlemen:

Mr. Gurler has gone over this subject so thoroughly that I think there is nothing left for me to say.

It reminds me of the story of two Irishmen, Pat and Jack. They went to a hotel and before they went to bed they took with them a bottle of the elixir of life. Before they got into bed they wondered what to do with this bottle; whether to drink it before they went to bed, or whether to wait until morning. So they decided that they would wait until morning, and put the bottle at the foot of the bed.

During the night Pat woke up, and he thought of the past, and he

thought of the future, and he thought probably he might die by tomorrow morning, so he took that bottle and drank the contents.

About 1 o'clock Jack woke up, and he began to look around to see if Pat was asleep. He saw he was fast asleep and snoring, and he reached down and felt for the bottle. All at once Pat jumped up. "What are you looking for Jack?" "Nothing." "Yes, you'll find it down there in the bottle."

That's the way with me; there is nothing left for me. I want to say, before I begin my subject, that it affords me great pleasure, in the beginning of the twentieth century, to congratulate the dairymen of Illinois on this occasion for the partial success or rather their partial achievement in the passage of the Grout Bill. We hope that the twentieth century will prove to be a marvelous one in the way of progress of dairy industry. We hope the good work will be continued.

The subject I am to talk of, is one of great importance to the public. So let us then first consider the most vital point—the proper handling and care of milk—which is the principal object, and which is at the bottom of all meritorious dairy productions.

The improper handling and care of milk has been a ban to the dairy business. The 19th century dairy man has little faith in the proper handling and care of milk, simply because we didn't achieve his results. He didn't understand the underlying principles, and often tried to explain himself in that story, which I must tell you.

There were three boys playing in a back yard, and as boys do, they soon got tired of play and began to brag. One boy said: "My father has got a cupola on his barn." The other boy said: "My father has got a peacock." The third boy couldn't for the life of him think what his father had. "I will tell you what your father's got," said one of the boys, "he's got the big head." Johnny became somewhat vexed over this matter and went home crying. His mother noticing his serious condition said: "Johnny, what are you crying for?" "Well, he says that pa's got the big head." "Well," says his mother, "there is nothing in it." That is the way the 19th century dairymen thought of the underlying principles of the proper care of milk.

The most serious problem that confronts our dairy food commissioners today is how to obtain pure milk for the city. We cannot realize the deaths and the sorrows that have occurred from the use of filthy milk, and yet, if milk is properly handled, it is the most nutritious food that can be given for the maintenance of mankind.

Now, what must we do? First, in order to accomplish what we ought to in the proper handling of milk. To explain this I must go to the foundation.

The fundamental principles of the care of milk lies mostly in the governing of bacteria life, combined with the absorption of gases. The absorption of gases was thoroughly explained by Mr. Gurler, so I will take the bacteria side of it.

All animal matter and vegetable matter, if exposed to air at ordinary temperature undergoes a change. This change is called fermentation, decay, or rot. The most common change in milk is that of souring. The souring of milk and the changing of any organic substance is due to a bacteria growth, due to a small vegetable organism called a germ or bacteria development. Germs or bacteria have different effects. Some of them are useful; we need them in the manufacture of butter, and they give butter its flavor. We need them in the manufacture of cheese to flavor it too.

Others are harmful, they produce taints, rosey milk, etc., and still others produce disease, such as tuberculosis, typhoid fever, cholera, and the like. In short, they are the scavengers of the earth's surface. If it were not for this bacteria, the earth's surface would be covered with carcasses and vegetable matter. It is to that they should go back again; it decomposes. They are very abundant over the earth, within the bounds of plant life. They are so abundant that it is a hard matter to get any substance that has been exposed to the air that is not thoroughly infected with it. The dust particles of the air are filled with this bacteria. Our clothes are full of them, we can shake them off. The cow's hair is thoroughly infected with it. They even get into the cow's teats and infect milk before the milk is drawn, and for this reason you should al-

ways throw away the first few streams of milk before milking.

(Shows charts). We have here a chart and I will explain it. We have here a plate and we put into this plate some bouillon and some gelatine that makes a semi-solid fluid. Decomposition can easily take place. We put another plate on this and subject it to heat, sterilize it, kill everything in there, and then set it away and it will stay that way indefinitely so long as no life gets in the bouillon. Whenever we want to determine the number of bacteria in a certain place, we just lift off the cover and expose it for a minute, or two minutes, or more. Now we put these plates in an incubator to keep the temperature where they grow best, and have upon these colonies the bacteria forms. They are simply large masses of bacteria. These charts are supposed to be illustrations of such plates.

We have here a plate with a hair on it. This has been in the incubator. We can easily see the large masses of bacteria growth around that hair. It is not the hair that causes the fermentation, it is what is on the hair.

When you strain milk you need not think your remedy the effect by straining out the hairs, for you are simply washing the hair off and putting the filth into the milk. So it is necessary to take the hair out before you put through another batch of milk.

Here is a straw that shows the same results. Straw does not spoil milk, it is what is on the straw.

Mr. Coolidge: Where was that straw taken from?

A. Any straw, right from the stack, dusty straw.

Here is a chart represents a drop of milk, what is called the fore milk. Look at the bacteria in that milk. That is the reason we should throw away the first few streams.

Mr. Cooper: Is that first stream necessarily imperfect?

A. It always is. It is very seldom it is not imperfect, because the cow is exposed to bacteria to such a great extent that it is invariably imperfect. I have never run across one that was not thoroughly imperfect. The whole milk is imperfect to a great extent, even the milk in the

system and as far up as the milk follicles—they are the little globules—bacteria is there too. The New York Experiment Station has recently made some investigation on this point, but not many get up there. The enormous number comes in right in the teat.

Q. Do you find as much bacteria in cold weather as in hot weather?

A. There is not very much difference. In hot weather that depends on the decomposition, depends on where you have your cows in winter. If in warm stables, your stable is as thoroughly infected with bacteria as in summer.

Q. Then temperature has nothing to do with it?

A. Certainly it has something to do with it. I will explain that later on.

In size, bacteria is very small. We can hardly get any conception by mere figures. But a good illustration would be to take a hair, an average hair, such as grows on any successful dairyman's head; cut it in two, and upon these flat surfaces you can place 350 to 375 germs side by side.

Another illustration compared with men. Take any bacteria. Suppose a cubic foot, or a foot in diameter. A man compared with that would have to be 26 miles high. That shows you the smallest of these bacteria.

Now in a drop of imperfect milk we have a million and a half of these germs. Our average milk, supplied in the city, range about 50,000 to 60,000 per cubic centimeter, which contains 20 drops. This shows the enormous numbers that are in milk.

There are three conditions that are necessary for the development of bacteria life. There are feed, moisture, and a warm temperature. All three, and especially the first two, we have in abundance in creamery dairies and stables. They live within a wide range of temperature, although the most favorable temperature for growth is 93 degrees Fahrenheit. At this point bacteria are capable of reproducing themselves from every twenty to thirty minutes. In twenty-four hours they have doubled themselves to 11 billions. That shows you the enormous development in a day, and also shows you the folly of letting milk stand at 98 degrees and cooling of its own accord to the atmospheric temperature.

Now we estimate that at 53 degrees that bacteria increases sixty-fold, at 93 degrees they increase 180 fold, and at 40 degrees bacteria life becomes inactive. Even freezing does not kill them, but this urges the necessity of cooling milk.

Q. Can I infer that bacteria ceases vegetating at 40?

A. Remember I am not talking of those that affect meat; some of them reproduce themselves even down to freezing point, and some of them decay, and if meat is imperfect, with that certain kind even to 24, but it takes a long time to do that. The development ranges from 60 to 180.

Now then, heat, on the other hand, has the same effect as cold. At 112 degrees, however, is the best point, for then nearly all bacteria life is killed, except the spore. I don't want you to understand that that includes all bacteria; this pertains to milk. The spore develops slower, and does not do so much damage.

Now when we kill all bacteria life, either spore or active germs, we call that substance sterilized. We don't apply this directly to milk very often. Sterilized milk has changed its composition to a great extent for that reason it is impracticable; it is not a practicable business. But where sterilization becomes practicable is in cleaning dairying utensils. Mere water and elbow grease does not clean milk pails. We have to sterilize them in order to have them germ-free, and then the spore is developed if brought to a favorable temperature, but the active bacteria that does the filthy work right away is killed by boiling. Hence, it is very essential that we should sterilize our utensils, by subjecting them to steam heat, or, if no steam, boil them in boiling water from 30 to 40 minutes. Give them a good long boiling. It is very necessary that we should clean our utensils first with soap and water, to get rid of the scum and germs, for if we do not do that we find that the albumen coagulates and adheres to the tin, and those who have cleaned utensils in which they have boiled milk first, find it is a very difficult task. For this reason, we should have the utensils free from corners as much as possible.

Here is a picture of a milk pail that is made improperly and which has sharp corners. If we do not sterilize that pail we have a lurking

place for bacteria that will start fermentation at ordinary temperature.

Here is a picture of another pail which is flushed with solder at the corners. We have here the bacteria too, but it is much easier to sterilize the pail.

It is very necessary to curry our cows daily. Mr. Gurler spoke about that, and it is very essential that we should wash with a moist sponge the udder and the surrounding parts to prevent the hair from falling into the milk. The hair does a good deal of the fermentation work.

We have here a place that has been exposed to an unwashed udder and one to a washed udder. The dandruff that is about to fall from the udder is thoroughly inoculated, and thus sets up the fermentation. To overcome that we merely rub a moist sponge over it, which either washes it off or makes it adhere while milking.

Here is a plate which has been exposed in a stable after feeding, and one before feeding. It shows you that it is bad policy to feed before milking ruffage or any filthy or dusty matter. The dust that rises goes into the milk, and hence sets up a fermentation which you can see on this plate.

The question of milking with dry, and the milking with wet hands: It is a foul practice to milk with wet hands. To take the milk and strip it into your hands and put in into the milk, you are agitating the teat and causing friction and thoroughly infecting the milk with whatever is on your hands and will go into the pail and will set up a fermentation. Hence it is very necessary to first wash your hands thoroughly before milking, and use clean outer garments, and then milk with as dry a hand as possible. Have the teats moist with water just simply moist. That will prevent water or any milk from dripping into the pail.

In regard to the stable, you should have it ventilated, well lighted, and well drained. This has all been gone over by Mr. Gurler. It is also that we should use lime or some disinfectant for this reason, if we put lime on any decomposing material it checks the infection for a while.

Immediately after each cow has been milked, the milk should be removed from the stable to a clean moist room and then cool and aerated.

Here is an aerator, the Star A. The milk is poured over the top and runs over in a fine stream, and cold water runs in the corrugated part here and at the same time aerates it.

We have here another small aerator. The milk is poured into receiving part here and it goes through some fine holes over the outer surface and while running down it is cooled. In the inside we can put ice or have running water to cool the milk. Both are very good principles.

This aerator should be down in a clean place. If it is in foul air the infection is greater than if it had not been aerated at all. A majority of the farmers have found that out; they put the aerator into a foul place and expect good results, but on the contrary have found bad results.

After the milk is aerated it should be put in sterilized bottles. A modern way is to clarify milk. By clarifying milk, run it through a cream separator. The intense pressure in the cream separator which ranges from 2 to 4 tons to every pound of milk separates the filth in that milk and it goes to the outside of the pail, and in this way a cream separator acts as a clarifier.

We can also at the same time standardize our milk. Estimate how much fat we want in the milk, and we have the percent of cream. In doing this we should cool and bottle the milk and put in sterilized bottles, the same as before. All these steps I have mentioned are steps to prevent bacteria from getting into milk and if followed you have the method of handling milk properly. This may seem extravagant and expensive to you, but it is not. The simpler you can have your arrangements, the easier ways of cleaning the better it is for you. These methods are within reach of every dairyman, and the extra expense of keeping the milk clean and keeping the animals clean will be duly rewarded by the superior products.

There is an old adage that "Cleanliness is next to Godliness," and it has been brought down all through the 19th century. It has made quite an impression upon some, but it still has a great deal of missionary work to do. I wish every dairyman, every 20th century dairyman, would paste this little adage in his hat as a reminder in his dairy business.

TYPES AND QUALITY OF FARM STOCK.

A. P. GROUT, WINCHESTER, ILL.

Ladies and Gentlemen—I have been wondering ever since I received a letter from your president, Mr. Gurler, inviting me to address this meeting, why he did so. It certainly could not have been from any knowledge I have of him. It is true I was born and raised on a dairy farm in Vermont, but my knowledge of dairying ceased more than thirty years ago, consequently any information I may have concerning dairying is behind the times, it is too old. You don't want any such knowledge here today.

My first recollections of dairying goes back to the time when I was a boy of eight or nine years old in Vermont. I remember that we had a small herd of dairy cows, and it so happened that my father and the man employed were away from home one evening and not likely to be back in time to do the milking, and I had an ambition to try milking. It was the first time I had ever milked, but I succeeded in milking eight or ten cows—that constituted our herd at that time. I was very proud of the feat, but soon had time for regret. I found I had made one of the mistakes of my life. I had to do the milking afterwards. It was especially aggravating at times, when I had an engagement to go fishing or swimming, and the cream would persist in remaining cream, and I could not make it remain butter. Oh, yes, I did it all. And those were the days before I knew about the right temperature with which to fix the cream. It is true I have a little practical knowledge, but it is too old to bring before you gentlemen today.

I also have very distinct memories of the odor from those stables. I was reminded of it this morning when Mr. Gurler was talking. Those stables were made for warmth, and the odor was stifling in those stables, I can almost detect it it seems to me today. The process of dairying has

advanced wonderfully. When I left the farm, I thought I never wanted to see a cow again; I certainly never wanted to milk one. Those were my feelings on leaving the farm. But when I heard Mr. Gurler speak of his stables with the cement floors that were washed out every day, and could not detect the least odor, I could imagine that dairying may be a great deal pleasanter, and a great deal nicer, than years ago. The dairymen have certainly made a great advance in the right direction.

In my talk today of cows, I will, of necessity, have to refer to beef cattle. That is my hobby; that is my business, and in my talks heretofore I have been talking in the south part of the state where there is little dairying, and the types of dairy cattle are exceedingly poor. I felt that when I come here that it is a different thing, and I will have to be more careful and more guarded in what I say.

In the first place, if we are going into business of any kind, we must have a plan and a purpose. We want to know what we are going into the business for; what we are going to accomplish, and all about it. For then we may ask ourselves this question: "Why do we want stock on the farm?" It is not for the dollars and cents or the immediate profit that we can make out of it, as I take it, although immediately if we ask that question of the majority of the farmers they would simply say, "as a means of making money" immediately. But that is not the real and only object. There is another. The soil must be maintained and set up, and I know of no other way by which they can do it without the use of livestock in some of its forms. Why I obtained such a dislike for dairying in my earlier days—well I must admit that dairying is the highest type of stock farming there is, because the dairyman who only sells his butter, his cream, or his milk off the farm is retaining nothing. There is almost nothing in the shape of fertility contained in the butter, cream, and milk. Dairying is the highest type of stock farming I know of anywhere. There is great necessity, and it is the first consideration, the soil.

Now then, Illinois is naturally very fertile, its soil is very rich, and we have been careless of this matter of fertility. They have raised wheat, grain, and corn, and the result is you have sent away largely of the

fertility of your soil. It is not what it was twenty-five years ago, and if the same process continues, it will be worse the next twenty-five years. We must keep up the fertility of the farm. It is absolutely necessary and those who prefer the dairy, I tell them it is the highest form of stock farming.

But if we can not all be dairy farmers, there is the raising of beef and mutton stock and horses and things of that kind. They are the next best thing as far as fertility is concerned.

Some form of stock farming is the basis of permanent and successful farming. There can be no question about this, and the only correct theory of farming requires that the fertility of the land must be maintained. It is the farmer's capital. If you draw upon that capital, if you unnecessarily exhaust the fertility of the soil you are soon going to exhaust your capital, and deserted farms will be the result, as in New England today. When you go into the stock business you want to keep that steadily in view. You are building up the fertility of the soil.

Now then, if we decide to go into the stock business, the next thing is what kind of stock shall we handle. You want to determine that. You want to determine whether you want to make butter, ship milk to the city markets; whether you want to make beef or mutton or pork; those things must be determined first.

Then study the different breeds of cattle and decide which is best for the purpose you want. We have various breeds of cattle. For the dairy people, the Jerseys, Holsteins, Alderneys, Guernseys, and others. Among the beef cattle the Short Horns, Herefords, and so on. Among the various breeds of dairy cattle I cannot say which is best. I could say in beef cattle. The breed you like best, that is best adapted to the purpose for which you want it, is the best. Always keep that in view. Decide what you want and select the animals that will best carry out that object. It is the same thing if you are going to raise horses. You want to determine in the first place the kind, and whether for a buggy or the race, or what kind of horse is good for heavy road work. It would be folly to take one of the finely bred draft horses and expect to win money on him. You must determine these things before you go very far.

Now then again, breed has its particular characteristics. It has its form; its color; its shape, and all these things constituting the type of the animal. The quality of the animal depends upon the uses that you want to make of it. If you want to make butter, you might take the Jersey cow. The qualities of that cow are excellent, are among the best. But if you want to make beef the Jersey has no quality in that respect.

I use these illustrations, but my work, as has been heretofore stated, is along the line of beef cattle. I have some cuts (shows pictures of cattle) of the dairy cattle here, but I simply take them along to show the contrast. That is the use I have been making of them heretofore. I do not mean that in a bad sense, but simply this: If you want a beef animal, the dairy type is the worst scrub in the world; they are absolutely worthless. On the other hand, if you want a cow to put in the dairy and give lots of butter, and rich butter, you would not select English, Herefords, or Short Horns, because they have no qualities in that respect. They have been bred and reared for different purposes, and of course depend upon the use you want to make of them almost entirely.

The Jersey cow has great qualities as a producer of butter fat, while she has no qualities whatever for beef. On the other hand the English has good qualities for beef but not for the dairy.

Now then, our animals are machines, or condensing factories, for the purpose of converting the food we give them into the production that we want.

For instance, we take the dairy cow, and her function and use is to reduce the feed that you give her to butter fat. The cow is built for that purpose and no other. On the other hand, the English cow I have represented is intended for a different purpose. It is to take the feed you give her and put it on her back where it will bring the most money in the shape of food. These animals have been bred and reared with this object in view. The Jersey cow, as you know, has been bred for that one express purpose of putting as much butter fat as possible in her udder. She is expected to convert as much food as possible to that one thing, the result is you have a cow that is largely developed in the udder, while the other

parts are simply a framework to hold the other together. She has been developed for that purpose. By breeding her early, by taking away the calf, and milking her as nearly as possible twelve months in the year, her milking qualities have been developed.

On the other hand, take the cows from Scotland, the calves have been run with them until large enough to eat for themselves. The cow have then been dried up and turned on to pasture, and she has put the meat on her back, and the milk development is very small. These things have been brought about by breeding and by feeding, and it has been kept up for so many years until that habit has become fixed.

Now then, for fear I forget it later on, I want to say this: I believe that if a man is going into the dairy business and is selecting cows, or selecting a sire, he should select one that has had the habit that he wants fixed as long as far back as possible; the farther back the better.

You take the Jersey cow, her habit has been so long to produce this butter fat, that's what she is developed for. You may pick up a cow, a native cow, that gives good milk and rich milk, but if you breed from that cow, you are not as sure that the progeny will be like her as you will if the cow has had that habit back and back for years and years.

If you cannot purchase the dairy cow that you want, and you want to breed and improve your herd, you want a sire that has an unbroken record for years and years for a good milk maker, then they are likely to produce better.

On the other hand, the beef cattle, and we do the same thing. We go back and look at their pedigree, and the record they have as prize winners in the fat stock shows, and the farther back that goes, and the better it is, the more likely we are of getting the calf, the product, something that will be like it.

I stated a moment ago that our animals are machines or condensing factories; they are intended to convert the food that we raise on the farm into milk or butter or something we can send to market in a condensed form, and keep the manure on the farm to keep up the fertility. The more perfect that machine, the more economical and profitable will be the work done. Isn't that true?

It was shown here this morning that if you take a dairy cow that will only furnish 150 or 200 pounds of fat in the year, she may possibly not do more than pay for her keep, and she may get you in debt. A cow with 300 pounds fat in the year, will return you a profit. That is what I mean by saying, the better the machine, as the cow is the machine, the better and more economical and profitable it is. If you are raising grain, you don't go and hunt up some old worn out threshing machine that will not do a good job, a machine that will waste a good part of your grain, but you want an up-to-date machine, one that will take out all of the grain you have raised and save it for you: That is the difference between a good dairy cow and an inferior or poor dairy cow. Again, if you are going to haul your grain to market, you don't take an old wagon that will scatter the grain, you get one that is whole and perfect and will take all the grain into it to the elevators. Why is it so many farmers will use inferior animals, when the process is exactly the same. They all reduce your feed to butter or milk, and the better the machine the more profitable is the business.

When I was on the farm in Vermont, the Babcock test wasn't used. We milked the cows and the milk all went in together, and the only way we judged of the value of the cows was by the quantity of the milk she gave. I don't think it was ever thought of testing in any way the quality of that milk, at any rate I don't remember anything of the kind. At this date you have an infallible test. There is no need to use an inferior cow, because you can test in a very short time and tell what she is doing. If the cow was giving lots of milk we thought she was a good cow, but now we know that that is not always the truth. The Babcock test is what determines the value of your dairy cow. The butcher block is what tests the beef cow. You dairymen have the advantage of us because you can ascertain what your cow is doing without slaughtering her, but we have to kill her to find out the test sometimes.

I have some charts here which I wish to show you. Of course this related to the beef business, but the lesson may not be entirely valueless to the dairymen. He wants to know his stock thoroughly to be able to

judge them. If a dairyman is a good judge of a dairy cow he knows her form, knows the forms that are best for dairying purposes. It is the same in regard to beef cattle.

This first chart simply gives the various parts of the animal. They are all numbered, head, the shoulder, loins, and rump, etc., etc. A man going into the beef business ought to have a chart of this kind, and find out and ascertain what the good points and desirable points are and then study his animals. If they do not conform to those requirements, turn those all down.

Now I have an illustration here that I want to call your attention to. Here is the cut of a beef steer supposed to weight 1200 pounds, and marked off to show the manner in which a beef animal is cut up for the retail trade in Chicago, and perhaps in other cities, with the weight of each cut and the price per cut marked on each one. These prices I obtained a year ago, but I don't think they have changed since then. Now, what is the lesson to be learned from that? If you run over these figures you will make this discovery. Here are three cuts, ribs 68 pounds at 18 cents, porterhouse 25 cents, and sirloin 34 pounds at 18 cents. If you take the total of these three pieces and compare it with the balance of the animal you will find this: That 28 per cent of the parts are equal to 64 per cent of its value, or, in other words, one-third of this carcass is worth two-thirds of the balance. Take the three cuts from the shoulder to the hips, the part of the animal that only weighs one-third of the carcass, and it is worth two-thirds of it. The stock men, the beef men here will appreciate this. It shows that if you are going to get the highest price for your beef, you must have an animal with a broad, strong back. The more of that high-priced meat you have, the more you will get in return.

Just look at the contrast there is between the beef animal and the dairy animals in the back. That explains to you why your dairy animals will not sell in the market for the beef, because they don't have this high priced meat in the back.

Here is a representative Gray Hereford steer and the other a Jersey. These steers were put on feed and fed the same. I think they consumed

the same amount, and they made practically the same gain. The Jersey made a gain of two pounds per day and the Hereford 2.3 pounds per day, practically the same. They were fed until they were both fat and then taken to be sold. You understand that both animals cost practically the same amount of money, and that they were taken to market and there was this result in the sale. The Hereford sold for ten cents a hundred above the top of the market of the same on which it was sold. The Jersey sold for 2.12½ below the top of the market.

Now, why was this? Possibly some dairyman think the stockyards people were prejudiced against their breed, but that is not so. They don't care about the color, or horns, or breed, but they are there for business. Why didn't this Jersey steer that was equally as fat as the other bring as much on the market? If you will notice right here in this cut, you will discover why. As I told you, one-third of the weight of this animal was equal to two-thirds of the other. He had the meat in his back and the other did not. The Hereford when he was slaughtered only had 133 pounds of tallow and suet, but this one had 245, more than 100 pounds more. You ask, what of that? Tallow is worth four cents a pound, but the meat right up there on the back is worth 20 cents a pound, consequently those buyers in the stockyards would have been very foolish to have paid the same money for a production that is worth four (4) cents, when they could get one worth 20 cents. It is no disgrace to this animal. They do not refuse to give because it is a Jersey, but he had not put his fat where it was worth the money.

This animal, Grey Hereford, did just what its mother did before it. He had put the food on his back. And this is where the Jersey puts its food. He put it down here in the intestinal parts for tallow and suet. That is the same as his mother had done for so many generations. It is just the habit with this animal. The other put his food where his mother had been bred to put her food, on her back, and when you want the animal for food, that's where it should be.

Sixty-seven per cent of meat to carcass on this animal, and only 57½ per cent on this one, a difference of 10 per cent right there. The differ-

ence in price between the Hereford and the Jersey was 49 per cent, quite a difference. And what I say here in reference to the Hereford would be just as applicable to the Short Horns or English. The others would have put their product on the back, and it would have been the same.

What a difference there is in the price of the steers. If feeding steers, one weighing 1400 pounds, and he sells at 2.12½ under the top of the market, see what you lose, \$31.15 on one animal. Take an animal that would weigh 1200, and if there is a difference of 2.12½, it makes a difference of \$26.70 on an animal. So you see the necessity of putting your feed into the right kind of a machine. Put it into a machine that will produce what you want.

I have a few illustrations here, and I may, perhaps, call attention to them as I go along. There are several requirements for a beef animal. I don't feel like talking about the type of the dairy animal. A beef animal should have high characteristics. It should be low, like this one; it wants to be broad, deep, smooth, and level with parallel lines. The Hereford and Short Horns, like these cuts, should be level and straight on top with parallel lines.

I have a cut here that shows the depth of the animal. If you see how the feet are placed, you would know what kind of a back that animal had. The animal that will make two tracks going for a pasture is the kind you want for high-priced meat.

Here is the type of the dairy cow, and here is the type of the beef animal. The beef animal's feet are far apart showing a broad back. This animal, the dairy cow, has not; its feet are right together, no back and only flesh enough to cover the bones. The development is in the udder. There must be a place for that udder to develop. Now in the beef animal, we care nothing about that development of the udder.

Here is another cut that shows the depth that I speak of. And here is a Short Horn. You see they have the same characteristics, no matter what the breed.

Something has been said about Short Horns as milking animals, and that is undoubtedly true, but I am inclined to be of the opinion that if

you take the Short Horn cow and attempt to develop her milking qualities, that just so far as you succeed in developing her milking qualities, you are going to depreciate the animal for beef purposes. I cannot help but think that. You cannot have a first class dairy and a beef animal in the same animal. I know Prof. Shaw is talking of the double purpose cow and at the same time they will produce a calf for a beef animal. Such a thing may be possible, but I doubt it very much. When you are developing the milking qualities of the animal, you certainly must detract from the beef qualities, and there is no possible way to get around it. I know Wallace here don't agree with me, but he can talk afterwards.

Here is a cut of an animal that is low; broad and deep, smooth and level. He is an animal on which you can build, and put that high-priced meat that is worth 18 cents and 20 cents a pound. And here is a picture of one that has not got those qualities. Which would you select to put in your food to condense it? You want to get as much as possible out of it. If you put it into one animal and get six cents for product and put it into another and get two-thirds more, which is the best paying animal? Why is it? If there are two elevators in town and you want to sell your grain, and one will give you a quarter of a cent more than the other, you will go there. I have known farmers go a good way for a small fraction of a cent, but when it comes to feeding that grain, they don't pay the slightest attention to it. They take an animal on which there is no frame to build to put the high-priced meat on. They do that and think they are doing business. I have done the same thing myself, but have learned better now. I found the result was not satisfactory. I had never heard anything about this, I simply thought I had bought the frame and built on it. I thought it was only a question of feed, and that we could put the flesh on any kind of an animal. I did not know that animals had been bred for generations for certain things. You see I thought if you got the frame that you could go right to work and make a good beef animal out of it and I paid for my experience.

Here is a cut of an almost perfect beef type, the celebrated Dot from Decatur; has taken prizes at fat stock shows some years ago.

Before I forget it, I believe there is a convention about to be held out west, stockmen's convention, in which they are going to take up what is known as the Grout Bill, and do all they can to defeat that bill. It is now pending, but I want to say this that while I am a breeder of beef cattle, I have no sympathy with those men who are trying to defeat that bill. (Cheers). I think that bill is just and right, and, as a general thing, the beef men in Illinois are in favor of that bill. (Cheers). I am in favor of it, because those men, in attempting to make butter out of the fat of those steers are attempting to perpetrate a fraud. It is not right. If they want to make an article of food from the oil, let them make it, but let them sell it for just exactly what it is. (Cheers.)

Here is an illustration. I had to go to the office of the Keystone Mill, and the agent there told me he had just sold eight mills to go to a mill in Southern Illinois. Eight large mills. That struck me as a little peculiar. I said, "Eight mills to go to one milling establishment." "Yes, sir, to grind cobs." Then, of course, I understand what it meant. They were grinding cobs by the carload and by the train load to put in their bran. They were making bran out of those corn cobs. I learned afterwards that they shipped corn cobs from Nebraska by the train load to adulterate their bran. On the same principle, the stock men are opposing this bill, I suppose the corn growers of Illinois will rise up here and say the pure food laws of this State shall not prohibit the sale of this bran. You are reducing the price of corn, if they are not allowed to sell these cobs to make bran to sell you dairymen. Why should they be interfered with? I will look for the same kind of a movement. There is just as much reason as in the other. If they want to grind up corn cobs and sell it to you men for corn cob bran, all right, but when they mix it with the pure bran and reduce its quality, they are perpetrating a fraud that should not be allowed in this country, and why the United States Senate should hesitate over the Grout Bill is something that I cannot understand.

In conclusion, let me say that if you are going to build up a herd, you want to decide the kind of herd you want. If you want butter fat, here is the kind of a sire you want. On the other hand, if you want a beef animal

and high-priced meat in the back, here is the kind you want. First decide this question and then go ahead and follow it out to the end.

These same characteristics are true of the sheep and the hogs.

By the President: I am sorry we have not more time to devote to this, but we have gentlemen on the program here who have to take trains this evening, so must pass on to the next paper on the program.

Wednesday, January 9th, 1:30 p. m.

FEEDING AND CARE OF THE DAIRY COW.

J. P. MASON, ELGIN, ILLINOIS.

A large majority of the farmers in the vicinity of Elgin contract their milk at the condensing factory, which contract restricts them from feeding turnips, wet or dry barley sprouts, brewery or distillery grains, linseed meal, glucose or starch refuse, buffalo feed, ensilage, oil cake, gluten meal, or any feed which will impart a disagreeable flavor to the milk, or which will not produce milk of standard richness.

Some of the feeds barred out are usually used in making up a good balanced ration for a dairy cow, such as ensilage, gluten or oil meal, or if we had plenty of early cut clover hay, could make a satisfactory ration. Under these circumstances we are trying to produce milk.

I mention this, not in a complaining spirit, but that you may understand why we feed as we do.

The barn should be warm and comfortable in the coldest weather. Ceiling of good height and well lighted and well ventilated; cement floor with gutter eighteen inches wide, not less than six inches deep, and

water tight. Water boxes that the cows may have access to water at all times.

The stable should be whitewashed at least once or twice a year; also the milk house and can rack, which can be done neatly and quickly with a spray pump.

I find it a good plan after cleaning the stable to sprinkle the drop and portions of the floor with air slacked lime. It is inexpensive and will give the barn a healthy tone that will repay over and over for the little trouble required.

We aim to have the cows fresh in September and October. What you might call a winter dairy. Stabling them in early fall, as soon as the nights get uncomfortably cool, and turning them out in the morning, believing a milk cow should not be exposed to any frost.

As the weather grows colder, keep them in all the time, except an hour or so in the morning, or while the stables are being cleaned. We then add the third feed of grain, and gradually increase till we get them up to their full capacity.

Each cow has her individual stall, although I am aware that many good dairy men do not consider this essential—she will quickly learn her place, the feeder knows where to find each cow. I believe a cow feels at home in the stall she has become accustomed to.

Then each milker must commence with the same cow, also milking the same cows in regular rotation. The milking should be done quickly, quietly, and in as clean a manner as possible.

The bedding should be thoroughly shaken up while the cows are out in the morning. Also straightened out in the evening before commencing to milk, not allowing it to bunch up. Have an abundance of bedding, aside from the comfort of the cow it serves to keep them clean and dry, at the same time your loads of fertilizers will be doubled, which is no small item in keeping up the productiveness of the farm.

When we are ready to milk, take two cans to the stable; as first can is filled set the strainers in the second can, and immediately remove the first to the cooling vat in the milk house, replacing it with another can

from can rack, and so on until we have finished, but one cover being used for all the cans. If the cooling process is begun at once, stirring and cooling, there is not likely to be any trouble in regard to the keeping qualities of the milk, provided the utensils used are thoroughly cleaned.

At present we feed twenty-six bushels of shelled corn finely ground mixed with nine hundred pounds of coarse, flakey bran. The fodder from which this corn has been threshed furnishes the roughage; with the exception of one feed of Hungarian a day—the stalks are cut about four inches long.

The first thing in the morning they are given a feed of grain, when we have finished milking, give them the cut stalks. About eight o'clock they are turned out and stables cleaned, after which they are given their next feed of grain, then salted and fed the Hungarian, after noon fed again with cut stalks.

About four o'clock the mangers are swept out and they are given their third feed of grain. Before commencing to milk, give a light feed of stalks, also another after we finish.

We usually feed half and half by weight, corn meal and bran, but at present are feeding some heavier of meal. Averaging the dairy, the cows consume a fraction over twenty pounds a day of ground feed.

We have found by weighing the feed for several days each winter, that that is about all a cow of 1100 or 1200 pounds weight will eat, and not get off her feed, and have a good appetite. We aim not to overfeed; they are not all fed the same. Here is one of the fine points in dairying. To obtain the best results the feeder must know his cows.

It has been my experience that winter dairying is more profitable than summer. It takes less land to produce the feed than it does in summer, where pasture is used. A cow will give more milk for a longer period. She is waited upon, her meals are brought to her, she eats, drinks, lies down in her well-bedded stall the picture of content. She has become sleek and fat, she has turned the raw material from the farm into the finished product.

This daily routine of feeding and milking is continued usually until about the middle of May, varying a little with the seasons. As we always reduce the dairy, it can now be done to good advantage, and we usually reduce it a third, sometimes nearly a half. The cows being in good flesh are sold for beef, usually bringing as much as they cost and sometimes more.

Some years when short on pasture we have made a practice of putting in a few acres of rye, thickly sown on rich land, to feed the following spring. A person who has never tried it would be surprised at the number of cans of milk it will produce to the acre, after which the land is plowed and planted to fodder corn. After the rye, clover, or oats and peas are fed, after which, if the season is favorable, a crop of Hungarian can be grown—then fodder corn is fed. This takes us back to where we started from. I want to say, we never stable the cows without some grain in the manger. They expect it and always find it, and will be on hand. Consequently, we have no use for a dog

At the end of the year we find the average number of cows kept on the farm twelve months, if there is anything made on the shift of the cow, it is added to the milk account; if any loss, it is taken out before the average income per cow is made.

The cost of keeping a cow per year, varies somewhat according to the price of grain. We raise all of the corn, selling the oats, and usually some hay and buying bran. I am well aware that this is not considered up-to-date dairying, but is, the method we have followed for a number of years and find it fairly satisfactory. We do not aim to produce the greatest quantity of milk, regardless of cost or quality, but we do aim to realize a fair profit above interest on capital invested and labor expended. To have a farm heavily stocked, to keep up the fertility of the soil and thorough cultivation which raises an abundance of feed; liberal and judicious feeding which is essential to produce milk; regularity in feeding and milking; kind and gentle treatment at all times of the stock, are a part of what go to make dairy farming profitable.

To be sure there is a vast amount of work connected with the dairy,

which seems to be the universal objection, but how that is to be avoided is a problem I am unable to solve.

I do not believe in running a dairy as a "side issue," but as the leader. Consider the farm your capital; the dairy your business, and, like any business that is to prosper, must be run in a businesslike manner.

If any farmer or dairyman will emulate the push, energy and perseverance necessary to succeed in any line of business or profession, why may he not merit the results of honest effort?

Q. How many pounds did you say to a cow?

A. What the cow will eat. There is a difference in cows. That is the fine point in feeding stock. One hundred cows will vary, the heavy milkers will eat more than others. Feed them all that they will eat. Over-feeding a cow is worse than throwing the feed away; feed plenty, at the same time feed with economy and the same with other grains. Now we have found that to feed oftener and a little at a time they will eat more and enjoy it better. The way we feed: We feed the first thing in the morning a feed of grain, then we milk. After milking feed with fodder cut four inches long, cut and threshed at the same time. About eight o'clock we turn them out and clean the stables and then they get another feed of meal. After that feed a little more fodder and at noon a feed of Hungarian. At four o'clock these cows have another feed of grain and before milking a little feed of fodder. It is considerable feeding. I know the value of feeding; commenced on a small farm and knew the value. It is no more work to give them a little twice than to give them a lot just once.

DISCUSSION.

Mr. Heavenwill: Q. In this feed you have talked about that you gave your cows, I believe you said three time a day; how many quarts do you mix of corn meal and bran?

A. About 20½ pounds of feed a day. You get more into a cow by feeding three times than twice.

Q. Is that of each food?

A. Three feeds.

Q. How long do you have your cows go dry?

A. A cow ought to have eight weeks' rest. The contract says 60 days and I think it a good plan anyway. They will give as much milk in ten months as in twelve.

Mr. Carpenter: Practiced summer soiling?

A. Take oats and peas. It is a good plan, if you don't use a silo.

Q. I have advocated considerably the sowing of oats and peas for summer soiling crops. I have oats and heard pease do not do well in the State of Illinois, is it so?

A. No sir, we have good luck.

Q. If they will stand up?

A. Well they are liable to go down.

Mr. Breese: What kind of cows do you use, Mr. Wallace?

A. Most all kinds.

Q. What kinds do you prefer?

A. I have good luck with milking Durhams, Short Horns and Holsteins.

Mr. Crosier to Mr. Mason: Q. Do you breed these regular breeding for the calves?

A. Some of them.

Q. How much do you get for your cows in a year?

A. For seven years—this last year, 1899, was the poorest year—taking the average for seven years. Whatever cows are sold or dry I charge it up and take out what and take out what the dairy has brought in, and my average is \$73.13 a piece.

Q. How much does it cost to keep them?

A. I can't tell you exactly, we got out whole generally.

Mr. Long. How many cows do you require a man to milk?

A. It takes about six men to milk 100 cows.

Q. Any trouble in obtaining competent milkers?

A. That is the only drawback to the dairy business is that one thing. That is all there is the matter with it. I can do with a dairy except that one thing.

Q. What land for 100 or 125 cows, how much for pasture for the cows?

A. I would not have over ten acres of land without any improvements on it.

Mr. Newman: How many acres in your farm?

A. Two hundred and eighty-five acres.

Q. How many cows?

A. One hundred and sixteen now, some dry ones.

Q. How many cans of milk?

A. Forty cans of milk.

Q. Did you raise the feed on 285 acres?

A. All but the bran.

Q. Sell enough feed on your own farm to pay for the bran you say?

A. Yes sir, done it for some time.

Q. Practically raise all your feed for those cattle?

A. Yes sir.

Q. What is the full capacity?

A. That farm could be made to produce 50 cans of milk eight months in the year. That farm is going to be provided and then get down to the dairy business. You want to run your farm so it will pay and your boys are more apt to stay on them. I have got boys who told me and my wife that years ago. You want to have your boys around you until 18 years old. This getting a little move on you shows it pays, by gosh. When they are 21 they want to have part of it and work it.

Q. Suppose you haven't any boys?

A. You wouldn't want to run a dairy. I have learned that all right.

Q. How many hands on your farm?

A. Seven milkers.

What did you do when not milking?

A. You get on a farm where there are dairy cows and you would never ask that question.

Mr. Monrad to the President:

Mr. President: I just have a remark to make that I did not have a

chance to make before. I want to apologize to our president because when I saw Grout's name on the program, I said, "What in thunder does he want a beef man like Grout on the program?" Now listening to Mr. Grout, I think he has shown us, not how to do it, but shown us the kind of cows we should not keep as dairymen. It shows me that the beef men know what they are doing. They have set their aim and they keep their eye on that aim. The trouble with the dairymen and farmers in Illinois is that they have been vacillating until they don't know where they are. The best lesson we have had is just here on these pictures of the cows we don't want to have anything to do with.

SCORES OF BUTTER.

MR. GEORGE CAVEN, SECRETARY.

The announcement was made that Mr. Collyer would score the entries here at Aurora, but yesterday morning I got a telegram from him saying that he had to meet a body of carload shippers in Kansas City, and as I did not wish to delay the scoring until so late, I sent for Mr. Gallagher, and he came out and scored the butter.

The judge said that the exhibit of creamery was exceptionally fine, one of the best he had seen, and you can see by the scoring that they are exceptional. With the exception of a few packages they would score in the extra class.

The scores in the creamery class are:

BUTTER SCORES CREAMERY CLASS.

C. R. Wilder	Eden	94½
D. C. Burton	Kaneville	93
C. W. Davis	Woodstock	92½
Frank B. Thompson	Greenwood	95
Grant Mallory	Freeport	96

Oscar W. Reed	Lebanon, Ohio	94
Peter Danielson	McConnell	92½
M. G. Atkinson	Woodbine	91
Wm. M. Fryer	Forreston	92¾
Mat Ludwig	Goodings Grove	96
Wm. Boethke	Elmhurst	93
A. E. Thompson	Poplar Grove	95
Martin Gullickson	Frankfort Station	93
Frank E. Rawson	Sugar Grove	92½
Geo. Bloyer	Harper	94¾
J. S. Waspi	Spring Grove	96½
L. H. Knigge	McHenry	91
Chas. H. Woodard	Kaneville	95
N. S. Hollister	Pana	95¾
John Carlson	Aurora	93½
David Van Patten	Plainfield	96¼
Geo. Reed	Belvidere	94¾
F. E. Barrett	Union	97
Fred A. Cooley	Yorktown	93
H. Eastman	Shabbona	93¼
G. W. Hoppensteadt	Eagle Lake	94¼
N. W. Finch	Victor	93¼
F. J. Muller	Milledgeville	92½
Peter Nelson	Creston	95¾
M. Francisco	Wauconda	95¾
G. Herman	Manhattan	97½
L. E. Camp	Polsgrove	88½
Otto Bloyer	Elkhorn Grove	96¾
Frank McFarland	Big Rock	95½
W. J. Grover	Belvidere	92½
Albert Smith	Springfield, Wis.	96
W. K. Tindall	Malta	94
O. Myers	Little Rock	95½
Wm. L. McNurlin	Steward	94
H. Nolan	Hinckley	97¾
H. R. Duel	Sandwich	96¾
H. F. Rotermund	Bemes	90½
Christ Becker	Elgin	96½
Howard O. Sears	Garden Prairie	92¾
Geo. E. Waterman	Garden Prairie	93¾

DAIRY CLASS.

L. W. Swanzey	Ridott	94
F. S. DuBois	Rockford	95
Samuel Gray	Hastings	94
Eli I. Crosier	Utica	96
Davis Bros.	Fairfield	91½

Thos. Slowborg	Savanna	91½
Irvin Nowlan	Toulon	95½
Eva H. Springer	Springfield	91
S. S. Merritt	Henry	95
Mrs. Emma Brunidge	LaFox	96½
Miss Mae Cooper	Steward	94
Mrs. Chas. Beede	Chadwick	93

FULL CREAM.

C. A. Poplett	Dunlap	88
S. G. Soverhill	Tiskilwa	87
J. H. Biddulph	Providence	92

SAGE CHEESE.

J. H. Biddulph	Providence	90
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POSSIBILITIES OF DAIRYING.

BY HENRY WALLACE, EDITOR WALLACE'S FARMER, DES-MOINES, IOWA.

Mr. President, Ladies and Gentlemen:

I cannot tell you how much good it does me to look in the faces of this audience. I have been at a number of dairy conventions in my life, and this is different from any one I ever yet attended.

I was asked to go to a dairy convention last September and give a plain talk to creamery patrons, and when I went and sized up the audience, I found just about four men there, by a stretch, that I could imagine ever held teats in their lives, so we had a nice heart to heart talk with those four creamery patrons in the presence of a great number of newspaper men and railroad agents and dairy supply men and creamery men, and I expect what I talked to those four patrons was all Greek to those other fellows. But this is a different kind of an audience here today.

I am particularly glad to see this kind of an audience in Illinois. I

have been laboring with a lot of heathens down where Grout lives, and when I talk dairying to them down there, they commence laughing, and say I have made an unfortunate mistake. "We tried dairying here; we had a creamery here and it lost \$6,000, and we haven't heard a man say cow since." I told them cows were their salvation.

I am glad to see a convention like this in the State of Illinois, gladder than to see it in any other State in the Union. There is hope for Illinois agriculturists yet.

In regard to the possibilities of dairying, I might take all afternoon on that subject. I will make my talk into two different parts.

The first man I will talk to is the special purpose dairyman. By that I mean the man who is in dairying for the milk and the butter, and who buys all or part of his feed. The man on the small farm. The man whose father kept cows before he was married, and married a dairyman's daughter, and they talked cow, and talked cow until the boy became, by inheritance and influence, a dairyman. That man wants the special purpose cow. He has no business with any other. He has no business with that until he learns some first principles.

One is to figure out what each cow is worth by weighing the milk and testing it, weighing the feed and feeding out what he is doing. Otherwise, he is groping in the dark. I don't think that man ever lived that could tell to an absolute certainty what a cow was worth until he tried it. Unless possibly it might be Norton in Iowa, who has a herd of double purpose cows 330 to 380 butter fat in a year. Norton is, however, one man in a hundred. There are probably a few in Wisconsin. One in Kansas said he could pick out a cow. So he sat down with his eight cows and figured and then give us scale and Babcock test, and he hit it on the first and last and missed every other one, and, by the way, don't you forget it, Kansas is going to be one of the great dairy states of the union by and by.

I think it is possible to almost double the quantity of butter from the cows, even those kept on special purpose dairy farms. You must not only know what you are doing, but know how to feed. Of the dozens who write me in the winter season what's the matter with the feed for their

dairy cows, I have found but one of them was feeding enough protein. They nearly all break down on that.

There is no telling how much you can increase the dairy output in the special purpose dairy farms until you get acquainted with your cow, and then learning how to feed her, and then how to breed with that special end in view.

I am here to tell you that you may be surprised at what I say, and you may not believe it. I want to say to you that with all your special purpose dairying in Wisconsin and on back east that after all you are only a small toad in the puddle; that special purpose dairying is the least end of dairying; that the possibilities of dairying, the possibilities of good dairying to farmers of all classes, lies not in your special purpose dairying at all, but lies in another kind altogether.

Let me put my thoughts clearly before you. First I will recite some history that's well known to almost every man in this audience. When this vast Mississippi valley was opened up by the hand of the farmer, it was stored with the accumulated fertility of ages and ages and hundreds of ages before Adam was a baby. The great Farmer of the farmers, and every progress in agriculture is formed out of the laws He has made, and the laws made by Moses.

In the growing of feed—He has been in the business long before you—He knows the best for the field and is especially careful to store the soil with humus. Never does winter fall but the winter floor is covered with leaves. He goes on the broad expansion and prepares during all summer long, and before his land is fit to grow grass, He starts waste; waste that comes in the spring; waste that comes in the summer; waste that comes in the fall, and gets a good start in the spring. Why? Because He wants to store this land with humus. What does he do with it? It is like sponges which drink up the rains and give it to the thirsty roots in dry time. He keeps his supply of nitrogen.

What is humus? Partially decomposed vegetable matter. And we come to this inheritance richer than anything that fell into the hands of man. And the first thing we do is to exhaust it, by raising corn, wheat,

and oats. The men that came first to Illinois saw the richness of that soil. These lands stand dry weather better than any land I ever saw.

They say the seasons have changed and commence to howl that there is something wrong with the administration and all such. They will say the seasons have changed; that the Lord had forgotten how to water this country, and how to run it. The fault is not with the Almighty, nor the party in power, but it is in yourself. You have violated the laws of the field and of all farmers, and they are complaining, and the furrowers of the land are complaining. Job tells us of the things he had done. He thought bad farming was as bad a sin as robbing his neighbor.

Now the furrowers of the land began to complain, and began to talk of chinch bugs. There are more chinch bugs in Illinois than any other State. I noticed all along the way here you had chinch bugs. Why chinch bugs are the penalties sent you for not cutting up your corn. Chinch bugs come to the land like lice to the ripe stalks. It is a regular chinch bug factory in Illinois I tell you. I could not help but notice the difference in the color of the soil on the railroad track, and the difference over in the field. Your soil is becoming pale, becoming light; in all the ridges it is light colored. Why? Because you have been exhausting your humus, violating the laws of Almighty God. Repent and be converted that your sins may be blotted out.

The next thing you can't grow clover. Proverbs you read: "Because I called and ye refused; because I stretched out my hand and no man regarded me, I will laugh at your calamities." That is what clover says to you. You said you could get clover any time, and now you complain because you are sinners, that's what's the matter with you.

About fifteen or twenty years ago the farmers in northeastern Illinois were doing the sin the central Illinois farmers are doing and they wanted to know what they should do to be saved, and Father Clarkson, Wilson, and I says: "Go to grass," and they wanted to know how to go to grass, and they went to dairying and they got rich. In Kansas and Nebraska there are the same soil robbers. They finally get to grass, but they can't keep as many cows. They can't keep hired men like my

friend here does. They can't put all their stuff into the cows, or, if they did you fellows here would not live.

They must have a cow as a manufacturer of two kinds of packages. Or rather the fillings of one package and butter tub and they must have the cow to manufacture another package to put in what the cow cannot eat. Nine-tenths of the butter snipped out of Illinois is made from double purpose cow. Why? Simply because we must have a cow to give 200 butter fat and make a calf. Bless your soul it is done every day, so don't say it is not.

There is a funny thing going on. There is a whole lot of human nature in this. This first breed of soil robbers get off; the cow chases them off, and then well to do farmers raise families, get rich, and move to town; the towns are full of them. He says, "I have milked all I am going to; I have raised my boys on the farm, and I guess I have milked enough," and he quits. Goes to something else and what happens. Inquire at the bank and find out. And what do you suppose? While in that bank they paid out \$20,000 for milk and \$40,000 for chickens, and \$60,000 for cattle, and \$60,000 for horses right in the center of the dairy country. I wanted to know the reason of it, and I have given the reason. The old man moved to town and quit milking, the boy says he will do something else, and so the dairy gospel moves west.

You can't keep up the fertility of land, as our friend Grout says, without some kind of livestock, you must have it. The hogs don't do much in the pasture; he ought to have a chance to do more. One hundred hogs is not enough. You can raise horses and horses but for the good of the land you must have the dairy cow and her value can't be told, and if you don't have her you can't keep up.

The great possibilities of dairying. It links itself with the maintenance of the fertility of the soil. The steer feeders can't do without the dairyman. I would not take 100 Jersey steer calves for a gift. I might take 100 heifer Jersey calves, if I could have them fed milk six months and sell them for veal. But if you want ever to keep up the fertility of the land you must have the dairy cow.

We now come to soil robber No. 2, and is the hardest fellow in the business, and they are not going to get rid of him until you have a first class funeral. No. 1 is poor and soon starves. He goes to Dakota and runs up against the Black Hills; finally get lower and lower, and you don't know what becomes of him.

But your sinner of all sinners is the man who has got rich on a farm by feeding cattle, and from which corn is a balanced ration, and he goes to town and he puts on airs. "I am a money maker; I don't see why my son or my tenant can't make money. I am worth \$20,000," etc. He never made any money to speak of. He got land worth \$5 an acre, and he raised corn on it until he exhausted the fertility of it, and then he went to grass and fed steers, and his land probably sold for \$75 or \$100, and he puts the money in his pocket and says he made it. He simply absorbed it. He had an opportunity, such as will never come again in this country, or possibly in this world. There is no such land to be given away now. His son must earn money; he must create values, and his son possibly goes to an institute and says: "Father had them go to dairying." Now he says you can't do it, because I will have to build a cow barn, and I will have to put up a windmill and have to put up hay sheds and have to provide cold water, and to put my farm into repair and build fences, and it will cost too much money, and so he hires it to the corn raiser.

You are working at cross purposes in this State. You have a lot of soil robbers. You allow the Danes to lay down \$30,000,000 worth and compete with you and knock down the prices, raising pig feed and horse feed to the English and Scotch and Irish. Now what is the salvation? Dairying; the dual purpose calf. Give them a chance to feed their cattle and keep up the fertility of their land. That is the only salvation for you. When you get rid of these old soil robbers who think they have got rich. It must go on north and south and east and west until we have a rational system of dairying in all these broad lands.

They put it down as an absolute fixed fact that the fertility of land can never be retained short of some kind of live stock and grass. On \$50 land you must have something more than a calf and the keep of a

cow, or else you must make your land raise twice as much as it is doing now. This \$100 land must bring twice as much as the \$50 land, or else have something more than the calf and the keep of a cow.

We have made great advancement, but the final solution is the farm separator. I don't advocate every man to do it. You must take time to do a good thing. You must have it in order that you get your milk sweet and warm to feed your calf without giving it the colic; without making a poor miserable creature born to grief and to grieve you too. You must give the cream properly balanced. I have no fight with any special purpose cow. It is the very thing for the special purpose dairy man.

Men won't milk unless they have to. There is no great fortune in it. The supply is used up every year and it is a blessing. Whenever it gets too cheap they just drop off their poor cows and sometimes drop off altogether, and it goes on year after year and generation after generation. But dairying is a blessing. It is binding up the broken hearts, repairing the wastes of the soil robbers, and laying the foundation for a grander type of character.

I have all praise for the corn raiser. He is no slouch. A man who can grow that corn and then use the whole of it, and feed it to a dairy cow or to a steer and feed it at a profit is a good deal broader and a good deal bigger man than he is given credit for.

Care in milking. Your cows will not give down if a man gets after them with a whip, or a dog. The cattle man is a different kind of a man now that thirty years ago. You have got to have the law of kindness; you have got to put brains in your work. I thank you for your attention.

ADDRESS.

PROF. E. DAVENPORT, UNIVERSITY OF ILLINOIS.

Mr. President:

I have never read a paper, and I have no business on this program this afternoon, but I told the Secretary I did not want to read a paper at the evening session. I want to talk to dairymen and no one else, and I hope those who are not dairymen here will find business elsewhere.

SOME CONDITIONS IN THE DAIRY AFFAIRS THAT NEED ORGANIZED ATTENTION.

I am neither an alarmist nor a pessimist, but I cannot look with deep concern upon certain conditions that prevade the dairy interests, because they seem to indicate that this great industry is not keeping pace with the general development of the country and of other important industries. Surely if such an assumption be in the slightest sense correct, then it merits the most thoughtful attention, for in these intense days the man or the industry that fails to catch the step and sustain the pace of others will shortly be left in the rear, if not hopelessly distanced or permanently set aside.

I very much fear that I shall say some things in the progress of this paper that may not meet approval. If so, I beg you remember that I am a dairyman myself, as well as a teacher, and that for more than twenty years one of the leading interests on my own farm has been and is yet the production of milk for making into butter. So I have a personal interest in the condition of the butter trade.

However, I am bound to say that I should not occupy the time of this meeting to listen to my views of the dairy situation upon any personal grounds. I write as I have written because of my connection with the Experimental Station of the State, that not only thinks it discovers some deplorable conditions, but finds itself unable to lend much assistance, owing to circumstances that will shortly appear. I take this early occasion to assure you that if I speak plainly it is because no other speech is necessary among sensible men, and I hope that some action may be taken looking to the modification of certain conditions, and the extension of trade. I have one request, and that is that for the time this body will look at these matters from the side of the consumers who are our customers.

In the day of our mothers and grandmothers, in New York, Pennsylvania and Ohio, when the milk was set in the spring house, good but-

ter and cheese were accounted necessities in every family, and while I believe that some better butter is made now than was ever made in those days, and perhaps cheese as well, yet I believe too, that it is by no means the rule and that the quantity is exceedingly limited. In any event, conditions have changed since then in a number of important particulars, not all of which are advantageous to the dairy industry.

Then, cows ran in pastures in summer and in yards in winter, and were milked almost entirely out of doors in pure air, under more or less motion—conditions unfavorable for contamination; now, although we have learned beyond a doubt that the cow herself is the chief source of contamination of milk; yet the milking is almost universally done in close barns, often, if not generally, shockingly ill kept, and resulting in wholesale contamination of the milk as fast as it leaves the cow. Indeed, if the purpose were to make the milk unfit even for a calf to drink, human ingenuity could hardly invent a more scientifically complete method than that which is in vogue today on many of our dairy farms, even in some of those supplying milk for human consumption. This is no idle assertion for it rests upon data on file in the offices of the Experiment Station, which has not been published for obvious reasons, but of which every member of this association is fully conscious from his own observation.

In the old days most families made their own butter and cheese and drank their own milk and cream, and the few who lived in towns engaged these table necessities from sources well known to them. Now, fully half our people live in cities, most of whom are compelled to buy these products in the open markets. The advantage of all this is in a steady demand and a money market for dairy goods, elevating dairying to the rank of a business; the disadvantage is that the producer and consumer are so widely separated that the personal element is lost and with it there is a letting down of the feeling of responsibility on the part of the producer who brings into frequent use that old saying, "Good enough to sell." Under this legend many a commodity makes its way to the general market that the producer would not for a moment think of putting upon his own table or of preparing for that of a friend. This is a shortsighted

and suicidal policy truly, but it yet exists to a wide extent among many people who have not learned that the fundamental principle of trade is to please the customer and get his money, to cater to all his natural appetites and prejudices and to educate him into new ones if possible, in all of which the personal element is to be studied and not ignored.

In still another particular we have exceeded the wisdom of our grandmothers. We have learned now to make both butter and cheese out of the same milk—a Yankee trick that seems not to have occurred to the silly old dames aforesaid; but thereby hangs a tale.

The time was when American cheese enjoyed a reputation and a ready sale. Some of you remember that time. Then came the saying that cream that had once risen could never be worked into the curd again and might as well be made into butter as to be run into the whey vat. So the power churn came into the cheese factory, and the cheeses got harder and harder till the days of "white oaks" were fully on. By this time all the cream seemed to have risen and gone, except from the label. The Canadians saw what was going on, made good cheese, and captured the market that we gambled away, and they've got it yet. I was talking with one of them about it the other day. He seemed to understand it fully as well as I did "Oh, yes," he said, "we understand all about how you lost the cheese market, and we got it, but we are not saying anything about it."

When we saw what we had done we formed a copartnership with Satan. We furnished the milk—after it had been churned. He furnished the cotton seed oil and the full cream label; but it deceived only Americans, and them not very badly, for they have never forgiven us unto this day, and they have paid us for it by practically stopping the consumption of cheese. Time was when every well-regulated family put in its stock of cheese for the winter, or at least bought it in quantities and ate of it freely; now we buy it in thin slices of about a pound each, likely cracked upon one side, serve it in little cubes with pie as desert, in this way disposing of about half of it, using the last of it for baiting rat traps. That is the way the bulk of the cheese business goes today,

excepting with a few factories that really make good cheese, and that is all snapped up for local consumption or absorbed in some definite line of trade. The retail trade gets little of it. That the general customer is discouraged about cheese and is stopping its use is only stating the truth in its simplest terms. The old timer is thoroughly mad about it, and the new generation that is coming up, having never known good cheese or developed an appetite for it, hardly counts cheese among the articles of diet, so we have practically killed the appetite and the demand for one of the finest of dairy products. We have laid all our butter troubles at the door of butterine, but American cheese has had no such competitor. It was killed by its own inherent badness.

Regarding milk and butter, the conditions are not so bad, but are tending in the same direction if trade indications mean anything, and the plain unvarnished facts are about as follows as to dairy products:

1. It is next to impossible for housekeepers, who are obliged to buy, to secure a good quality of either milk, butter or cheese in the retail markets. No other articles of living are half so troublesome except eggs.

2. The consumer who ought to be our friend and whose money we covet, is in a bad frame of mind. He is rapidly passing from a general condition of ugly irritation to one of fear as regards milk, hopeless discouragement as regards cheese, and active anger as regards butter. This latter feeling has in many individual instances already passed through all the stages experienced in cheese and they have gone over to butterine as by all odds the most generally satisfactory. They have worn themselves out hunting butter and have given up the chase.

3. The effect of all this is to work a permanent injury to the dairy trade and to arrest the proper development of this industry.

I have said in substance that a good quality of dairy products is hardly to be had at retail. Enough has been said as to cheese, and as to what is known as to the milk trade, the less said about it the better. The conditions surrounding the butter trade are peculiarly aggravating. The dealer always has some good butter "if you will take creamery but-



PROF. E. DAVENPORT
Dean Agricultural College, University of Illinois.

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ter." Of course you take that kind. It is nicely wrapped in paraffined paper, marked Elgin, or some other equally delusive name, but when you get it to the table it proves to be, Oh, horrors! process butter, and visions of its composite pedigree and its whole abominable ancestry rise before you until you are ready in your righteous indignation to commit manslaughter on the first dairyman you see. You curse the groceryman, but he swears that he bought it for creamery butter and there is no use in murdering him. And so the whole wretched business goes on year in and year out until the housewife who has known good butter sometimes surrenders and orders butterine straight, and finds it far more satisfactory than the butter she has been able to secure. This too, is no fancy picture, for I can point you to many a family of good livers that have gone over to butterine. As matters are going now, and in spite of all that has been written and said, we need not be surprised shortly to hear of legislation to prevent the sale of butter as butterine. We have been industrious in our opposition to butterine and there has been good reason for it. In our zeal, however, we have overlooked some important items.

Now the truth is there is no natural competition between butter and butterine. The appeal to different classes of people, and it is folly to say that either is necessarily bad or unwholesome. Butterine, like butter, is good or bad, according to the way in which it is made, and in respect to pedigree, in my way of thinking, neither can make faces at the other. I have said that these two products are suited to the conditions of widely different classes of people. Good butter, well made from clean milk, is so infinitely superior to butterine in flavor, that once tasted nothing else will satisfy, and it will be eagerly taken at a price which is prohibitive to thousands of people to whom ten cent butterine is a Godsend. And I say to you in all candor what everybody knows, but what nobody likes to talk about—that the reason we feel the competition of butterine so severely is that the butter of the markets is not good enough, so that butterine is coming to be actually preferred to much of it; and I say further that while every good citizen is bound to help prevent one product being sold for another, yet any attempt to abolish butterine will arouse the opposition of the thousands engaged in producing

beef and pork, and will array one class of cattle farmers against another, and any movement that doubles its cost will bring down the wrath of a mass of consumers, and their name is legion, who are unable to buy butter as good as it should be and who will stubbornly dispute the right of the public under any pretext to put an artificial cost on a staple article of food, while every compound that originated in the cow goes on masquerading as butter and protected by the law, and while the natural lifetime of milk is so generally lengthened by the use of preservatives powerful enough to prevent the development of living organisms.

I tell you frankly there should be more house cleaning at home in these matters. The consuming public is both irritated and frightened, and it is going to do something. What it does will not be noisy, but I promise you it will be effective. It is discouraged with cheese and has practically quit eating it; it is disgusted with the available butter and is strongly inclined to butterine; it is growing afraid of milk on the score of health and is using less of it, with a growing disposition to still further decrease its use; it has practically abandoned cheese without a substitute, and it will not take it long to repeat the treatment to butter when it is behaving even worse than cheese ever behaved, and when so cheap and convenient a substitute is so ready at hand. With our rapidly growing population this decreased use of dairy products is less noticeable, but it is there nevertheless, and there is the root of the difficulty in the dairy business.

Now dairy products are essentially matters of luxury and not necessities, and dairymen seem to have forgotten or not to have noticed the wonderful development in the use of articles of luxury in the last decade or two. Take the single article of candy. A few years ago we had only the regulation stick and the impossible mixed candies, half terra alba, and handled with shovels like coal. Now we have the most delicate creams and caramels put up in the daintiest perfumed boxes at anywhere from 25c to 50c, 75c and even \$1.00 a pound. Yet the standard sweet they contain is worth anywhere from three to five cents a pound. The rest is addition to the flavor or the appearance, and we who eat it

pay the difference not the producer. Has the dairy business kept pace with the development of the candy business, I ask you? I can buy Gunther's or Lowney's candies in any town and they will always be standard and good. Tell me, what are the chances of my being able to get an equally good and uniform quality of milk, butter or cheese in the same town? Remember, my dear friends, that the quarrel that the public has with us is on quality not on price. Butter sells at 40c, 60c, and \$1.00 a pound in this country if only it is good enough. It reminds me of Mark Twain's grocery sign: "Eggs, 10 cents; good eggs, 15 cents." Any housekeeper will tell you that the dairy part of the living is the most troublesome of all except the eggs, and we all know that there are multitudes of people ready to take these products at almost any price if only they are good enough.

Dairymen do not sufficiently realize that they are engaged in producing one of the world's luxuries. Now the inherent advantage in a luxury is that it appeals to wealthy people, or to the weakest side of all people, and if it pleases them it will pull the money out of their pockets in spite of them. On the other hand, the disadvantage of a luxury is that if it does not please the consumer, he will finally grow discouraged or disgusted and quit using it because it is a luxury and not a necessity. Dairymen are too exclusively intent on cheapening production, though they do not seem to have largely availed themselves of the two most effective means of doing it, viz: The use of the Babcock test on every member of the herd and the home raising of cows by use of pure bred bulls.

The lesson we must learn contains the fundamental principle that we are engaged in producing a luxury, and that we must please the very largest possible number of people able to pay a good price, and to do this economy and production is not the first consideration, but rather quality and appearance. Not only that, the drift of public sentiment plainly indicates that the dairymen's fight against butterine in so far as it aims to prevent its sale as butter is right and just, but that in so far as it opposes the manufacture and use of butterine, and attacks the article

itself it has hopelessly failed. It indicates further, too, that butterine is becoming more and more able to sail under its own colors, and relatively speaking butter is less so. A few individuals have solved these things for themselves and our appreciative public is paying them for it. These are they who sell their butter at 40c, 60c, 75c, and \$1.00 a pound and their milk at 10c and 12c a quart; yet the dairy people do not seem to take the cue. I have heard men say, for example, that Mr. Gurler's milk is no better than any other; that he has a "pull," or has "got his name up," and that is all. There is the rub. We don't relish the truth and would evade it. Now the truth is that the men who buy Mr. Gurler's milk to feed their babies and their sick don't care a fig for Mr. Gurler or his name, except as it is a guarantee that the milk is standard and clean and may always be depended on. That is all there is of it. Go thou and do likewise.

Now these are not pleasant things to say, and I certainly would not have said them if I did not hope that good might come of it. They have not been hastily brought to mind nor unadvisedly uttered. I have had them constantly in mind for more than ten years, as I have watched the struggles of the dairy industry. Nevertheless I would not have said them here except for the fact that as Director of the Experiment Station I am troubled. The Station is desirous of doing everything in its power to contribute to the development of the dairy industry to the very highest state possible, but every time Mr. Fraser has started out on a line he has run into some of these things and into conditions and facts that made it seem unwise to go further and certainly to circulate reports in printed form. Accordingly he has a mass of information which is useless except as it indicates conditions. These conditions can be corrected only by organized and persistent effort of the dairymen themselves. The plain truth is that there is a condition of things that needs careful study and then concerted and vigorous action.

The public has charged up against us on general account the following: Skimmed cheese, filled cheese, butter made in thousands of places where no decent man would eat his dinner; process butter, which is the

same stuff with its face washed and hair combed; milk loaded with filth visible, constantly suggesting the occasional infection with tuberculosis and typhoid fever; milk that has been watered and milk that has been skimmed; cream that never saw a cow and that contains no fat, and both preserved by drugs powerful enough to prevent the growth of the organisms it contains until they reach a more favorable habitat in the human body—all these things the public has charged against us and our business, and they say besides that our trade marks mean nothing. It is not strange that thinking people, those most able to pay, are using less and less of dairy products.

In the words of another, "We may as well look at these things as to wink at them." Indeed we cannot afford to do otherwise, for it is a condition and not a theory that confronts us. If the people interested in dairy products are to live up to their possibilities they must go after markets, they must study conditions, appetites, and prejudices and cater to them. They must do as the Germans are doing—do everything to extend trade and please the customer, not disgust him. We want the customer's money and what we need is more quality and uniformity and less violations of the sacred meaning of brands and trade marks. There ought to be a modern trade text reading, "Cursed be he that imitates a trade mark or violates the sanctity of standard brands." How shall it be secured, and what system of inspection shall be inaugurated? You must meet these problems sooner or later—the sooner it is done the better for the dairy industry of Illinois. If long deferred it will take more than one generation to repair the damage, as for example, to recover our lost cheese market we must not only make good cheese, but also grow a generation of cheese eaters and develop their appetites.

I commend these things to your attention, again reminding you that I have said them not for pleasure or from choice, but from a feeling of desperation, hoping that this body that officially represents these great interests will be able to devise effective methods of further developing our trade in dairy products. There are inherent difficulties, but I have faith that they will be met and overcome whenever such associations

as this address their serious attention to the business, and I assure you that the University will be only too glad to contribute anything in its power to assist in putting the dairy trade of this country where it belongs—second to that of no other industry and of no other country on earth.

To accomplish this requires three things:

1. Higher averages of quality in dairy products.
2. Greater uniformity.
3. More liberal evidence to the buyer that he is getting the grade of goods he desires.

This is only another way of saying that what is needed is a system of registered brands or trade marks protected on the one hand by law against imitations, infringements or violations of any kind, and on the other by such methods and manufacture and inspection as shall insure uniformity, quality, up to grade in each particular brand. Or, in other words, imitate the methods that have been found useful in extending trade in other industries, and the present distrust and odium under which other productions are laboring will disappear.

Are the dairymen able to accomplish this. Upon the answer to this question it seems to me depends the real future of the dairy industry. It was the American system of meat inspection that put our meat into Germany in spite of the Germans, and it is that system upon which the stability of the meat trade depends.

Is not this worth more than passing attention? Are not conventions like this the only agents powerful enough to take the initiative? Is it not matters of this kind that such conventions are to undertake, and should not this body maintain a standing committee on trade conditions to devise means for the further development of the industry it represents?

Wednesday, Jan. 9, 1901, 7:30 p. m.

President in the chair. Convention called to order.

Reading by Miss Bauman. Responded to an encore.

Colored specialties. Responded to an encore.

Song by Miss Sherer. Responded to an encore.

ADDRESS.

MR. W. S. MOORE, CHICAGO, ILL.

Mr. President, Ladies and Gentlemen:

I think it would hardly be proper to call my remarks an address, as I have prepared nothing for this occasion. I was asked to present the status of the Grout Bill, which is before Congress, to restrict the sale of colored oleomargarine.

I had hoped there would be some thing definite that I could report, but I don't know as I can give you anything more than a short revision of what has been done.

As you know, about two years ago, an effort was begun under the leadership of the National Dairy Union, to put through Congress a bill which would tax oleomargarine, when made in semblance of butter, ten cents a pound. In other words, when made fraudulently to be taxed, but when left in its natural color and sold for what it really is, the tax which is now two cents was to be reduced to one-fourth of a cent a pound.

Naturally, an undertaking of this kind met with the strongest opposition from those who had their millions invested in making oleomargarine. There were only sixteen interested in this business in the United States, and the profits of this oleomargarine had been so great that they

became millionaires. They saw that a fight would be had and that something of the sort would take place, so they make an effort to work themselves into the good graces of the politicians of the country from one end to the other.

However, the scheme was launched at the National Creamery Butter-makers' Association and has progressed. When Mr. Knight, who was Secretary of the National Dairy Union, first went to Washington to urge the bill, he was met on every side with the assertion that he was foolish to come with a bill of that kind for he would not get a single vote for it. Yet he was not daunted in getting what he thought was just for the creameryman and the dairyman.

He pursued an entirely different policy than those others. He, instead of making use of lobbying, did the only thing the dairyman had with which to contend with in this fight. It was not possible for the dairyman to attempt to obtain anything by the use of money in the ordinary acceptation of that term, for when it came to money, the oleomargarine men had hundreds of dollars to one of ours that they were willing to spend. Consequently he had to appeal to the dairymen and obtain from them the only thing that remained that they had with which to fight, and that was their votes. It became a fight between votes and money.

He wrote to the Congressmen and asked aid of them. We were disappointed in not obtaining definite action on the Bill at the last session. All we accomplished was to succeed in having it made a special call for December 3 after the House met this year. At that time our Bill came up with the favorable endorsement of the Agricultural Committee. The minority brought in a report. The other side lined up every influence that they could against the Bill, but the issue was brought out fairly and frankly on the whole, and the vote was taken. First, on the substituting a Bill which was introduced by the oleomargarine men not only to kill our Bill but to make the conditions more favorable for themselves. This was overwhelmingly defeated. Then came the main issue on the Grout Bill, and while it had been asserted we could not get a vote, it got 196 to

their 92, or a clear majority of 104 votes. This, I think, put to rest forever opinions in the minds of any one, and especially those who had not taken the trouble to inform themselves that this fight was on in earnest, and those who were pushing it, that they had no chance. They pushed it to obtain the legislation they claimed they would secure.

Meanwhile, while this fight was going on—this was not the only thing the Dairy Union has had to do; it had to watch the corners; had to watch its enemy and help its friends. At one time the Union was helping to elect a Democrat, a Populist in one State, and a Republican in Minnesota and so on. The issue for the Dairymen and the National Dairy Union, the paramount issue in the last campaign was not money, or the Philippines, or labor, or capital—but oleomargarine. That was the only issue. They did not recognize anything else. If a man was for the Grout Bill they stood by him; if against the Grout Bill they were against him. They did this to accomplish the purpose.

Our Bill has now gone before the Senate with the prestage that an endorsement of that kind must give it. The battle is not over. The first skirmish is hardly over yet.

When our Bill went into the Senate it would naturally have been referred to the Committee on Finance, but our people wanted it to go to the Committee on Agriculture, and they accomplished that purpose notwithstanding the opposition of the oleomargarine men. They wanted to get action on this Bill and the Committee got it and commenced giving them hearings upon it. The oleomargarine men have been anxious to delay final action on this Bill, and leave it until the last moment, so that when the Bill comes into the Senate that action can be postponed, and in the closing of the Senate, talk it to death. On the other hand supporters have been trying to get a definite day set when this Bill shall be reported favorably or unfavorably; it has been thought that we could not accomplish this, but I have been advised today that the Committee has finally decided that this Bill shall be reported one way or the other on next Tuesday.

The oleomargarine men, seeing that a vote must be taken, it has been discovered, by the Committee, before many days on this question, have

made an effort to absorb absolutely every minute of the time at the disposal of the committee, so that when our side wants to be heard that they must ask for a postponement. But I am also informed that we have scored another point; that we not only have had the date fixed for next Tuesday, but are to have the whole day of Tuesday to report to them. No matter how much they may say up to that time, we can have that day in which to report.

But we have not yet won the battle. They have political influence; they have money; they have a powerful lobby, everything that an injurious cause can have, but we have votes, and we must impress upon our representatives in Congress that we not only have votes, but are going to use them where they will count.

The only thing this body can do to help on the cause is for every man and every man's friend who believes in this cause to write to his Senator at once, tomorrow, or the very first thing when you get home, and urge upon both Senator and Representative the necessity of not only voting for this Bill, but working for it. Now, if every man who is here will do his duty, we will have no trouble to line up both of the Senators in this State who are favorable to the Bill, and if they know that their people demand it, there will be no trouble, and to my mind, if the dairymen will do their duty and simply express their wish, we will accomplish our purpose.

It is a hard fight that we have got. It is not for me to say whether we will win or lose. There are many things that would lead one to think we might lose at this session; there are many things that discourage us, that show us that it's going to be a terrible fight, and that we must leave nothing undone. I have no advice from Washington, either directly or indirectly which assures me that we shall secure the passage of this Bill. But I want to say, ladies and gentlemen, that personally I have every confidence it will go through because if there is a man in the United States that can and will do his part, it is C. Y. Knight, the man who is giving his whole time and attention, without pay, to the work of the Dairy Union, and to accomplish with them their rights and to obtain jus-

tice for those who are working so hard to make a living against the men who are putting out a fraudulent article to supply their trade.

I don't know as I can offer anything further on this subject. If I can answer any questions I will do so.

Song by Miss Sherer, "Life's Lullaby." Responded to an encore.

THURSDAY, JANUARY 10th, 9:30 a. m.

Convention called to order. President in the chair.

PASTEURIZING.

NELS BENGTTSSON.

Mr. Caven wrote to me a letter some time ago, asking me to write a paper and read same at this convention, and as a subject suggested "Starters." My reply to him was that I would write a paper, but the subject suggested, I thought, had been discussed so much in the dairy papers as well as at conventions, that I could hardly add anything new to it. I shall instead give you my idea of pasteurizing.

Pasteurizing is quite new in this country in the science of dairying. It was first successfully put into practice by the celebrated bacteriologist, Dr. Pasteur, but it has not yet come to so much use in this country as it deserves, and various reasons have been assigned against it, namely: It is too expensive; It makes too much work, and our home market does not favor mild flavor or pasteurized cream butter.

In regard to this last remark, I would like to ask: What does our market demand? My answer to the foregoing question is, A uniform and good keeping quality is the main thing, as well as a tendency to mild flavor.

Now if I am right in my judgment of our market demands, then it follows that I must be right in advocating the use of the pasteurizer, as I know of no other way to make this kind of butter, considering the circumstances under which our factories have to work. And if we want to get a market and good returns for our butter, we must furnish just the quality wanted.

In order to get a uniform quality of butter, our cream must be uniform, and also the milk from which we get the cream; but how is it with the milk? The milk, as drawn from the cow, is pure and free from bacteria, but as soon as exposed to the air, some kind of bacteria begins to develop in the same, varying in degrees and kind, according to the care taken of the milk.

Regarding kind of bacteria, I shall divide them into two classes, good and bad. The good bacteria we must employ in our cream, to carry out the fermentative changes that gives to our butter the desired flavor; but the bad bacteria, which are bred in dirty milk cans, strainers, or have immigrated into the milk from the cow barn or manure pile, we must keep out of our cream, because if we give them a chance to develop in our cream they will give to our butter different tastes, expressed as unclean, old, bitter, weedy, etc., etc., no matter how careful we are in making a "starter" and keeping the factory clean.

Assuming this as a fact, and in addition thereto the daily experience of getting in altogether too much milk at our factories tainted with these bad bacteria, which cause us no end of trouble, it surely is time to look about for a remedy for this evil.

Bacteriology teaches us that a temperature of 190 degrees means death to every organism; also just the thing we are looking for in order to get rid of the bad bacteria, which comes into our cream from some tainted milk, which we, in order to keep peace with our patrons, sometimes have to accept.

Now we know the remedy, and all we need is a pasteurizer to do the work, which can be done in two ways—to heat the cream after separating it is of late advocated as the better, but I prefer the other way, to heat

the whole milk before separating. My reasons are: I can skim cleaner; I get the skimmed milk improved in the very best way at the same time and at the same expense, and with the same apparatus. It also, in many cases, saves a cream pump. After having done this or rather at the same time, we must air and cool the cream, and I would recommend cooling it down to 40 degrees, also to leave it at that temperature at least two hours, after which time it is ready for the ripening process, which now can be controlled according to our best skill and knowledge.

These are, in short, my ideas of pasteurizing and its value to buttermakers; and my advice to every creamery proprietor who has not a pasteurizer in his factory is to go into a creamery supply house to take a look at Reid's and Jensen's pasteurizers, and not leave until he has ordered one of them. It will be a money saver both for himself and his patrons, as it means improved butter and skimmed milk.

CHEESE POSSIBILITIES OF ILLINOIS.

E. L. ADERHOLD, NEENAH, WIS.

I am forced to apologize for the shortness of my paper for the reason that I am not acquainted with the history of the cheese industry of Illinois, or with the present status of it, so I have not tried to cover the question in a comprehensive way, but prepared a paper for the purpose of leading up to a discussion.

The cheese possibilities of Illinois, it appears to me, depends upon the answer to these three questions: (1) Are you within easy reach of the cheese markets? (2) Will the relative prices of dairy products warrant the manufacture of cheese instead of butter? (3) Can you make a uniformly good quality of cheese?

With your close proximity to the markets of the South and Middle West, and with Chicago to fall back on, the first question is entitled to an answer in the affirmative.

The second question you must answer for yourselves.

The balance of this paper is devoted to a solution of the third question.

The rules governing the care of milk are essentially alike for either cheese or buttermaking. But if those rules are disregarded the results of such neglect are many times more apparent in cheesemaking than in buttermaking. Thus, the milk which appears to give satisfaction in a creamery would, if made into cheese, be liable to cause great vexations and losses.

Because cheese is a vtrogenous compound and because of the curing process it must undergo, conditions are furnished which greatly favor fermentation. Therefore, in the handling of milk for cheesemaking it is of special importance to observe those rules which make further exclusion of germs and the control of fermentations.

We are told that to the farmer weeds are a blessing in disguise. The same may be said of undesirable germs in milk. If the milkers were as neat about their work as we can reasonably expect they should be, the germ content of fresh milk might be reduced to a minimum and an almost unlimited quantity of dirt and dung would likewise be excluded.

I believe that filth in milk constitutes the most insurmountable obstacle in cheesemaking.

In the manufacture of sweet curd cheese, the use of a heavy started and the elimination of gas from the curd are precluded. Therefore, in this industry, it is doubly important that the milk be of excellent quality.

I believe, for more reasons than one, that those parties who operate a combination of factories who handle the total output of milk in a given territory, have the best opportunity of achieving success in the cheese industry.

Following are some of the advantages that could be gained by doing business on such a scale:

- (1) Rigid rules in the care of milk could more successfully be enforced, especially if a premium were offered for a superior article.
- (2) An instructor could be employed to keep both makers and patrons in line.

(3) A central curing room or cold storage at some shipping point could form part of the facilities of such concern, where cheese could be held at will and from whence it could be shipped in good condition and in lots of any size.

That theoretically ideal plant, the combined factory, is worthy of mention in connection with this problem. During the past two years, at times, the prices of cheese were relatively higher than those of butter, and it would appear as though an advantage were afforded if a factory were equipped for the manufacture of both cheese or butter.

A factory of this kind would necessitate the employment of either two skilled men or one "combination" maker. The latter are exceedingly rare, and if I were to employ such a man I should prefer one who had mastered the cheesemaker's art first. Very few buttermakers have the amount of patience necessary to make a skillful cheesemaker.

In conclusion, I will prophesy that if the cheese industry of Illinois grows, it will be a very slow growth. I base my predictions on the history of dairying in Wisconsin, which shows that for the past ten years cheesemaking has not encroached upon buttermaking. On the other hand, in some sections creameries are crowding out cheese factories, and it is conceded that the climate of Wisconsin is better adapted to cheesemaking than that of Illinois.

DISCUSSION.

Mr. Monrad: Do you recommend the combining of cheese factories and creameries?

A. No, I called it a theoretical idea. I have not seen it practiced much. It is more theoretically ideal than it is practically ideal for the reason that it cannot be applied everywhere, because the milk that is used at creameries I don't believe would give satisfaction in cheesemaking.

Q. How about Canada. Don't they do it there?

A. Yes sir; those farmers were first instructed to bring milk to cheese factories.

Mr. Gurler: You think the milk is not in good enough condition to make cheese?

A. That's just what I think. Yes sir.

Mr. Carpenter: What would be the effect on the milk, by sending it to the cream separator and putting the milk together again? Would it improve the milk?

A. That would be taking the animal by the tail instead of by the horns. The only way out of it is to see that the milk is milked in as cleanly a manner as possible, properly aired and cooled and cared for. I don't believe in getting the filth and all kinds of germs in first and then get it out again.

Mr. Monrad: I think Mr. Aderhold just hit the mark right. The only milk I honestly believe that we have in Illinois which is fit to make cheese, is that which is prepared for shipment to the large city of Chicago. The trouble is that the farmers here, when they stop shipping to Chicago and take their milk over to the creameries say, "Oh, anything is good enough for the creamery." Now they do that, for they have told me so time and time again. They said they would rather ship to creameries because it makes no difference to them. If they deliver milk to the creameries as carefully as they prepared it for shipping to Chicago, all the buttermakers would make better butter, it would have better keeping qualities, and then Mr. Aderhold could make cheese if he wanted to.

But in that locality the difficulty is that of unrest. The farmers sometimes think they will ship to Chicago and then get tired and go to the creamery, and that is the big mistake. The cheese industry of Illinois, if I may express my opinion, Mr. President, the cheese possibilities please, are greater certainly and would be more natural to develop in the central part. We have only a few factories in Illinois, comparatively few cheese factories that have a local market. I think it would be uphill work for a man to start making cheese in Illinois and send it to the open market in Chicago, just on account of the lack of quality or market.

Mr. Gurler: What Monrad says in regard to the milk coming to the creameries is too true. I think we should have just as good milk at the

creamery to make butter as they should to make cheese, but they have got in the habit of sliding off, neglecting to care for that milk, and if you don't take it the next man will. The competition is so sharp that to keep that man, the man who takes in the milk will take milk that he ought not to take, it is not in condition to make good butter, and then we get cursed, as you might say, and the trouble is all laid to the buttermaker, when the fault is in the milk. If you give the buttermaker poor milk you can no more expect that he is going to make good butter out of that milk, than you would expect your wife to make good bread out of poor flour. It is a parallel case and we have too much of that tainted milk taken into the creameries.

Mr. Biddulph: Haven't we got to that point where we need some one else to do the talking. It won't do for the patron to stand up and talk to the creameryman, but to have some man to go around with authority who will talk and not find any fault. It will not do for the cheesemaker nor for the buttermaker.

A. I will state, where we are now in Wisconsin, the Dairymen's Association have for a number of years been sending instructors to the cheese factories, and this year have also put an instructor among the creameries. I have been one of these instructors in cheese factories. We go to the factories and take each man's milk and make a curd test, a sample of cheese curd from each man's milk separately. Now the farmers have an idea that their milk is all right, of course. But there are a good many things that they don't know anything about, and if they hear it talked about, they do not get the correct idea. We call meetings and in the evening at the meetings those curds are finished and shown up, and shown the difference, and there usually is a very large difference, especially in warm weather. They have got to believe it when they see it, and when they want to know what causes it. That gives us a chance to tell them how to prevent it. We don't tell the patrons whose got the poorest milk unless they insist upon knowing it. The next morning we tell them how each one was, but do not tell it in the crowd. That is one of the best ways of instructing the patrons along this line I have ever seen and one of the most effective ways.

Q. What are the principle differences in the curd?

A. The amount of curd is not taken into consideration at all.

Q. What was?

A. The quality of milk that will make a good cheese will make a fine curd without any gas in it. We have curds that are that way. Other curds are very slimy, some are soft, and that would not make a fine cheese. Other curds are full of gas and smell very strong. They have those differences and are very plain so you can all notice them.

Q. Is that caused by the lack of the calves milk or food?

A. I am not going to attempt to tell the causes for all these things, but the principal ones are caused by filthy milk and exposure of milk where the air is loaded with all kinds of germs. One trouble, the vessels or cans are not scalded. We have got to keep the germs out as much as possible and control the fermentation. Not expose the milk to that barn yard air or stable air more than we can possibly help. Milk in a clean manner and then keep the milk away from the manure pile; there must be considerable distance between the two. Air the milk and cool it thoroughly as soon as possible and have it delivered as early as possible, that shortens the time of fermentation. If that is done—but of course that don't cover the whole of it. There may be something wrong with the cows; they have eaten some kind of food that would injure the quality of the milk, but we are not so afraid of food flavors as trouble with fermentation.

Mr. Gurler: If you could have either aeration or cooling, only the one, which would you take?

A. That would depend on the climate, the further north you go the better you could get along with cooling. We advocated that years ago as well as now. We had factories where milk was not set in cold water only in exceptional cases in extremely hot and muggy weather. The milk was thoroughly aired immediately after milking and it would be very fine, provided the cans were washed and scalded according to rules; if that was not done it would sour the milk.

Mr. Wheeler: Would it depend where it was done?

A. Yes, sir, it would. Of course the milk must not be exposed to barn yard germs. If it is a question of airing it in those surroundings I would rather not air it at all.

Mr. Monrad: Milk cans to be properly sterilized should be boiled is an important item in securing good milk?

A. Yes sir, I am sure it is.

Mr. Gurler: That makes me think when we sterilized the skim milk we are sure those cans are washed with scalding water and that is better than not washed at all. We get better milk from those factories where we sterilize the milk the year around than we do where we do not. But of course it has got to be in good condition or you can't sterilize it. I have another idea that I am very much pleased with at some of our factories. The patrons bring a can or two cans on purpose to fill with water, put the steam pipe into them and heat that water to a temperature of boiling to take home to wash the cans with. Those cans are generally clean and I will encourage that business for all it takes a little bit of steam.

Mr. Stewart: Can't you make good butter out of milk that is not thoroughly cleaned and cooled before going to the factory.

A. We certainly cannot.

Q. The fact is you get at the factory now all the milk that they can't ship. Every man sells his milk, and when he can't sell it he takes it to the factory and makes it up into the butter and we have to eat it?

A. That may be true in your section.

Q. In yours?

A. No sir.

Mr. Monrad: I didn't intend to start scolding again this year, but the subject came up now and induces me to enter my annual kick. That this Association is now getting \$1500 a year, and we hope to increase it to \$2000 or \$3000, but even with \$1500 a year this Association should do something more than having one meeting a year and 50, 60 or 200 or 300 farmers listening to the men who come long ways to address us. Should do something more than print 1000 reports. I do say, and I do think with the officers of this Association this year, as I did last year, to spend

some of that money in getting nearer to the farmer; nearer to the milk producer by sending and paying per diem to go to the Farmers' Institutes, when we could get more support doing like they do in Wisconsin and send out butter and cheese instructors to call meetings, school house meetings at the factories and thus get nearer to the farmers. There is need of it. We have with us today Mr. Carpenter, and he is sent out to talk to the farmers to tell them to take better care of the milk, and I have pleaded with the officers of this Association to turn their attention in that direction.

Mr. Harvey: You spoke about taking back water to wash the cans. In a milk wagon, the kind we use in Oswego, the wagon is full, 30 to 40 cans, that come from about 8, 10 or 12 miles, and we cannot do that. Sometimes they are washed with steam at the factory, but we have to fill them up with skim milk to take back. How or where they are washed when they get home is a mystery, but the great lack is in the washing of cans.

Mr. Gurler: Those loads that you speak of, perhaps they don't get home until the middle of the afternoon. The women are through with their work at noon. At night the men come up to milk, skim milk is in the cans. They dump the skim milk in the swill barrel and take those cans and put in a pailful of cold water and turn it out and then that is all the washing they get.

Mr. Aderhold: We not only speak of the mistakes and care of milk and the results, but also the mistakes in the management of factories and the result. We get at both sides. We got the farmers and cheesemakers right there. We don't speak in a fault-finding way; no offense at all felt; go about it and try to make the farmers understand that the milk producer has got to pay for all the mistakes, no matter where they are made in the long run, and that helps to get them interested.

Mr. Monrad: Can you talk to a factory man that keeps his factory dirty and make him feel good.

A. Yes sir and before his patrons. He may not feel good, but he will not be offended.

CHEAPER PRODUCTION AND LARGER PROFIT FOR THE DAIRYMEN.

BY H. C. CARPENTER, GARDEN PRAIRIE, ILLINOIS.

Gentlemen: I want to tell you in the first place, the first request I make is this. In my work in the State of Illinois for the past three months, in talking in school houses and various places trying to instruct the patrons of the Elgin Creamery Company in feeding a balanced ration, the first request when they come in is to ask them to get right close together. I believe in outdoor religion. I believe in direct contact of that electric shock; all is broken if the current is broken, and if you touch elbows you will be close together, and when your hearts beat I want you to feel my heat throb.

I am now looking into an audience of manly faces, but why are not the wives here as we have them in Minnesota. The best friend a man ever had is his wife. The idea of his going to these conventions and leaving her at home and the splendid talks we hear here, it is a great mistake. You never have as good a convention as when your wives are with you. It inspires the speaker. If the audience want me to go up on the platform I will do so. Now, figuratively speaking, I will be closer to you when this paper is ended than I am now.

Mr. Chairman, Officers and Members of the Illinois Dairymen's Association:

First of all, before taking up the subject assigned to me by your Secretary, I wish to express my grateful acknowledgment and thanks, for your invitation to mingle with the dairymen of this convention. Especially so, having been twenty years actively engaged in the dairy industry in Minnesota and for many years closely allied to our state dairy association.

I notice that I am announced on the program from Garden Prairie, Ill., which is an error, resulting from my reply to your Secretary dating from that place. My home is in Minnesota, and proud of the attainments she has made in the dairy industry within the past decade, I wish to perpetuate the genial and profitable association of the past.

Cheaper production and larger profits for dairymen, involves so much and carries the student of milk production into so many different avenues of thought, that one is lost in the maze of details so intricately connected with the machine we make use of, to convert our farm products into the most profitable commodity obtainable to the husbandman of the soil, that one almost despairs of only mentioning a little, of much that might be written on the economic production of milk and consequently greater profits to the dairymen.

The question of feeding dairy cows so that the animals employed and the food consumed, will yield the farmer the greater possible benefit is a question of great importance. In order to feed economically, the animal must be supplied with nutrients needed for milk production in proper quantity and in the right proportions. If a cow gets more of a certain nutrient than she make use of, the excess is worse than wasted, because it not only helps to fill the digestive tract with that for which it has no use but energy is also wasted in expelling it from the system.

In the discussion of the subject, I wish to make the balanced ration a feature of vital importance and hope to make the matter so plain that every farmer in the audience may understand it and realize the importance of properly mixing his farm grown foods and in the right proportions to realize the greatest possible benefit when feeding for the production of milk. In the maintenance of her life, and make a reasonable profit for her owner, a cow requires twenty to twenty-five pounds of dry matter, containing $2\frac{1}{4}$ to $2\frac{1}{2}$ pounds of protein, $12\frac{1}{2}$ pounds of carbohydrates, and $\frac{1}{2}$ to $\frac{3}{4}$ of a pound of fat, which is stored up in the body as fat, used as a lubricator for the digestive tract and burned to furnish heat and energy. Every farmer has carbohydrates largely in excess of his needs, which is found in cornstover, timothy hay, millet hay, drilled cornfodder,

corn, oats, barley, etc., and mix our grain and roughage as we will, it always follows that we are short in protein. In fact, all the nutrients needed by our cows are found in great abundance in all our farm foods, excepting protein. It follows therefore, that we must sell some of our excess carbohydrates and buy mill feed containing a larger percentage of protein, which is found in wheat, bran, oilmeal, glutenmeal, cottonseed meal, etc. Four pounds of corn meal contains .31 of a pound of protein; four pounds of oats .36 of a pound; four pounds of wheatbran .51 of a pound; four pounds of oilmeal 1.17 of a pound, and four pounds of cottonseed meal 1.48 of a pound.

Now then, we will assume that a herd of cows are to be fed and the roughage is cornstover. In twenty pounds (all the cow will eat) we only find .34 of a pound of protein. It follows therefore that we must look after the balance of the $2\frac{1}{4}$ pounds required in some concentrate containing a large percentage of protein. We will add four pounds of corn meal and get .31 of a pound more, making .65 of a pound and still we find we are short. Adding eight pounds of wheat bran which contains 1.03 and two pounds of oil meal containing .58 of a pound, we find that we have secured 2.26 pounds, all that is required for the food of support and a sufficient supply for the cow's need in the production of milk for her day's work. It will be well to observe in making use of roughage such as cornstover, where we can secure only .34 of a pound of protein to 6.48 pounds of carbohydrates that the concentrates used must contain a larger percentage of protein and less of carbohydrates. In making use of cornmeal the carbohydrates run so high that in eight pounds we only secure .63 of a pound of protein, with .34 contained in the roughage only giving us .97 of a pound where we need 2.25 pounds, and have already made it impossible to secure in any other concentrate the necessary protein as the carbohydrates are so high it will be difficult to raise them but very little without producing an abnormal heat and a tendency to increase in flesh, which is objectionable for an animal during the period of lactation. In the twenty pounds of cornstover and eight pounds of cornmeal, we have only .97 pounds of protein to 11.81 pounds of carbohydrates, when

about 12.50 is all the cow ought to have. With clover hay for roughage, the conditions would be quite the reverse of cornstover. In twenty pounds of clover hay we have 1.36 pounds of protein against .34 in the same weight of cornstover, making it possible to use a concentrate containing a larger percentage of carbohydrates and less of protein as the protein is secured in the clover.

In fact, an ideal ration for milk may be had where clover is abundant with the farm grown concentrates by adding only one-half pound of cottonseed meal, fifteen pounds of clover hay, with four pounds each of barley, corn, and oats and one-half pound of cottonseed meal, give 23.84 pounds of dry matter containing 2.25 pounds of protein, 12.62 pounds of carbohydrates, and .71 pounds of fat.

An important factor in the economic production of milk and larger profit for the dairymen, consists in selecting those concentrates which furnish protein at the least expense and balance their roughage grain and mill feed in a ratio of one pound of protein to six of carbohydrates, always considering the market price of the farm grown food and protein it contains.

Not three weeks ago in the village of Sharon, Wisconsin, the writer ascertained the market value of oats which was 23 cents per bushel. This price made the protein or milk food contained in one ton of wheat bran worth \$20.14. Bran was selling in the same market for \$14.40, so that for every ton of bran that was used instead of oats with corn meal, the farmer saved \$5.14, and for every one hundred bushels of oats used in the ration for milch cows, the farmer has literally lost \$9.18, as much as though he had opened his stove door and thrown it into the fire. Notwithstanding this extravagant waste, the farmers were feeding oats and corn for a milk ration. This is not only true in Sharon, but the writer has found that the same extravagance is unconsciously indulged only in a less degree among many farmers in the State of Illinois. Many thousands of dollars will be lost the present winter in the State of Illinois that might add comforts to many farm homes, because the real feeding value of our different kinds of food is as yet so little understood.

Another very common and expensive mistake is allowing the cows to stand out in the cold, burning the food to furnish heat for the body that might have been used to stimulate a larger flow of milk. Excepting the mistake of feeding unintelligently, there is probably no greater error committed among the average dairymen than employing cows as unfit for the business of producing milk, as the cumbersome slow moving stage coach of a half century ago would be at the present day, competing with our splendidly equipped railway service, transporting the hustling business world from place to place with lightning speed.

Four years ago in the writer's barn in Minnesota were two cows, whose names were respectively Lillie and Midget, each occupying $3\frac{1}{2}$ feet of floor space, consuming practically the same food and receiving the same care. Midget produced 384 pounds of butter which sold for \$96. Lillie produced 240 pounds which sold for \$60. In one year the former produced \$36 more than the latter, and at the same ratio, Midget will produce in ten years \$360 more than Lillie. With twenty such cows in ten years the herd would produce \$7,200 in excess of the same number like the poorer cow. These are facts astounding as they are, that exist on nearly every farm. We all know in the flight of years how quickly a decade is gone. Some who sit before the speaker today, can recall the time when the first little bud of humanity was ushered into the farm home and how soon he was 10, nay more, in what an incredible short time he was 20 years old, and while this rushing mighty river of time impels us on to an age of sorrow and dependence or of ease and affluence, will be determined by the exercise of intelligence in our work, or the carelessness and indifference we display in the exercise of our duty toward providing for the comfort and welfare of our herds.

An example like the one cited from the writer's experience, means \$14,400 in twenty years with a herd of twenty cows, or the same constant application and hard work with \$14,400 less than might be obtained for a competency in the declining years of life.

Another source of failure to produce milk cheaply and an extravagance in which nearly all farmers indulge, is neglecting to provide a

summer soiling crop for the cows two weeks before the flies come, which enables the dairymen to forestall the effects of those ravaging pests, which destroy the profits of the summer milk producer. One of the greatest absurdities, if not the greatest, is not providing for the extra energy a cow must expend in fighting flies after the middle of July in every state. Certainly no careful observer will deny that our herds stand bunched so compactly together three or four hours every day kicking and fighting the scorpion sting of their terrible tormentors without eating a mouthful of grass and finally becoming so hungry that they are compelled to wander out into the pasture in search of food, and for every bite of grass gathered, more energy is expended in the stamping of the feet and violent tossing of the head from side to side than the grass supplies, and it is not strange that in two short months after July 15th, the milk sheets in all our creameries record a shrinkage of 50 per cent in the amount of milk received which might have been avoided by expending one hour per day gathering a green crop and putting it into the mangers for a herd of twenty cows if any. Illinois farmer has land poor enough on which he can sow oats and peas (and not have them lodge) at intervals three weeks apart, an acre will sustain a herd of twenty cows twenty days, giving them forty pounds each per day, provided eight tons of the green feed can be produced per acre, which is a conservative estimate. The writer has grown twelve tons in Minnesota. They should be sowed four inches deep in light soil, and half as deep or less on heavy clay soil, mixed, two bushels of the Canada field pea to one bushel of oats. This is the greatest milk producing food I have ever fed for a summer soiling crop.

The first sowing with us in Minnesota is about the 10th of April, which gives us the first cutting July 1st, and the second sowing is needed two or three weeks later, which will furnish the cows from the manager with food to supply the extra energy wasted in fighting flies and the shrinkage in milk will be very slight. Following the peas a succulent crop of corn may be provided by successive plantings until the time for filling the silo or adopting other and less profitable methods of winter feeding.

Much more might be said as touching cheaper production and greater profits for dairymen. Time, however, will not permit, and in the final summary would say the chief requisites are, first, the proper confermation, the balanced ration, summer soiling after July 1st, protection from cold during the winter months with abundance of sunlight and good ventilation, while in the stable (which should be nearly all the time), and kind treatment always to our bovine mothers, which among our domestic animals is the best friend and greatest money maker man ever had.

Rubbing against the Chief of the Dairy Division of the University of Minnesota, that student of students, in his constant increasing research for more knowledge for the dairy men's benefit, has endeared Professor T. L. Haecker to the hearts of the dairymen of Minnesota unequaled by any living American. The permission from the regents of the Unversity to distribute regardless of state or territory the bulletins issued at the dairy division in the department of agriculture, to any who should exhibit interest enough to ask for them, is an expression of the earnest desire of the chief of the dairy division to build up and develop the dairy industry everywhere and has made Professor Haecker a benefactor to the dairy world. No thoughtful student can fail to catch an inspiration from such a noble character.

Touching the elbows of such a man an hour before preparing my paper for this convention has awakened in me a desire that I might weave words together that would be like apples of gold in pictures of silver and arouse my fellow dairymen to awaken from the lethergy and sleep of death to a life of activity and profits worthy their calling. Many a farm wife long after the shades of night have gathered around the home, nerved up by a stern duty to economy, sits patching the little pants or darning the little stockings, to save a nickel, while her husband unconsciously squanders a dollar every day by not adopting better and more intelligent methods of feeding. God in his providence has stored up for his children the bountiful sunlight and refreshing showers, which He dispenses to the human race and cattle upon a thousand hills as they may need. The sparkling dew drops are diamonds, which express the wealth of the great

Creator's love for his children. In the gray morning light a myriad of feathered songsters chant his praise long before the King of day peeps over the Eastern horizon.

In my life in the country, I have often thought how much people loose who live in the city and are never up to see the sun rise.

My friends and fellow farmers it is neither manly or good citizenship to spend twenty years accomplishing what might be accomplished in ten. We have no right to squander the beautiful sunlight and refreshing showers. Apply mental as well as manual labor in your business, and in good reason we may retire from the constant application to business and enjoy the fruits of our labor. Not long ago I was told of a farmer who broke his leg and was mourning over his misfortune and the loss of time he must endure before he could engage again in his work on the farm. He said, however, the seeming misfortune was a blessing in disguise, and my leisure three weeks were the most profitable weeks I ever spent on the farm. He had time to read and study into the principles which make for success in his business, and became a more prosperous farmer. Forced leisure hours might result in a profit to many of us.

DISCUSSION.

Mr. H. B. Gurler: I wish you would tell us how we are going to avoid the effects of the flies in the summer time. I must confess they beat me.

A. Well, sir, I have endeavored to show in my paper how we might overcome the effects of the flies to a certain extent. You understand by the reading of that article that all I displayed there was that cows wasted her energy for three or four hours a day and didn't eat a mouthful; some days for six hours. What does your cow do? She gets so ravenous she wanders out and takes a bite of grass. Then round goes that head; that is energy just like your horse is exerting when he is in front of your plow. We feed those horses a peck of oats to a feed, and that occupies a great deal of energy in plowing. If in a team they would not need this support. Your cow is using up energy that might be otherwise

for the production of milk, and when you don't fill up her stomach before she goes out into the pasture, she can't fill it herself because the flies worry her so, and the little bit she does get is not enough to sustain her, and thus you lose your milk.

Mr. Gurler: I am worried to death and I find it is most economical by feeding ensilage and feeding it in grass out in the grove where the cows are away from the sun. I can't keep them away from the flies. I did a little experimental work a year ago last summer dividing the herd keeping a record of each cow. I have the record days of several weeks as my basis. When all were running out and fed in the grove and the following week we turned only half of them out and kept the balance in the stable in the dark. To my surprise I didn't get one-half enough more milk, I think one-eighth of a pound per cow a day than those who were out in the shade in the grove, the cows being fed the same. That is all I have been able to do, I can't fight those cursed flies. I would rather contend with weather 40 degrees below zero, but the flies beat me every time. Another fly incident. You know these men selling fly killer. I took some home—the man was honest; let me take it home on trial. I went out to the farm one day and applied some to my horses. They stood all right, but had not got back from town before they were as bad as ever. I applied this remedy to a portion of the cows and kept track of the weight of milk. Thought I was to get something advantageous to the cows. The remedy gave a short relief. We applied it once or twice a day. But by the time we got through milking and let them out again the flies returned to them and seemed to make them all the more nervous. It is all theoretical this idea of killing the flies; I get beat every time I run up against the flies.

Mr. Carpenter: Was there any odor about that remedy that troubled the cow?

A. No, sir, I would not have that. I have to be careful in my high-grade work. It was put on in the form of a spray. It was unpleasant for the flies for a short time. If I could keep the cows in the barn and keep spraying a herd of sixty cows it might help, but it would keep a man busy all the time.

Mr. Carpenter: I know of no better way than to fill her up full. She stands and kicks and works, but she is full. She don't take the time to eat when she is being worried to death by flies and is not making money for you when hunting for food. She is just getting ready; she is beginning to get ready for you, and the least energy she can expend to fill up is the greatest profit for you. That is the point I wish to make.

Mr. Stewart: It is a fact that some of these farmers don't know the large words you have given us. Take the farmers where you live, feed their cows on their home farm and their care seem to be the most successful and makes the most money, and while you have given us a nice paper it goes over the head of nine-tenths of our farmers.

A. You probably could not convince them we are not having facts today you did not know of ten years ago.

Mr. Newman: I want to set this audience right as not feeding the balanced ration as the gentleman gave us. Don't you feed bran on your farm; isn't that full of protein. I don't want it to be understood that our farmers don't use protein, as in bran.

RAISING CALVES ON SEPARATOR SKIM MILK.

BY F. W. BELDEN, KANEVILLE, ILL.

Ladies and Gentlemen—I have no paper, but had a few references made yesterday on skim milk, or factory separator milk, to raise calves.

I take my milk to a creamery. I am also doing another thing which will strike you dairymen as being a little out of line. I have a herd of Short Horns and take the milk to the factory, and I am raising the calves on that separator milk.

You are a Wallace man?

Well, I want to say I do not go into this carelessly. I do it in a wholesale way, maybe. I make nearly as much out of my calves as the

milk from my cows. I think a great deal of that separator milk that comes from the factory. My milk goes to the factory every morning, and the skim milk is brought back home. I feed the morning ration warm, and the night ration is heated by steam at the creamery, and with the addition of good ground flax seed, why I succeed in raising very good calves.

I have now ten on hand that are just about a year old. A gentleman asked me last week what I would take for the bunch. I ran them over the scale and the ten weighed 6400 pounds.

Q. How old?

A. Average a year.

Q. How many pounds?

A. 6400, average 640 pounds. One is a little older than a year, but that is the average.

My idea is to have my cows come in November and feeding separator milk in cold weather, why I do get some very good calves.

Q. Do they pastuerize the skim milk?

A. Yes, sir; I did not know, but he said it is.

Mr. Gurler: How much skim milk do you feed a calf at a feed?

A. An ordinary corn pail not over half full.

Q. Use that quantity of milk with a little calf?

A. I have a large box stall in which I put the little ones at birth, and they have their mother's milk, the whole milk, for about a couple of weeks, and then instead of mixing it, I give them the separator milk as it comes from the factory warm and heat it at night for them. Whole milk at night for a couple of weeks and then change it. In a few days they learn to mumble a little drycorn.

Mr. Gurler: I raised over fifty heifer calves from separator skim milk and know why I ask you how much skim milk you feed. The first trouble I had was in preventing my men from feeding too much.

A. That is the trouble, they do want to feed too much skim milk.

Mr. Gurler: They want it so rapidly, and after they drink that milk I scatter the whole grain and some eat a little. I keep the corn and cut it with a machine and it goes in on the feed every morning.

Q. Do they digest it?

A. Yes, sir.

Q. Do young calves handle that corn different from a feeding steer?

A. Yes, sir.

Q. Anything else? Oil meal?

A. Sometimes, but I depend on dry shredded corn. My calves were sold and fetched good prices.

Q. How long did you continue feeding this milk?

A. Along until grass comes and ready to turn them out; then I give the milk to the pigs.

Q. Mr. Gurler: You speak of the ground flaxseed; you don't compound that with oil meal?

A. No, sir.

Q. The flax meal ground?

A. Yes, sir.

Q. How long do you continue the use of that flax meal?

A. As long as I feed milk. It is only a spoonful.

Q. You don't discard that when you use grain?

A. No, sir, the teaspoonful of flax seed meal is added to it.

Mr. Aucutt: Q. Do you prepare this flax seed meal?

A. No, sir.

Mr. Crosier: Would you recommend feeding the same to Jerseys or Holsteins?

A. I do not know.

Q. I should think in feeding so much corn meal, especially to dairy calves, that the heifers would tend to lay on too much fat?

A. I have not gone into those things. I am milking Short Horns.

Mr. Monrad: Q. What is your average yield?

A. I have no figures. I take what is handed out to me and am thankful for it. I never kicked but once and that was the last month and my average was below the average, and that made me feel badly. I don't think that has occurred over three times before.

Q. If you sold all your milk, what would you do about your calves?

A. I would not sell my milk.

Q. You could raise some calves, couldn't you?

A. I should put two good calves on a cow and let them suck.

Mr. Crozier: Q. Do you think it possible to get warm separator skim milk in the summer as in the winter?

A. Yes, sir.

Q. This raising of calves on skim milk is the least known. I want to tell you a little talk I had yesterday morning with one of my patrons at DeKalb. He was only bringing 100 pounds of milk in and he is raising eight calves on the skim milk that he takes back from the 100 pounds of milk. He was down in the creamery Monday and I noticed this gentleman come in and take a can of hot water. I stood by there and he says: "I am reducing that skim milk to make enough to go around for those eight calves." And I want to tell you he raises fine calves; I would be proud to have any one see them.

Mr. Belden: My bulls are sent to Texas for breeding purposes every year.

CHICAGO MILK MARKET.

EDWARD N. EATON, ANALYST, STATE FOOD COMMISSION OF
ILLINOIS.

Mr. President, Ladies and Gentlemen:

I consider the Chicago milk market from the standpoint of the milk shipper and of the milk consumer rather than from the standpoint of the State Food Commission or the Analyst.

Professor Davenport the other evening in his paper, which we did not have time to thoroughly discuss, made some remarks that it may be advisable to say something in regard to dairy products found in our markets.

Mr. Davenport made the statement, or brought out the idea, that there was a decreased consumption of dairy products, due to an inferior quality, and his whole paper was tending to run down the quality of dairy products, of course with the view of first discovering faulty matters in dairy productions and then remedying them, as Wallace says, first conviction of sin and then promises of sanctification set in.

I don't believe it is a very good plan for any one who has anything to sell to run down the value of their product. No other profession nor manufactory does that. The confectioners, for instance, have a standing reward of \$100 for any one who will discover adulteration in candy, and so far that reward has never been claimed to my knowledge. It is on that principle that the depreciation of the production that the dairymen should take a stand.

No matter how good the quality of goods you have produced, no matter how much care you take in producing the goods, if the people do not think you have an idea yourself of the good quality and values, you would not sell them, and the idea of the condition of milk in Chicago market illustrates that.

There is a good deal of talk about that and therefore the consumption of milk in Chicago has decreased, and the good milk has about the same reputation as the common, every-day milk, cheap milk. Probably there is not anywhere any milk like Mr. Gurler's, and no one is getting rich in selling good milk at 12 cents a quart. So I hardly think that the statement that Prof. Davenport makes in regard to the inferior quality of dairy products is borne out. We are producing better milk. Filled cheese is a dead letter. As to the decrease, it cuts no figure as to filled cheese.

In the case of butter, the conditions of affairs is equally as good. The process butter, spoken about by Davenport has tended to improve rather than to depreciate the average quality of butter on the market. There is no question but process butter is a good deal better than the dirty and rancid butter that this process butter is made from. But it should be sold under its own name. It should be sold honestly, that is

all we can ask of process butter. It should not be sold as imitation creamery.

Perhaps the less said about milk the better. But there is no question that milk is better now than it was ten or even five years ago. St. Paul and Minneapolis are largely supplied with pastuerized milk. Four hundred gallons of pastuerized milk is sold in Minneapolis today. Some of these cities are supplied exclusively by Jersey herds and the average is 5 or 6 per cent fat.

Chicago, the last city to take hold of the selling of pure milk, has a system of delivering milk in bottles, and it has taken a firm hold and is much cleaner than several years ago.

CHICAGO MILK MARKET.

Within a space scarcely ten miles square dwell two million people. Two million people to be fed and housed and clothed with material produced from the farm, the mine, and the forest. The arteries of commerce carry the crude material from almost every clime to Chicago—the heart of manufacturing industry.

Milk, owing to its brief life, must be procured within a few hours' ride of Chicago. As that city is bounded on the east by Lake Michigan, and on the south by a swamp, the milk producing territory is limited to two sides. Into this territory, to an average depth of eighty miles, twenty-one lines of railway carry the vital food to the city. Piercing the swamp and skirting the lake, the Pittsburg & Ft. Wayne and the Grand Trunk reach to Valparaiso. The Baltimore & Ohio runs milk trains to Walkerton, and the Erie to Kouts. Leaving Indiana and passing into Illinois, the Wabash and Illinois Central carry as far as Monee and Mokena. Dipping to the south west, the Santa Fe and Rock Island run milk trains to Joliet. To the west, the Chicago & Great Western brings from Byron; the Chicago & Northwestern from Harvard; and the Milwaukee from Huntley. Other divisions of the Northwestern find their milk shipping termini near Aurora and Sycamore. The Wisconsin division of the Northwestern runs a milk train to Rockford. To the north the Milwau-

kee handles milk from Somers; the Northwestern from Kenosha, and the Wisconsin Central from Silver Lake—all in Wisconsin territory.

Collectively these lines of railway carry approximately eighteen thousand eight-gallon cans of milk and cream into Chicago daily. The Northwestern, with its numerous divisions, handles more than one-third of the entire product. The three divisions of the Milwaukee carry about two thousand five hundred cans. Then follow in the order of their carrying capacity the Great Western, the Illinois Central, the Wisconsin Central, Grand Trunk, Erie, Wabash, Baltimore & Ohio, Rock Island, Santa Fe, Pittsburg & Ft. Wayne, Pan Handle, and Monon.

The wholesale value of the milk and cream varies with the season, but will average about \$22,500 per day, or over eight million dollars yearly. The retail value delivered to the consumer is about double the amount. The railroads receive for handling this milk over one million dollars yearly.

With this general survey of the milk shipping industry of Chicago I will pass to the consideration of the care of milk and methods of handling for Chicago markets, and suggest some changes which, in my judgment, would conduce to more comfort and profit to the shipper, and insure better milk to the consumer. The problem of supplying Chicago with pure and wholesome milk presents difficulties not appreciated by the creamery patron. Before reaching the consumer market milk is handled by three parties—the shipper, the railroad company, and the dealer. Each has his duties relating to the care of milk while in his possession, and if either of these parties fail in the performance of his whole duty, the patron suffers in the quality of the milk, and an innocent party must share the responsibility.

It requires experience and training to become a successful milk shipper. Several attempts have been made to extend the milk shipping territory beyond its present limits, but usually without success. The Chicago & Erie railroad attempted to develop territory between Kouts and Huntington, but with the exception of a few cans at North Judson, gained no permanent shippers. The Northwestern attempted to form

milk shipping communities between Kenosha and Genoa Junction, but with little better success.

Owing to the long interval between the pail and the palate, the production of market milk requires a peculiar treatment. Odors and flavors not noticeable in fresh milk develop on keeping, and the natural ferments present increase in geometrical progression. The feed and care of the cow, proper milking, and the treatment of milk in its infancy are all important. Within the milk shipping territory this is generally understood. The only suggestion I would make would be the introduction of modern aerators to take the place of muscular energy and the paddle, and that the shipper be more thoughtful and careful in the selection and breeding of cows, both from the standpoint of economical milk production and the health of his herd and consequent purity of his milk.

The railroad corporation can certainly afford to take better care of milk during shipment than they at present do. Their earnings from milk amount to over one million dollars, and not one cent is lost. The farmer stands all losses from sour milk or leakage in transit, and pays before service is rendered. The transportation charge per can averages sixteen and one-half cents, which is paid by the farmer out of the price he expects to be so fortunate as to get for his milk at the end of the month, or the middle of the next month. In May or June, almost one-third of the total value of the milk is paid in advance for transportation, and milk, be it remembered, is not produced from sun and soil, but at considerable expense and labor. No other commodity to my knowledge pays as princely for the privilege of traveling. Even passenger rates, in instances, are exceeded. A man may travel from Aurora to Chicago on a monthly ticket, carrying with him a good sized trunk, place twenty-five cents in the hand of the porter, purchase a morning paper, and still find financial consolation in the fact that he is a man and not milk.

Every attention is given to the passenger. He is aired and lighted and kept at the proper temperature. He is provided with spring cars and cushioned seats. It requires two men to look after his fare and welfare. An equal number keep tab on his trunk. But how journeys the milk?

It is often loaded by the farmer and unloaded by the dealer. It travels in a remodeled express car; no ice in summer, no heat in winter; dust and dirt have only too free ingress. Usually platforms are erected for the reception of return cans, but in some places (as for instance in the neighboring town of Batavia) where a car is sidetracked to be loaded by the shipper, there is no platform, and the return cans are dumped into a gravel heap to be sorted out by the farmers. It is not forgotten that the railroads return the empty cans without extra charge, still they can surely afford to more carefully study the convenience of the shipper, and, in justice to all parties, should take such care of the milk while in their possession as will preserve its value and healthfulness.

Not until dust-tight refrigerator cars are provided—perhaps not till trains are so run as to enable night milk to be distributed the next morning, will the transportation companies perform their full duty to the shipper, the dealer and the public. It is surely to the best interests of the railroads to perform their duty to the general satisfaction. The one million dollars and more is a great temptation to capitalists. Indeed, rumors of electric lines to carry the milk and passenger traffic to Chicago have been heard for some time, and high charges and poor service will aid in their organization and success.

The dealer is responsible for the milk for a longer period than the shipper. However, if he is content to sell the milk he buys, his duties are narrowed to keeping it cool and clean. All methods of refining milk, such as centrifuging, pastuerizing, and sterilizing demand perfectly fresh milk. The method of delivering milk in bottles is growing in popularity, and although Chicago has been slower than many other cities to conform to the innovation, the time is not long distant when all retail milk will be delivered in bottles. The one defect in this method from the consumer's standpoint is the opportunity for contagion in improperly washed bottles. Before the bottling of market milk can be unqualifiedly recommended, the dealer must recognize the importance as well as the duty of sterilizing every bottle before refilling with milk. Another duty of the dealer, often neglected, is the thorough washing and sterilization

of the farmer's cans when he is ready to return them. This will not only lighten the burden of the shipper, but insure a better keeping and more wholesome milk.

While the natural limits of this paper can scarcely bound the thought, I must briefly mention the business relations of dealer and shipper, in the light of its bearing on the quality of milk furnished the Chicago market.

It is a well-recognized fact in Chicago, and perhaps elsewhere, that value and price bear a fixed relation. The goods purchased conform to the value tendered, not considering gold bricks and lightning rods.

There are all kinds of cows, many varieties of feed and several grades of labor. Time is usually spent where it yields the greatest profit. Neither the dealer nor consumer can expect good milk when the price falls below the cost of production of good milk. Not alone a low price but insecurity in receiving any price at all discourages the production of high grade milk. These conditions the shipper has to face almost every day. The dealer is not alone to blame, neither is the consumer, but the natural conditions of trade, unbridled competition, and the dead-beat dealer encourage the production of the cheapest and therefore the poorest milk.

When the consumer is educated to know and demand good and wholesome milk; when the unprincipled dealer is driven into less protected methods of stealing, and the honorable business men relieved of this burdensome and unjust competition; when the shippers band firmly enough together to control the output, and therefore the situation, and, either by themselves or agents, make or accept only such price as will give a fair return for the labor and investment; when the railroads realize that milk is a perishable product and requires even more care than meat or fruit; when the dealer, the patron, the city, and the state guard well the gates of fraud and demand in addition a high standard of quality—then, and not till then, will the consumer raise a glass of milk to his lips without awakening premature, if not unwelcome, visions of heavenly bliss.

DISCUSSION.

Mr. Dietz: On what basis was that amount of 18,000 cans made?

A. It is hard to get an exact estimate of the amount of milk shipped

into Chicago, it can only be done indirectly. Some of the shippers at different stations along the route have given us other information on this. I have an idea that 18,000 is a trifle high. I have tried to revise that figure and place it nearer 15000 cans. Of course, each agent will put a high figure of the amount handled.

Mr. Stewart: Five years ago we got about 15,000, as near as we could get an estimate, and it was a lot of work to get that.

A. Probably is was considerable increased. These increased amounts might have included the amount hauled to Chicago and also the suburbs.

Mr. Stewart: Condensed milk is being used more than it was?

A. Yes sir, considerably. However, condensed milk is finding a market of its own, as in the manufacture of caramels and several other industries.

Mr. Dietz: I am wondering if these figures wouldn't bear our Prof. Davenport's statement. You say in 1894 the figures were about 15,000 cans. Eaton says he is inclined to make it 15,000 now. Thus in a little over five years we are still hauling about the same amount. Where has Chicago increased, if she has increased in population one-third in five years. That would tend to bear out Davenport's statement that the consumption of our products are not increasing.

A. The reason for that is that the people have been scared into believing that the milk is not pure, but the milk is purer than the statements made regarding it. Some say it is full of tuberculosis and people are believing those statements, and that is why the consumption has decreased.

Mr. Monrad: I tried to get that five years ago for the division and I could not make it 13,000.

Mr. Stewart: I might be wrong.

Mr. Eaton: At least there is 14,000, there is every evidence of that, and with the prospect that there is over 15,000 eight-gallon cans of milk.

Mr. Monrad: Mr. Newman is right. He says there is more cream shipped, and that would take the place of a large number of cans that were shipped previously.

Mr. Sawyer: I would like to ask the doctor if he has found, while in that office, any increase in the percentage of butter fat. Are we, who are living on Chicago milk, securing skim milk. Did you notice any increase in the better quality of milk in the short time you have been testing milk?

A. I don't know as I have Mr. Sawyer. No sir. There is plenty of good milk to be had in Chicago, if you want to pay for good milk.

Q. It is not the price at all that recommends it, it is the amount of cream. We have dairymen driving by the door every day and have tested a number of them and found invariably that when the demand for cream was greatest our milk was the thinnest.

Mr. Monrad: That reminds me of the times before the Babcock test. A man told me that every time there were Sunday school meetings or entertainments he could tell it by the milk—they had his cream that day.

Mr. Newman: You get tests from the milk dealers' cans?

A. We have made tests from the shippers' cans, the milk dealers' wagons, and store keepers who handle milk throughout the city.

Q. How does it average?

A. I don't believe I have ever averaged them. I could make a general statement that the milk is best in the milk shippers, best next in the dealers' wagons, and worse in the stores.

Mr. Sawyer: I went over to our milk dealer's depot one day and saw three or four little jars setting up there and I asked what they were there for. He said they were looking for the inspector that day.

Q. What is the standard for the city?

A. The city and state standard is three percent of fat.

Q. What is the standard for the state?

A. The same as the city, 3 per cent. That law has been in existence for some time, but no provision made for it until lately.

Q. That's statutory milk is it?

A. Yes sir.

Mr. Monrad: Isn't it a fact that it is illegal to sell skim milk at all; we can punish men for selling 4 per cent milk skimmed down to 3 per cent when we can prove it has been skimmed. Under our law I understand we can do that. If the milk has not been skimmed and it is below 3 per cent they will not be allowed to sell it as milk, they must sell it as skimmed milk.

A. That is the law in the case, but the facts are they can skim down to 3 per cent without it being possible to do anything in the matter.

Mr. Newman: In your shippers' cans generally it will run higher than 3 per cent?

A. Yes sir, the percentage will depend on the time of the year, nearly 4 per cent in Chicago we get.

Q. What would be the estimate of a test of 100 farmers' milk?

A. Mr. Monrad could answer that.

Mr. Monrad: The yield from 112 patrons of creameries was 3.8, wasn't it, of butter fat. But I want to explain. I had my figures from the creameries in butter yield and I had to figure back on that and got 3.8 for the year.

Q. Four per cent fat in the butter?

A. Yes sir.

Mr. Dietz: He spoke of the duty of the railroads on that matter. Last August I tested your cream that was put on the train at a distance of 68 miles from Chicago at a temperature of 55. That cream was turned over to the milk dealers at a temperature of 58. Do you think the railroad men could do better than that?

Q. How long on the road?

A. Two and one-half hours on the road.

Mr. Newman: What was the atmosphere?

A. A hot day in August, 90 degrees.

Mr. Gurler: Was that in a common milk car or refrigerator?

A. That was the car Mr. Gurler ships in, the regular milk car that the milk goes in.

Q. All iced?

A. No sir; insulated and ventilated.

Mr. Eaton: That is not as large an increase in temperature as you would expect. It depends to a certain extent how cool it is when put on the train whether the temperature would have any effect on the keeping qualities.

Mr. Monrad: I think the railroads, in view of the price they get for transportation, could afford to put in some ice.

Mr. Dietz: Milk that gets to Chicago under 60 is satisfactory. We heard that germs stopped germinating at 60.

A. No sir, 40.

Mr. Diertz: They will multiply only once at 59?

Mr. Eaton: The cooler you transport milk the better.

Mr. Hoisington: Most of the roads do not use ice in their cars?

A. I don't think they do, all of them.

The Great Western does. I thought the rest did.

By the President: Any questions not dealt with on this program if they will hand them to the Secretary they will be answered.

Adjourned until 1:30 sharp.

THURSDAY, JANUARY 10th, 1:30 p. m.

Meeting called to order by the President.

RELATIONSHIP OF BUTTERMAKER AND PATRON.

BY DAVID VAN PATTEN, PLAINFIELD, ILL.

Ladies and Geneltmen—As the subject, "Relation of Buttermaker and Patron" was assigned to me, will endeavor to give a few ideas as they occur.

Most writers on this subject place the buttermaker in the position of a teacher to his patrons, which is more or less true. He should know how to get every ounce of the best butter possible out of the milk, and be able to operate, care for, and keep in repair all the machinery and everything connected with the plant including an ice machine, whose value in connection with a creamery, personal experience, leads me to believe, is, as yet, an unsolved problem.

He should be an artist with a scrub brush and lye water, and, by example, strive to impress upon his patrons that cleanliness is absolutely necessary to produce the best results. And above all he must exert all the wiles of diplomacy to promote harmony or interest, which means unity and success.

The truth is, if our diplomatic services were recruited from the successful buttermakers of the country, it might be an improvement, as all their training is along diplomatic lines.

He should be a judge of milk, and be able to teach others how to care for it; know something about how cows should be fed to increase the flow; try to convince his patrons that it would be financially for their interest to trade corn for bran, or other food that will make a balanced ration. Better still, be able to get them to subscribe for some good dairy paper, that he may profit by the experience and practical results obtained by others in handling and feeding cows, and everything else connected with dairy farming.

I believe in the rules laid down by authorities, that teach how milk should be cared for, and would be glad to have them followed to the letter. But, where dairying is a secondary consideration with the patron, it is doubly difficult to get them to take proper care of their milk. In that case, is it best to lay down rules, when you are almost sure they will not be followed? Is it not better to go slow—creep before you walk?

Study your patrons, study their dispositions, as they will study yours. Then when you have anything disagreeable to say, you will know better how to approach them. Exercise diplomacy. Find out, in a friendly way, how they are caring for their milk; quietly suggest any

changes that will improve its quality with little or no added work. Strive to impress them with the fact that your interests are the same; that your reputation as a buttermaker is at stake, and is gauged by the quality of the butter you make; that the better and sweeter the butter the more money it will bring, and their dividends will be larger. They are students as well as you, and when they see that you have their interest at heart, as well as your own, that you are honestly anxious to cooperate and work for the benefit of all concerned, the rest will come easier.

There are four places where the relation of the buttermaker and his patrons are often trying. The weigh can, the skim milk vat, the tester, and cleaning of cans.

First, the Weigh Can: Tell a patron his milk is off; he may answer: "It ain't sour, is it?" He naturally thinks there are only two kinds of milk, sweet and sour, and the only way to test it is, stick your finger in, and if it don't leave a hole, he cannot understand why it isn't all right. Diplomacy again. Take the ground that the income of the plant depends upon the quality of the butter, and, in justice to the other patrons, you cannot afford to lower the grade of a day's churning by accepting a batch of tainted milk. If possible, talk to him alone, and ten to one you will succeed. At any rate, the balance of the patrons will uphold you.

Second, the Skim Milk Vat: How many patrons there are that we would tell where our pocketbook was and to go and help themselves to a certain amount, with absolutely no fear that they would take a cent more. But would we trust them at the skim milk vat, and feel sure that they would take no more than their share? I leave it to buttermakers to say if they can be trusted there, any further than they would trust a church deacon in a horse trade. Some time ago our creamery put in an automatic skim milk weigher. We were so delighted to think that at last we had a device that the honest patrons could not beat. But to our sorrow, a few days ago, a milk hauler (who evidently had been having trouble with his patrons) called me out, and showed me how to run off all the skim milk, with any sized check, and raised a kick on the weigher. Then the fond dream of another buttermaker faded. I would draw the manufacturer's

attention to the defect, in hopes it may be remedied; then no creamery could afford to be without one.

Third, the Tester: However much confidence patrons may have in the honesty of the buttermaker, many of them are suspicious of the Babcock test, and it often seems almost impossible to convince them that it gives a fair test. They will tell you that they are feeding heavier than they did, and cannot understand why their test is lower this month than last; they know it ought not to be. More diplomacy. Don't argue, but pleasantly tell them when you are going to take the next test, and give them a pressing invitation to be present and see it done. Promise to show them how samples are taken, and give them all the information possible, and if their milk tests way below their neighbors, urge them to bring in samples of each cow's milk; that you will test them separately. You will thus enable them to weed out their herd, and in time they will swear by the Babcock, and don't forget to advise them to take a good dairy paper.

Fourth, Cleaning of Cans: All buttermakers know that much depends on having the milk stored and shipped to the creamery in clean cans. It matters not how cans are cleaned, so long as they are clean. But right here we come in touch with the woman, which puts all our diplomacy to the crucial test. If you tell your patrons to tell their wives that their cans are dirty and you want them to wash them better, then the devil is to pay. I charge you to steer clear of the woman. Always assume that they have nothing to do with washing the cans, but, in a general way, take the ground that the income of the creamery, in a large measure, depends upon having the milk handled in clean vessels. This is an appeal to self interest and rarely fails to carry the day.

I might say something about caring more particularly for the night milk; how to cool it in hot weather and how to keep it from freezing in cold weather, and also to keep it from being tainted with barn or kitchen odors, but as time is limited will close by saying this: That in my judgment, the co-operative creamery is a teacher of teachers, because it is proving that men with limited capital can co-operate and handle the

raw material produced by their own toil, and get what there is in the finished product. Co-operation, that is, teaching the common people that they can trust each other. Co-operation, that can stand only on justice. Co-operation, that may solve many of the mighty problems that loom across our way. I thank you for your kind attention.

DISCUSSION.

Q. You speak of automatic weigher, I did not know there was a way of beating that weigher, but we had a little experience with the Barber Check Pump. I had a patron who learned how to get all the milk he wanted, and he wasn't satisfied then, but had to tell all the other patrons.

A. Well, that's so.

Q. Boasts about it, and watched to see what he did. He took that pump and worked it as hard as he could and the milk came so fast that the check didn't go back to stop it and he could get twice the amount of his milk. To remedy that one of my foremen told that man when he came again, if he wanted to use that pump he was to use it right or else he could leave his milk at home; we wouldn't have it, but I had not learned the other weigher could be beat. How can you beat it?

A. There are lots of our patrons who don't know how its done, and as we are not far from home, and some may be here; so will not tell it in public.

Q. Have you notified the manufacturer?

A. No, sir.

Q. I think it is your duty to do it. Is that the Ideal?

A. It is the Ideal.

ENSILAGE.

BY H. B. GURLER, DE KALB, ILLINOIS.

This question of ensilage! I have talked so much about this subject that I am almost ashamed to talk any more about it. I don't feel that it is advisable for me to go over that field again. I feel that about all that I need to say would be to talk about the silo. I feel like talking to you about my new circular cement silo. It gives me walls almost as perfect as any fruit can and that is what we want, and that is what we have been working for. We have been sadly deficient in our early experiences with cheap john silos. We had dairy writers and institute workers that years ago tried to inform us how to build a silo for the least money possible, and if it would keep the feed for one year that is about as far as they thought at that time, and the result has been to give the silo a black eye. I know of silos in my own township that rotted down or got in condition that they could not be filled after the fourth year, and it was just in that effort to build something cheap.

I think you can all see the advantage of the silo being built circular. In that way we have no corners. The corners are where we lose the most. It requires less lumber to build in that way. If the silo is built square, you have got to depend upon combating that resistance by the support of your studding. If you build circular and sheath it right around on the inside that pressure is resisted and you have cut the bill for the lumber right in two. The studding simply is to hold your material together; that's all the object of your studding, and support the roof if you put one on. I have one without a roof. I expect this morning they had snow. I use four inch studding, put twelve in centers, and then I sheath inside with a heavy lumber—usually get fencing and make it a little less than a half-inch thick. Then have a roof made from that same material. I will cut it into strips two inches wide and have it

beveled, so that when I put it on to the sheathing I nail it fast and put the narrow side or beveled side next to sheathing, so I have the same surface, and put on the roof and paint it. That dove tail joint to put your center into to get a clinch. I wonder if you understand me now.

(Illustrates by pieces of board and paper.)

Q. How do you get that beveled?

A. Take it to the planing mill and get my lumber resawed.

Mr. Hostetter: How about that resawing?

A. Rip it right open in half.

Mr. Sawyer: Do you put your lath vertical?

A. No, sir, everything round so as to help resist the lateral pressure. Only studding up and down. Even have your hoop outside. I have five built inside of a building and roof enclosing one place and another three places and another two. For additional hoop then saw $\frac{1}{2}$ inch lumber, double it, and breakjoints. I had an expert figure that out. It is better than iron or bank iron. I can get more resistance in wood than in iron. I have one built out by itself and that one I sheathed outside of the studding and I made my sheath for the outside of that same half inch material, and you cannot put common siding to a circular silo, the blamed stuff won't lay up to the studding, but you can take those strips six inches wide and knock off the corners with a saw and they will lay up against the studding all right.

With the inside sheathing and this form of a sheathing on the outside you have got all the resistance that is needed, that I know from my own experience, practical experience.

Q. The real strip lap siding?

A. I don't know it by that name. I remember our old dung house was sided with that kind of a joint in it, but I applied it here.

For the cement work, get the best cement you can, and get the best men you can to do the work. Don't get a man who don't know what he is about. Get a good job done and then have a wall.

Q. What kind of a cement?

A. The imported genuine Portland cement.

Q. In what proportions?

A. About two parts of sand to one of cement. I won't be positive about that though. You get a man who understands his business, he will know; don't have any other. There has been more faulty work done in the cement work. It cost me \$500 a year ago last fall to go over that. I let some men have their own way and it went to pieces. I had that work patched up by a man that knew his business. When we came to tear it out that patchwork was as sound and hard that the stones themselves that were in it, and when we went to break through a section of that we would go right for the flint and the cement would not let go. That is what you want.

Q. Will it stand the shrinkage of the lumber and frost and all that?

A. Well, I have got three of those filled the fourth time. I found no weakness along that line. Here's a point, if it does crack it costs but a little to go over it with a wash of that cement.

Q. How thick is it?

A. One-half of five-eighths of an inch outside of your lath.

These ideas did not originate with me. I can say this, I studied out in 1897 this plan of building my silo, and after I got the idea perfectly in my own mind, I wrote to the Wisconsin Agricultural College, and they replied that in investigating and hunting for material to make such a silo they had found out that they were using some that had been in use six or eight years that were built in a similar manner, and the gentleman said that at that time, after six or eight years' use, were in just as perfect condition as when built, and I see no indication of decay in my silo.

Another point, that cement wall preserves your lumber; it keeps the moisture off the silo in coming in contact with the lumber and it does preserve the silage from coming in contact with the air. I do think gentlemen that that makes the ideal silo. I am not going to throw mud at any other circular silo. I think you will find inside of ten years there will be a good many that are lathed and plastered.

Q. What is the cost?

A. That's a hard matter to get at. You figure the cost on the contents and what it contains and it depends on the size of it. I will give

you something better. I found this: The silo that I build outside and sheath outside and put my roof on it cost me $12\frac{1}{2}$ cents per square foot to surface, figuring the square feet in the walls of the silo. Well, now, you can fit that to any size silo you want to build.

Q. Inside measure or outside measure?

A. Inside measure.

Mr. Monrad: How many tons did that hold?

A. Five hundred tons practically, but that cost me about 65 cents per ton when I figured it but thirty-eight feet in diameter, but built 116 feet in diameter and would cost more per ton of what it would contain.

Q. How high?

A. Twenty-four feet.

Q. In regard to the bottom?

A. Mine have all got a lath bottom, and the lath bottom is just as good as any unless you have it protected from rats or vermin. I have found silage laying on the dirt to be all right. I remember one time of looking my silos over and had that question raised. He wondered how silage could go down to the ground, thought the bottom ought to be cemented. I told him we would find out and dug down on to the lath, and to his great surprise he could not find anything that was not all right on the lath.

Q. Is there any chance of drainage through that lath?

A. Yes, sir, a tile put all around the building. There are three compartments in this silo. I put two circular silos in place of the three square ones. In ten years time these wooden silos will be rotted.

Mr. Hostetter: About the doors?

A. We put in a wooden frame, a beveled wood frame, the larger side inside, and these frames are set the same as you would plates up to a door frame in a house; then we make wood doors that fit into those beveled openings; that's the way.

Q. How much space between the doors?

A. Up and down. I should say five feet or six feet. You can get along with six feet apart. You can pitch up three or four feet and you can dig down to the next one.

Mr. Hostetter: Does your silage spoil around the edges?

A. It don't mold anywhere. To illustrate that, I have in my employ this winter a young man from Pennsylvania, who has been for several years a school teacher. I was out to the farm about six weeks ago and he was at work in the silo. He remarked as I got in the silo to look around: "I am surprised to find how perfectly this silage is keeping," and he dug down next the wall against the cement wall, and I did the same, and we could not find anything decayed at all. He said in Pennsylvania all silos he had seen had a loss; they decayed silage around the wall. That comes from imperfect wooded walls.

Mr. Hostetter: In my silo it usually moulds around the edges. This plan is all right and I will have to give up my old silo; it has been run ten years.

Mr. Gurler: That is my answer. You got a poor circular silo.

Q. Whether you have corn cutter, a shredder.

A. I do, both. Formerly I had a cutter that simply cut the corn in section. I have a cutter now that is a cylinder twelve inches in diameter and seven feet long, and it is more like the old threshing machine than anything else. On that cylinder I put knives. Those knives cut against teeth in a concave, that is all there is to it. It drops right through. Well now between these knives there is a little pick, so that after the corn is cut into sections, by adjusting this concave, we can adjust them close enough to the cylinder so that the little teeth picks these large stubbles of pieces between that can get through between the concave and the cylinder.

Now the corn is laid right in lengthwise of this cylinder. I find that I have a much less waste, much less when cut that way than when it was simply laid in and did not try to pick the stalks.

Q. What variety of corn and when do you cut it, at what stage of maturity.

A. I use corn at different dates; some early and some late native corn, and plant some of the red cut ensilage corn and some of this large Virginian with the idea of getting most of it in the right stage of matur-

ity, which I cannot always do, putting up as much as I do. I asked Prof. Haecker that question and I am hunting information on that myself. I have aimed to get my corn when the early ears have commenced to glaze, but I find I have got to commence earlier than that or else I see some of it so ripe, and that is not so good. I put some in a year ago in 1899; you remember corn dried up early. I had to wet down half of my corn. I run a spray on it as it went in the elevator. I find when the corn begins to get a little dry it is advisable to do that. If you don't, your corn has not moisture enough to exclude the air and preserve the fodder; it will not pack close enough to exclude the air and will damage. I have done a little something on this line last month.

Mr. Wheeler: From your remarks I judge you plant your corn so that it has some ears on it?

A. Yes, sir; I won't say always. I have years ago planted a bushel to the acre, but I kind of drifted away from that. I got an idea I had better go that way in the food that I wanted my cows to have it, believing that was the economical way to feed the cow that amount of corn, because I find that the corn put into the silo in that stage of maturity, beginning to glaze, that the cows digest it all, no waste. I am not arbitrary on that line though, I know I have something to learn, and it does me good to hear Prof. Haecker, because I am uncertain and I expect I always will be.

Mr. George: I notice that the railroads are using concrete and cement to take the place of brick and stone. It has occurred to me several times in speaking of silos that it could be used to advantage.

A. I have done nothing more than think about it since I have come to this convention; I have been talking that way.

Mr. George: I had occasion to build some of these conduits under the streets and they are being constructed for the carrying of pipes and wires, and they have been thirty-five feet below the street. These are constructed now entirely of this same concrete with the same kind of cement you are talking about. If it is so airtight then it would certainly do for silos.

The comparative cost; I don't know how heavy a wall we would need to build. I have not done any figuring of the comparative cost of building such a silo, compared with the wooden one.

Q. On the Burlington road, between here and Chicago, the abutments and piers are all made of it.

A. Elgin is building piers of it now. The engineer insisted that the walls should be of brick and stone, but now after two or three months have decided that the concrete is by far the better.

Mr. Soverhill: All of the abutments on the canal are built of cement.

Mr. Stewart: To make a point here. Some six or seven years ago I had one of these men that handles this cement do a job for me. He wanted to use German cement, and did use it. But I have not used any now for five years. The cement I use is made in your own State. We had to put on some of these iron hoops and it is as good as any cement you can get. The man that did it lives in Aurora.

Q. We have a silo where we have used that cement and it is not a circular silo; it is in good working order.

Q. What are the dimensions of it?

A. I could not tell you that.

Q. A square silo?

A. No, an oblong one, with mighty thick walls. They need to be thicker in a square silo than in a round one.

Mr. Soverhill: You wouldn't build a square silo?

A. No, sir, I would not build a square silo of any kind. I cannot afford to; you don't preserve your silage, let alone the cost of building it.

Mr. Crosier: In reference to this Portland cement, I know of three factories using it. One of them a year ago this winter was being built and a truck run over the foundation of it before it set, and those truck tracks are as perfect today as they were a year ago. There is no question but that they will be the same fifty years from now.

Mr. DuBois: You have not said a word about your foundation.

A. I put a grout, a circular grout, one where the building topped the ground.

Mr. Monrad: About the drainage, taking away the water with the silage laying on the lath floor.

A. I started to say I had three compartments under one roof laying in a row, and I put outside of this building a tile a little below the bottom of the ground so it carried all the surface water away; it don't go below where you can get drainage. If you get below the water line I have heard say you could keep water in a cistern, and I fear so with the silo.

Q. Does it make any difference where the silage has any dew on it or not, or water?

A. All the difference is the convenience of handling it. It is unpleasant handling corn when wet, but as far as any ill effects from it, I have not been able to find it. You can get your corn crop in the silo, and it may rain every other day in the fall. You can work when the sun shines, or when it don't rain, and as fast as you get in it and if it gets rained on in the silo it is allright.

Q. As far as the silage is concerned it is all right, but of course I would not ask my men to work that way.

A. There have been times this fall when I wished I could have some rain on my silage. It was not wet enough to pack properly.

Q. What was the effect on the open silo?

A. It is as fine as a fiddle, the silage in this open silo. We have had no snow until now. When it has snowed it had to be removed, that was all the drawback I could discover. I was not the first person to build a silo without a roof.

Mr. Hostetter: Did you cover your silage or not?

A. Yes, sir, I did. I just put up the most worthless wet straw or slough grass or anything that has got water to pack to preserve. Whatever is on top of the silo will rot just so far as the air gets to it. Put anything on that will give water, the heavier the better, that will pack down and answer the purpose. If you don't put anything on you will lose somewhere from six to twelve inches of your silage on top. The latter part of December—I filled my silo last fall—I got on my silo to look at it and found it too dry. I had one silo empty then and run in some dry corn and wet it to make it pack, and was surprised at the amount

of water that it took to soak up that dry corn, and I knew if I didn't keep it thoroughly soaked that it would all rot.

Mr. Young: How about using chaff for the cover and top of the silo?

A. That is one of the nicest things you can get, but wet it. Wet it before you put it up if you can.

Q. I am wondering if that concrete wall works well for a silo, why it would not be well for an ice house. If the timber won't rot, why won't it do for that?

A. You would have to effect a compromise. It would not do to make a concrete wall. You would conduct so much heat through it to your ice. If you put some air spaces in a six inch concrete wall, and all dead outside to stop the circulation of the air, it would be all right.

Q. But make it the way of making a silo, by plastering?

A. You would be cracking it.

Prof. Frazer: How did that corn keep that you put in dry and wetted down?

A. I don't know yet; I am on the anxious seat myself.

Q. Did it get very hot?

A. Yes, quite hot.

Mr. Hostetter: How dry was that?

A. As dry as I ever saw corn get in December. When those winds were blowing up so dry it blew it all around the buildings. Dry enough to put away in a mow. You can't very often do that in December.

Mr. Wheeler: The results you obtained, the apparent beneficial results was due to its moisture.

A. That's true largely. It is a more perishable food, more like grass than the dry food is. The cows prefer it. The horses like it. Everything around the farm likes it.

Q. What do you harvest this crop with?

A. We cut it with corn harvester and usually bind it. That's a question in my mind whether I save enough labor to pay for the twine. I am figuring that out now. There has been a little question in my mind

whether that was economy or not. It takes less labor when it is bound. They pick those bundles up and it is easier. And then if you work at it when the corn is not in bundles it is mussed up on the road and it is lots of work, and it is not in condition to go through the feed cutter. It is an unsolved problem. We cut with the harvester and have the low down racks under both axles.

Mr. Wheeler: How many wagons do you have to use?

A. I have five of those hay platforms and can adjust them to any wagon that we have. It depends upon how far I have to haul.

Q. Do you let it lay in the field before going to the cutter?

A. If the corn is a little green in the early part of the work it is all right, but after the corn gets up to the desirable state, the quicker you get it in the better. If the corn is too dry, don't let it dry in the field, because you have got to the point where you need to have moisture.

Mr. Crosier: In speaking of your herd of cows, part being let out in the grove and part in the barn, were those in the barn out in the pasture at all?

A. Those in the barn were turned out nights and kept in the barn, darkened barn in the day time, and they were fed silage the same as those out in the grove were fed silage in feed boxes.

Q. What would you think of the plan, run in the pasture two or three hours in the morning and then in the evening, and feed silage in the heat of the day in the barn?

A. Well, I don't know as there are any objections to it, but I think it is better for the cow to be out all night in warm weather. That would be all right, but I don't see yet where there would be any advantage of being fed in the barn in the heat of the day to those out in the grove.

Q. Away from the flies.

A. Confound it, you don't keep them away from the flies. They just live with the flies and they don't sleep nights. They are burrowing in the skin all the night long. They don't go to the ceiling to roost.

Q. Where did you get the name Texas for them?

A. I don't know. They called it the horse fly; that was the first name for it.

Q. Is this silage all you feed?

A. No sir, I feed a little hay and if I had clover I would feed it largely in connection with silage. I feed oats, corn, corn fodder, and I have recently been drawing some out of the shock in the field and feeding the cows outside. I find the cows like a little dry corn fodder even when having silage. They like a variety. Another question, it has more protein in it. Clover hay is best for the cows.

Q. I thought these flies were buffalo flies?

A. See here, don't keep reminding me of the flies.

Q. Any grain feed with your silage and your hay.

A. Yes sir, I am feeding now ground corn meal and cob together and wheat shorts and gluten meal—the Pope gluten meal.

Q. What quantity?

A. I can not tell you exactly. We probably feed about five pounds of that gluten meal. We have to feed according to the size and the appetite and the ability of the cow to handle it.

Q. Five pounds gluten meal, how much bran?

A. Just commenced feeding wheat shorts, not bran. I tell you we are feeding to get two and one-half pounds protein and twelve and one-half pounds carbohydrates. That is the main point.

Mr. White: How many cows to the acre, or acres to the cow?

A. That's pretty tough. I wish I might get where I could talk that way. We need to when land gets up to \$100 an acre. But now I will tell you what I am doing. I have 360 acres in my farm, renting 80 acres. I have got about 280 head of cattle, and I think 14 or 16 horses and that's about all having dry feed. I give all the cows silage, but I have to buy a good deal of my ground feed, most of it. I grow seven thousand bushels of corn and grind that up for the cows and buy gluten meal, wheat shorts, and am now buying corn. My corn this year I did not husk, and I had 150 acres of corn. Put it nearly all in the silo and the rest in the shock.

Q. Soja bean wouldn't be as good as clover?

A. I don't know.

Q. Does feeding ensilage affect the quality of the milk?

A. I don't know how to get at that. I will have to tell you a little incident. There is a prominent milk dealer in Chicago that every times he meets me begins talking of feeding ensilage. Finally I told him I would bet him two to one that he couldn't tell milk made from ensilage in comparison with dry food milk unless because ensilage milk is better. He has not said ensilage to me since. Now to go back to my early experiences. To satisfy myself I had the milk shipped to New York from my own dairy, with a regular weekly shipment to parties who were taking all my make of butter. Marked the ensilage butter so that I could describe the package and told those parties I wanted their judgment on those packages. I wanted the score on the two. That is all the information they got. When the report came, some were off in salt and some in color. No objection on flavor. It was equal to the other butter.

In the butter line here a few years ago I was down in the country south and was appointed to score the butter. In scoring that butter a package stood up above all the others in flavor right clearly. I thought no more about it until the meeting adjourned and then a farmer came to me and he said, "Mr. Gurler I am pleased, I want to tell you that that butter that scored the highest in flavor was mine, and that I feed my cows nothing but ensilage, and I am the laughing stock of the whole country."

When it comes to shipping certified milk to Chicago I did not dare feed ensilage to the cows in the certified milk stable. I had samples of milk from that stable where they had all dry feed, and from the other stable where they were fed ensilage. I had them marked so I knew which was which, and had them brought to the house. My wife and daughters did not know and were put on their merit for a month, pretty nearly every day as to which was the best milk. It was very seldom when the ensilage milk was not selected as the best milk of the two.

I don't think it was over two or three times that they selected the milk on the dry feed as being the best. They put clover hay against corn ensilage as far as the flavor of the milk is concerned. Gentlemen, if I want to make the highest flavored butter and milk I would insist on having ensilage to do it with. I am just thoroughly honest in that, but you must have splendid ensilage and then you are all right. We have learned what condition to put it in.

Mr. Hostetter: You feed ensilage to all your cows now?

A. Yes sir, and to the horses what the cows don't eat.

Mr. Barnes: There's a prominent Jersey breeder in Will county who asked me the question the other day if I ever had any experience with the calf dropping from feeding ensilage. He spoke of several noted breeders who had trouble in raising strong calves while feeding ensilage. He didn't know from experience, but wanted to know. As far as my experience goes, it is not so. I have fed ensilage a good many years and get good success.

A. I don't believe ensilage has anything to do with it. I think if anything it would help you to keep clear of it. Keep the animal in better condition and when the system is in the best possible condition you can resist disease. I had 35 out of 60 cows lose their calves and it made me sick. I think if anything the argument is in favor of the ensilage.

Q. Have you had any experience on this abortion?

A. I did and I let it run because I did not know what else to do. I didn't know any better. Now when a cow aborts I remove her and put her in a sanitarium and we remove everything that comes from that cow and either bury or burn it immediately, and we go to work and renovate that cow, treat her with injections until we get her cleaned up in proper shape before she comes in contact with the herd. From that time I have been able to prevent it extending to any extent. For the purpose of injecting I use a solution of bychlorade of mercury, or rather you better go to a veterinary and he will tell you all about it.

Q. Ever use bone meal?

A. I did years ago and I felt that I got some advantage from it, but I never was able to prove that I did, and I reasoned it out in this way:

That we were carrying away so much in the milk, it was a reasonable theory that the animal needed it. But that idea was got from old Dr. Tefft, who was one of the first, if not the first, presidents of the Association. I don't use it any more.

**WHAT CREAMERY MANAGERS CAN DO TO INDUCE
PATRONS TO SUPPLY BETTER AND
MORE MILK.**

JOSEPH NEWMAN, ELGIN, ILL.

Mr. President, Ladies and Gentlemen:

The subject assigned to me is one I would like some information on myself, but I will give a few thoughts as I view it.

I find in the vicinity of my home, Elgin, where nearly all farms have large dairies supplying the condensories and the Chicago market, they are not troubled much with this problem, but where the field is new and the milk comes from the patrons who make dairying a side issue and give the creamery the milk during the summer months after the calves are started, we do find it a very serious matter. We have tried to induce the patrons to look to their own interests in the matter, by premiums, etc., also sent them articles on rearing calves, soiling crops, benefit of fall calves and winter milking, but the results are very discouraging. We may have to wait another generation.

I find the average patron does not take kindly to the advice of the creameryman on account of the old Davis & Rankin outfit and the buttermakers they put in charge and what was instilled into them by the promotor, they still think that "All men are liars," but time is the great leveler of all things, and if we are patient and persevering in good works, we can gradually overcome that prejudice. When we do, if we could get all these men who are making a business of raising steers

to give us the milk at the creameries, after the calf is two weeks old, they would save money and put the dairy business, and also the cattle business in the State of Illinois, showing a much larger net profit to the farmer, and give the creameries more and, I believe, better milk than they get today.

I believe the talk of Prof. Haecker and Mr. Carpenter on the practical points in the feeding of the cow, the raising of the calves, the raising of the crops to help them out, are all money-saving ideas and should be practiced by every dairyman as far as possible.

I also believe every dairyman should become a member of this Association; it costs but one dollar a year and entitles each member to our published reports; take them home, have your family and neighbors read them, because we know they will profit by them.

But after all is said and done, one of the best ways for us to reach the dairymen is by the creamery manager, and you creamery managers don't realize it. Today a creameryman must really be an encyclopedia. If the farmers have sickness among their herds he must give information and help them along; if they want to know anything about the farm, what this soil will grow, or what crops are best, the creameryman is expected to help out and advise a little on it. I want to tell you creamery boys that the more you can educate yourselves along these lines so you can do it, the better it will be for you.

We must do it in Illinois if we want to keep up with the other states. The agricultural colleges are turning out dairy graduates by the hundred every year. Our own state school is now ready at Champaign. They have a grand building, but need more appropriation to facilitate this education. Perfect the education of the young men for the farms; they will find it to their interests. It is just as essential as making fine butter, and will help a great deal in "making more and better milk," to study these questions. When their fathers leave the young men will want to stay on the farm and work out their own salvation.

These soil robbers Brother Wallace spoke about—it sounds rather a harsh word. (don't think they do it with the intention of robbing any-

one.) It was because they were not educated in agriculture any better. But as their sons educate themselves along these lines, they will turn over and bring up the fertility of the soils and come out all right.

I believe that in the future the young men will stay on the farm, where there is more need of them than in any store. It takes more brains to handle a well-managed farm than any other position in this country. I really think that the whole thing in a nut shell is "education." You can offer all the prizes you want to at conventions, but unless you commence from the ground up, with good strong cement foundation to make it last, the improvement is not a lasting benefit. You remember the five virgins with their lamps all ready and trimmed. Just think of that boys. It means eternal vigilance all the time. You cannot let up, you must go right on.

You have got to have a cow to produce milk. I don't care so much about the breed. I believe that Brother Belden is just about as good a dairyman as there is, the 1200 pound cow every time. I believe the vast majority of renters in this state or any other state, will do better with the general purpose cow. A cow from 1000 to 1200 pounds; that if she will not give milk to more than pay for her keep, she will sell for more than she was bought for.

The ideal dairyman of this state, from a practical standpoint, was on the platform yesterday, Mr. Jud Mason of Elgin, and I tried to figure out what his profits were, and before I got through, it scared me. I thought I was not right. I made it that out of a farm of 285 acres. I will not figure it out as an owner of a farm for so many of the farmers live in town, but will figure it on the renter's basis.

We will try and find out if he can afford to pay his rent, send his children to school, educate the whole family, girls as well as boys. Domestic economy, we have to work on that line too. The country schools should be thinking of getting teachers for these questions. It won't do to be satisfied with teachers unless they keep up to date. They have done the best they know how, but now the Normal schools are turning out teachers versed in domestic economy.

Now this farm was 285 acres, which, with the average rent with us, would be about \$4 an acre—I say an average. Mr. Mason agrees with me on that. With this, the rent of that farm was \$1140. He had to use seven men for seven months in a year and five men for five months in the year. We figured this at the rate of \$35 per month, because we pay \$20 and \$25 and then board them. Whoever boards them has got to have pay for it. We figured what was right for him, and made the total of the labor for the year \$2590. If the renter had to pay that, we have got to figure it. There were 116 cows at \$48 each, which makes \$5567, and we allowed \$334.08 for interest, if he borrowed the money. We are entitled to figure the interest. And \$2500 for implements and horses was another \$150 interest. Then we thought probably during the year he might lose three cows, so we put \$150 for loss on cows, making the money he would have to pay out \$4364.08.

We have to offset that by selling the milk he produced and the calves. They don't raise hogs up there. He produced milk sufficient so that his returns from the factory was \$7055 for the year. A large portion of that was made in the seven months. There were 100 calves from 116 cows sold at \$3.50 increases his total to \$7405, and would leave a clear profit of \$3040.92 on 285 acres. I say, gentlemen, this is an average farm in the northern part of Illinois in the Fox River Valley near Elgin, and the milk is sold to the condensing company. The owner is an ideal farmer. Set your minds on that ideal. I don't say you can all reach that—we are not all Masons. But what he has done, others can do, and a great many people in the Fox River Valley are coming somewhere near that with common cows, picked of course with an eye for milk.

Q. Figure out the interest there would be on the farm?

A. Four dollars an acre the man gets. I am figuring from the renter's standpoint.

Q. If a man was running that farm himself, what interest would he be getting on the farm?

A. I think up there about 4 per cent.

Q. Those best farms up there?

A. Jud's must be a pretty fair farm, a little better than the average. He is the ideal I am setting up. The farms around Aurora, no better land in the State of Illinois than up around that section, and at Lanark, and there are oceans of it in this state just as good and better.

Mr. Hostetter: You didn't put in any thing he paid our for feed. He probably had to buy \$1000 worth of feed.

A. He buys a vast quantity of bran, but he assures me and his word is as good as gold), that he sells products from his farm more than enough to buy his bran so as to offset that item.

Q. What about taxes?

A. This is from the renter's standpoint.

Mr. Stewart: Was that the brain of the man or the farm. Wouldn't that man be worth \$2500 to do business with?

A. It is the ideal. The average men on our farms can't better it, but he can grasp at it. And I think if all the young men could see these figures they would be encouraged. The possibilities—we have not begun to touch it yet. I hope to see the day when we talk of how many cows to an acre, instead of how many acres to the cow.

Mr. Long: These cows are changed and these machines wear our, anything for the depreciation of the machines?

A. That is another point. He is now keeping 116 cows; he turns off in the spring probably one-third to one-half; makes comparatively small amount of milk for the summer. But he has this intelligence, he buys large frames and feeds them high, twenty pounds to an animal a day, hence in the spring of the year, when these cows are ready to be turned off, he ships them into Chicago. His experience last year was this: Cows that cost him \$48 he sold as dry cows for \$52 on the average. That shows where the brain comes in. This profit we didn't mark here.

Q. You can't buy milch cows for \$48.

A. You get Jud Mason to stir around the country for you; he can. I am trying to reach over the heads of those on the front seat. I want the boys to stay on the farms and keep their home like the ones I see

in driving through Millidgeville to Lanark. You should see the nice kept lawns in front of their houses, just as you see in the yards of the swell houses in Chicago, and you can have these things gentlemen and the profits also, by education.

Q. Give us the gross receipts again?

A. Seven thousand four hundred and five dollars. Milk check for last month was over \$1100. You can cut that down considerably and still leave fair profits. We can't all get the prices Mason does, but what he had to pay out made his milk cost $73\frac{1}{4}$ cents per 100. Prof. Haecker's milk production cost 38 cents a 100, but I don't want it to go broadcast over Illinois that we can produce milk for 38 cents.

The renter is supposed to leave the farm at the end of his term in as good condition as when he took it at the beginning. It is a hard thing to do, but put dairy stock on it. In running your farm so as to carry this number of stock you can readily see how much better it will be at the end of the season.

Q. Did he keep his cattle in pasture or feed them in barns?

A. Fed them largely in barns. The most expensive feed we have is our pasture land.

As I see it, the dairymen and creamery manager must work together, giving and receiving knowledge here a little, there a little, the results will show up slowly, but once started will work for the good of all, giving us more and better milk.

The committee on resolutions presented its report as follows:

These resolutions we first read you we recommend their passage.

Whereas, The Pure Food Commissioner of our state, Hon. A. H. Jones, appointed as his assistant having in charge the dairy department, Mr. J. H. Monrad of Winnetka, and

Whereas, They are working harmoniously to carry the pure food law into effect as fast as the means at their disposal will allow, and

Whereas, We know Mr. J. H. Monrad to be an honest, fearless worker, well qualified to fill the office of dairy assistant; therefore

Resolved, That the dairymen of the state in annual convention assembled hereby approve his work done and sincerely trust he may be kept

in such position that he may be able to carry out his plans and recommendations in both his dairy and creamery work.

Mr. Newman.—I move the adoption of these resolutions. Seconded and carried unanimously.

Whereas, The State of Illinois has invested large sums of money in erecting and maintaining the University of the State of Illinois, and equipping the same with complete apparatus for making experiments in agriculture; therefore

Resolved, That the Illinois Dairymen's Association recommend that the legislature of this state, at its next session, make a sufficient appropriation to make thorough experiments in the lines of dairying, under the direction of the officers of the Agricultural Department of the State University.

It seems that the University feel they are asking for so much in a lump. They have a little feeling in asking.

I move the adoption of the resolution above. Seconded. Carried unanimously.

Third resolution:

Whereas, The public highways of the State of Illinois are, for a large portion of the year, in a deplorable and almost impassable condition, thereby causing great loss and inconvenience to the dairymen of this state, and

Whereas, The present laws governing the disbursement of the vast sums of money paid as road and bridge tax by the farmers of Illinois seems faulty and inadequate to the production of good roads, therefore

Resolved, First, That it is the sense of this Association that the convict labor of the state should be expended upon the public highways, thereby partly atoning to the public for the crimes which they have committed against it.

Second, That the state pay its just share towards the betterment of the public highways of the state.

Third, That the Chairman of this Association appoint a committee of three to represent this Association, and look after legislation bearing

upon this question and report to the Association what action, if any, should be taken by this Association.

President: What did your committee do with that?

Mr. Stewart: I make a motion to lay that on the table. I do think that that is one of the foolish things our people try to do. What are we going to do with convict labor, 40 or 100 fellows from the penitentiary. How are they going to employ them. I saw fellows outside of Galena breaking stone on the road and you don't want to drive with your children along and see a man with a shot gun watching them. That was abolished long ago. I see no way you could employ these people. To move them out over the state, why that sort of thing has been abandoned years ago in all civilized countries. Else give us more seasons.

Mr. President: Any more remarks.

Mr. Gurler: They object to one clause of the resolution. I mean the convict labor, using convict labor. As I understand it, they are asking to recommend that they should use the convict labor, making the highways of the state. Now my idea is they could not be used in certain places. There would be too much expense changing them around and the disgrace of seeing them chained up—that is too old and barbarous a custom and done away with long ago, and I don't know how you can utilize them.

Mr. Hostetter: I wouldn't like this Association to go on record as saying anything against good roads. I don't think we should strike this resolution out on account of one clause that does not suit us. Have the first part of the resolution read again.

Mr. Wheeler: Amend the resolution as offered by the committee by striking out that clause or portion of the same that refers to the use of our state convicts for the purpose of crushing rocks on the highways.

Mr. Newman: Would it meet your mind, that instead of crossing that out they would simply do the work of crushing stone along the road near Joliet. Couldn't that be changed to meet your views. Crush it there and deliver it on the cars. We would like to help that along, anything to make peace.

Mr. Gurler: I don't agree with you, Mr. Stewart, about it being unhealthy. I think if our young people saw them on the street, I think it would be a benefit instead of a disgrace. I don't see why we should hide them on account of their wrong doing. I can't see it in that way.

Mr. Stewart: In all my experience in life, where people were executed, where they cut their heads off, or hang them or torture them, it is my idea the people have gone down and backwards and the less your people can see of it the better. No punishment of mankind ought to be done in public, or allow the public to see it; it is not a benefit to the people. This putting them to a whipping post should be put away and done in secret. You can't make them better by seeing people punished in that way.

Mr. Long: It seems to me the way this should be done, whether taken out in gangs or otherwise, is a matter of detail we don't recommend at all. Merely that they should be used, and not how they should be used. It cannot harm us if the state will use them in a good twentieth century manner to do this work.

Mr. Thurston: Many of the southern states are doing this very thing.

Mr. Thompson: Many of the southern states have no way of using this labor. They send some of their convicts to the state of Illinois in the stone quarries. These convicts are not supposed to be taken out on the streets or anything of the kind. It was the idea to put them to the gravel bank and the farmers can get the crushed stone. They can do some good. In the central portion some of this very stone is crushed by the convicts, and it has made the material cheaper. Convicts can do that.

Mr. President: Voting on amendment. Moved and seconded the resolution be laid on the table. Are you ready for the question. All in favor of that motion make it known by raising your right hand. (Eight.)

Those opposed to laying it on the table raise your right hand (Ten.)

Mr. Hostetter: I would like to have it read again. We do not distinctly understand it.

(Resolution read again by Mr Thomuson.)

Mr. Long: I move the adoption of the resolution as read.

Mr. Stewart: That resolution says we ask the state to expend the labor on the highways, what do you mean?

Mr. Long: A matter of detail to be left with the legislature.

Mr. Stewart: It is a blind thing.

President: It is moved and seconded the resolution be adopted as read. Are you ready for the question. All in favor of the adoption of the resolution raise your right hands. (Nine.) Those to the contrary. (Nine.) A tie.

The President casts a vote for the adoption, settling the ballot.

Mr. Thompson: I wish Mr. Cairman and gentlemen of this committee to apologize to Neighbor Steware for having brought forth such a ridiculous resolution as he terms it.

Here is some action which you can take on several heads and vote on them all at once, to the several persons and interests here mentioned: Resolved that the thanks of this Association be extended to the following:

To the Honorable Mayor and people of the City of Aurora for their courtesy extended to us.

To the Hon. Jules Lumbarđ and the State Union Line, enabling his presence here with us on this occasion.

To the Illinois Quartette.

To Miss Bauman.

To Miss Sherer.

To all who gave a helping hand to the Association.

By the President: Are you ready for the question? All in favor of the adoption of the resolutions, will rise.

Carried unanimously.

Report of Committee on Nominations:

For President—Joseph Newman, Elgin, Ill.

For Vice President—J. R. Biddulph, Providence, Ill.

FOR DIRECTORS.

Joseph Newman	Elgin, Ill.
G. H. Gurler	DeKalb, Ill.
John Stewart	Elburn, Ill.
R. R. Murphy	Garden Prairie, Ill.
J. R. Riddulph	Providence, Ill.
Fred A. Carr	Aurora, Ill.
Irvin Nowlan	Toulon, Ill.

Respectfully submitted.

Mr. Wheeler: I move that the names as submitted by the nomination committee be the nominees of this Association.

Motion moved and seconded.

Mr. Newman: Before that motion is put I suppose they realize what this means. I think we have done well enough under Mr. Gurler's leadership.

Mr. President: I think you are out of order.

Mr. Newman: Hadn't we better continue Mr. Gurler for yet a while. He is quite a young man yet.

Mr. Stewart: I think Mr. Gurler has served us faithfully and well. I think he ought to be released, in justice to himself.

By the President: All in favor of that motion say "Aye. Contrary. Carried unanimously.

Mr. Wheeler: I only moved that they be the nominees. Is the ballot by ballot or acclamation.

I move these be nominated by acclamation.

Mr. Hostetter: I think the constitution provides we should have the secretary cast the ballot to vote for this election.

By the President: The Secretary is instructed to cast the ballot. All in favor say "Aye." Contrary (one) "No."

Before retiring I wish to thank the officers of this Association for the help they have given me during my five years' service. Gentleman I thank you.

Convention adjourned.

Division of the Pro Rata Purse.

H. Nolan, Hinckley, sweepstakes on creamery butter	\$20.00
Mrs. Emma Brundige, LaFox, sweepstakes on dairy butter.....	15.00
C. R. Wilder.....	3.90
D. C. Burton.....	1.55
Frank B. Thompson	4.65
Grant Mallory	6.20
Mat. Ludwig	6.20
Wm. Boethke	1.55
A. E. Thompson	4.65
Martin Gullickson	1.55
Geo. Bloyer	4.25
J. S. Waspi.....	7.00
Chas. H. Woodard ^d	4.65
W. S. Holister	5.80
John Carlson	2.35
David ^d VanPatten	6.60
Geo. Reed ^d	4.25
F. E. Barrett	7.75
Fred A. Cooley	1.55
H. Eastman	1.95
G. W. Hoppensteadt	3.50
N. W. Finch	1.95
Peter Nelson	5.80
M. Francisco	5.80
G. Herman	8.55
Otho Bloyer	7.35
Frank McFarland	5.45
W. K. Tindall.....	3.10
O. Myers	5.45
Wm. McNurlin	3.10
H. R. Duel.....	7.35
Christ Becker	7.00
Geo. E. Waterman	2.70
L. W. Swanzer	3.10
F. S. DuBois.....	4.65
Samuel Gray.....	3.10
Eli I. Crosior.....	6.20
Irvin Nowlan	5.45
S. S. Merritt.....	4.65

Miss Mae Cooper.....	3.10
Mrs. Chas. Beede.....	1.55
Total.....	\$10.30

CHEESE.

J. R. Biddulph, two classes.....	\$17.00
C. A. Poplett	8.00
S. G. Soverhill.....	5.00
Total	\$30.00

Treasurer's Report.

Mr. President and Directors of Illinois State Dairymen's Association:

Gentlemen—Below find report of your Treasurer from Jan. 9th, 1900, up to and including May 17th, 1901.

Jan. 9, 1900, Balance on hand.....	\$ 645.98
Jan. 30, 1900, Received from Secretary	160.00
Aug. 8, 1900, Received from Secretary	1500.00
March 26, 1901, Received from Secretary	50.00
April 1, 1901, Received from Secretary	10.00
April 1, 1901, Received from Secretary	5.00
Total	\$2370.98
Credit by paid orders No. 442 to and including No. 586 inclusive, excepting Nos. 488, 537, and 580, which have not been presented for payment.....	\$2327.78
Balance on hand.....	43.20
Total.....	\$2370.98
May 18, 1901, Balance on hand.....	\$ 43.20
Bank Book and Orders herewith.	

H. H. HOPKINS, Treasurer.

Secretary's Report.

Following are receipts and expenses for the year, including the Aurora convention of cash received by secretary:

Memberships	\$130.00
Check July 23.....	10.00

Checks Oct. 3.....	50.00
Aurora.....	236.00
Elgin Butter Tub Co.....	10.00
Wells, Richardson & Co.....	20.00
Vermont Farm Machine Co.....	10.00
The Sharples Co.....	10.00
A. H. Barber Mfg. Co.....	10.00
Dairy Mutual Insurance Co.....	10.00
Francis D. Moulton & Co.....	20.00
DeLaval Separator Co.....	30.00
Genesee Salt Co.....	10.00
Heller & Merz.....	5.00
Worcester Salt Co.....	10.00
Creamery Pkg. Mfg. Co.....	50.00
Diamond Crystal Salt Co.....	10.00
Total	<u>\$631.50</u>

EXPENSES.

Stamps.....	\$ 61.60
Express, freight, and drayage	16.45
Cuts for report.....	10.50
Printing, typewriting, etc.....	55.95
Telephone and telegrams	5.80
Paid Treasurer.....	65.00
Convention expenses	386.52
Balance.....	<u>29.68</u>
Total	<u>\$631.50</u>

Board of Directors Meeting.

The annual meeting for settling up all matters pertaining to the convention at Aurora and arranging for the present year's work was held at Champaign, Ill., on the occasion of the dedication of the new Agricultural College of the University of Illinois, May 2, 1901. The meeting of the board was held in "The Beardsley," with President G. H. Gurler in the chair, this being the last meeting under Mr. Gurler's direction, and at its close the chair was surrendered by him to Joseph Newman, elected president at the Aurora convention after Mr. Gurler had refused longer to

serve. Besides Messrs. Gurler and Newman the other directors present were: J. R. Biddulph, R. R. Murphy, F. A. Carr, and Irvin Nowlan.

Reports of the treasurer and secretary were presented and after they had been examined in detail by the auditing committee they were approved.

On motion the printing of the annual report was left to the president and secretary.

It was moved and adopted that the next annual convention be held Tuesday, Wednesday, and Thursday of the second week in January, 1901, (Jan. 7, 8, and 9). Directors Carr and Nowlan and the Secretary were appointed a committee on location. Mr. Newman named several towns to be considered when the question of locating the next convention is brought up.

The matter of appointing a committee to act in an advisory manner, with committees from other agricultural organizations of the State in the matter of spending the appropriation for agricultural advancement at the State Agricultural College, was discussed. The naming of the committee was left to President Newman.

Geo. Caven of Chicago was re-elected secretary, and H. H. Hopkins of Hinckley was re-elected treasurer.

After the meeting President Newman announced as members of the advisory committee to act for the Illinois State Dairymen's Association the following: H. B. Gurler, DeKalb; John Stewart, Elburn; M. Long, Woodstock; Irvin Nowlan, Toulon; A. N. Abbott, Morrison.

After the committee had assembled, several week later at Champaign, a brief report of its action was sent to President Newman as follows:

The committee appointed by the Illinois State Dairymen's Association to confer with the Dean of the Agricultural College as to the work to be carried on at the Agricultural College Dairy Division met.

The matter considered of most importance was to send a man out over the State, principally in dairy sections of the State rather than non-dairy sections, to conduct educational experiments along the lines of calf feeding, breeding, care and handling of milk.

It was recommended that the dairy division at the College experiment as follows:

First.—Devise methods of keeping flies off the cows.

Second.—Best methods of raising calves with little milk and best substitutes for milk.

Third.—Immediate and continued effect of different quantities of the same feed upon milk production.

Fourth.—Wide and narrow rations for dairy cows, and which most economical for all.

Creamers Division:

First.—Explain why some cream whips, while other cream of same per cent does not.


Second.—Most effective insulation for creamery refrigerators.


Third.—Experiments on mould in refrigerators.

Fourth.—Experiments to determine the species of bacteria which decomposes butter rapidly when in cold storage.

Fifth.—Freezing cream and the effect of it in making butter.

Committee composed of H. B. Gurler, DeKalb; A. N. Abbott, Morrison; Irvin Nowland, Toulon; M. Long, Woodstock, and John Stewart, Elburn, Ill., met at the office of Prof. W. J. Franzer, June 18, 1901.

**Dedication of Agri-
cultural College
Building. **

**University of Illinois, Cham-
paign, May 21, 1901. **

Morning Session, 10 o'clock, May 1, '01.**MORROW HALL.**

Prayer.....Rev. C. N. Wilder

Brief addresses from the following representative citizens of the State:

S. Noble King.....Bloomington

Chairman of Legislative Committee of Illinois Farmers' Institute, 1899, officially representing the farmers of the State in the third campaign for an agricultural building.

A. P. Grout.....Winchester

Chairman of Committee from Illinois Agricultural Associations which drafted and secured the passage of the "Rankin Bill," for the "Further equipment of the College of Agriculture and the extension of the work of the Experiment Station."

Hon. Henry M. Dunlap.....Savoy

Member of the Senate from the thirtieth district and in charge of University appropriation bills when the appropriation for the Agricultural Building was secured.

L. H. Kerrick.....Bloomington

Member of Illinois Live Stock Breeders' Association and President Illinois Cattle Feeders' Association.

Thomas J. Burrill, Ph. D., LL. D.University

Vice-President, University of Illinois and Dean of the General Faculty.

E. Davenport, M. Agr.....University

Dean of the College of Agriculture and Director of the Agricultural Experiment Station.

Afternoon Session, 2 O'clock

UNIVERSITY CHAPEL.

- Music—Gardes du Corps.....Hall
 University Military Band.
- Address—Thomas F. Hunt, M. S.....Columbus, Ohio
 Dean of the College of Agriculture, Ohio State University.
- Address—Hon. Joseph G. Cannon.....Danville, Ill.
 Chairman of Committee on Appropriations, United States
 House of Representatives.
- Music—Pilgrim ChorusWagner
 University Military Band.
-

Address by S. Noble King, Bloomington.

Just fifty years ago at the first farmers' convention held in Illinois, the seed was planted whose fruitage we behold in the beautiful building which we are now assembled to dedicate.

This convention was held at Granville, Putnam County, and was called, "To take into consideration such measures as might be deemed most expedient to further the interests of the agricultural community, and particularly to take steps towards the establishment of an agricultural university."

Among the resolutions introduced by Professor Jonathan B.B Turner of Jacksonville, and passed by the convention, were the following:

"Resolved, That we greatly rejoice in the degree of perfection to which our various institutions, for the education of our brethren engaged in professional, scientific, and literary pursuits, have already attained, and in the mental and moral elevations which those institutions have given them, and their consequent preparation and capacity for the great duties in the spheres of life in which they are engaged, and that we will

aid in all ways consistent, for the still greater perfection of such institutions."

"Resolved, That as the representatives of the industrial classes, including all cultivators of the soil, artisans, mechanics, and merchants, we desire the same privilege and advantages for ourselves, and our prosperity, in each of our several pursuits and callings as our professional brethren enjoy in theirs; and we admit that it is our own fault that we do not also enjoy them."

"Resolved, That, in our opinion, the institution originally and primarily designed to meet the wants of the professional classes as such, cannot, in the nature of things, meet ours, no more than the institutes we desire to establish for ourselves meet theirs. Therefore,

"Resolved, That we take immediate measures for the establishment of a university in the State of Illinois, expressly to meet those felt wants of each and all the industrial classes of our state."

At the request of the convention Professor Turner submitted a carefully thought out plan for an Industrial University for the State of Illinois.

Limitation of time prevents giving this plan in full, but extracts from it will show that he had a clear and definite understanding of the needs of our people. He said: "What do the industrial classes want? How can that want be supplied?"

The first question may be answered in few words. They want, and they ought to have, the same facilities for understanding the true philosophy—the science and the art of their several pursuits (their business life), and of efficiently applying existing knowledge thereto and widening its domain, which the professional classes have long enjoyed in their pursuits. Their first labor is, therefore, to supply a vacuum from fountains already full, and bring the living waters of knowledge within their reach. Their second is to help fill the fountains with still greater supplies. They desire to depress no institution, no class whatever, they only wish to elevate themselves and their pursuits to a position in society to which all men acknowledge they are justly entitled, and to which they all desire to aspire.

"How then can that want be supplied?"

"In answering this question, I shall endeavor to present, with all possible frankness and clearness, the outlines of impressions and convictions that have been gradually deepening in my own mind for the past twenty years, and let them pass for whatever the true friends of the cause may think them worth."

"And I answer first negatively, that this want cannot be supplied by any of the existing institutions for the professional classes, nor by any incidental appendage attached to them as a mere secondary department.

"We need a University for the industrial classes in each of the states, with their consequent subordinate institutes and high schools, in each of the counties and towns. The object of these institutes should be to apply existing knowledge directly and efficiently to all practical pursuits and professions in life, and to extend the boundaries of our present knowledge in all possible practical directions."

Foreseeing the changes that would occur in agricultural methods he went on to say:

"There should be connected with such an institution, in this state, a sufficient quantity of land of variable soils and aspect, for all its needful annual experiments and processes in the great interests of agriculture and horticulture. Buildings of appropriate size and construction for all its ordinary and special uses; a complete philosophical, chemical, anatomical, and industrial apparatus; a general cabinet, embracing everything that relates to, illustrates, or facilitates any one of the industrial arts.

"To facilitate the increase and practical application and diffusion of knowledge the professors should conduct, each in his own department, a continual series of annual experiments.

"Let the professors of physiology and entomology be ever abroad at the proper seasons, with the needful apparatus for seeing all things visible and invisible, and scrutinizing the latent causes of all those blights, blasts, rots, rusts, and mildews which so often destroy the choicest products of industry, and thereby impare health, wealth, and comfort of millions of our fellowmen. Let the professor of chemistry carefully

analyze the various soils and products of the state, retain specimens, give instruction, and report on their various qualities, adaptations, and deficiencies."

"Let similar experiments be made in all other interests of agriculture and mechanic or chemical art."

"It is believed by many intelligent men, that from one-third to one-half the annual products of this state are annually lost from ignorance on the above topics. And it can scarcely be doubted that in a few years the entire cost of the whole institution would be annually saved to the state in the above interests alone, aside from all its other benefits, intellectual, moral, social, and pecuniary."

Realizing the deficiency of available information on these subjects he added:

"I should have said, also, that a suitable industrial library should be at once procured, did not all the world know such a thing to be impossible, and that one of the first and most important duties of the professors of such institutions will be to begin to create at this late hour, a proper practical literature, and series of text books for the industrial classes."

"As regards the professors, they should, of course, not only be men of the most eminent, practical ability in their several departments, but their connection with the institution should be rendered so fixed and stable, as to enable them to carry through such designs as they may form or all the peculiar benefits of the systems would be lost."

That he spoke as a prophet is shown by the following quotation: "As matters now are, the world has never adopted any efficient means for the application and diffusion of even the practical knowledge which does exist. True, we have fairly got the primer, the spelling book, and the newspaper abroad in the world, and we think that we have done wonders; and so, comparatively, we have. But if this is a wonder, there are still not only wonders, but, to most minds, inconceivable miracles from new and unknown worlds of light, soon to break forth upon the industrial mind of the world."

"Here then is a general, though very incomplete outline of what such an institution should endeavor to become. Let the reader contem-

plate it as it will appear when generations have perfected it, in all its magnificence and glory; in its means of good to man, to all men of all classes; in its power to evolve and diffuse practical knowledge and skill, true taste love of industry, and sound morality not only through its apparatus, experiments, instructions, and annual lectures and reports, but through its thousands of graduates, in every pursuit of life, teaching and lecturing in all our towns and villages, and then let him seriously ask himself, is not such an object worthy of at least an effort, and worthy of a state which God himself, in the very act of creation, designed to be the first agricultural and commercial state on the face of the globe?"

"Who should set the world so glorious an example of educating their sons worthily of their heritage, their duty and their destiny, if not the people of such a state? In our country we have no aristocracy, with the inalienable wealth of ages, and constant leisure and means to perform all manner of useful experiments for their own amusement; but we must create our nobility for this purpose, as we elect our rulers, from our own ranks, to aid and serve, not to domineer over and control us. And this done we will not only beat England, and beat the world in yachts and locks and repairs, but in all else that contributes to the well being and true glory of man.

I maintain that if every farmer's and mechanic's son in this state could now visit such an institution but for a single day in the year, it would do him more good in arousing and directing the dormant energies of mind, than all the most incurred, and far more good than many a six months of professed study of things he never needs and never wants to know."

The effort of this convention resulted in the land grant act of 1862, which provided, "That there should be granted to each state 30,000 acres of government land for every senator and representative to which it was entitled, according to the census of 1860."

Among the conditions were the following:

"These colleges were for the benefit of agriculture and the mechanic arts."

"The object of it all was to promote the liberal and practical education of the industrial classes." And in 1868 Illinois established its college under the name of the Illinois Industrial University.

FOUNDING.

While no difficulty was experienced in securing teachers for scientific and classical courses it was found almost impossible to find teachers or literature for the agricultural department. Principles of agricultural science familiar now to every progressive farmer, were at that time undiscovered. Under these conditions the college of agriculture had a precarious existence.

After a struggle of twenty-one years relief came through an act of congress commonly called the Hatch Act, by which \$15,000 was appropriated to each of the states to establish "Agricultural Experiment Stations" under the direction of the college of Agriculture. A second measure of relief was found in another act of congress by which an appropriation was made for the further endowment and support of the colleges of agriculture and mechanic arts. It was generally supposed that the agricultural college of Illinois was then on a basis that would make it a credit to the state, but when in February, 1898, the Illinois Farmers' Institute held its annual meeting at the University, to the surprise and disappointment of the farmers present it was found that the buildings belonging to the Agricultural College consisted of three wooden barns. The necessity of having a department in our State University in which the sons of farmers, or those wishing to fit themselves for agricultural pursuits could have the advantage of scientific instruction equal in every respect to other departments was recognized and in the following September at a meeting of the Board of Directors of the Illinois Farmers' Institute it was determined to ask the legislature for an appropriation by which the Agricultural College could be placed on a basis fitting to the rank which this state holds in agricultural productions. Accordingly a committee from the State Farmers' Institute asked the legislature for an appropriation of \$150,000 for a building for the College of Agriculture.

This appropriation was readily granted and we now have the pleasure of seeing it ready for use. Through the united and persistent efforts of the farmers of Illinois, we have, after thirty years, a college of agriculture which we confidently trust will be an honor to this great state. Notwithstanding the fact that the instructors have been handicapped by want of proper facilities and equipment they have done excellent work, proof of which is found in the fitness of graduates to fill responsible positions, one Mr. Gardner lately having been appointed by the U. S. Government to take charge of the agricultural interest in the Island of Porto Rico. But we must remember that the equipment and instruction are only helps to students. Success is dependent upon personal efforts.

Already we have been gratified by honors won by the students of this college at the Inter-Collegiate Live Stock Judging Contest at Chicago, and we unhesitatingly predict that the winning of the Spoor Trophy will be only the beginning of the honors which shall be accorded to students of the Illinois College of Agriculture.

Paper Read by Mr. A. P. Grout.

This occasion marks the beginning of a new epoch in the history of agriculture in Illinois. It is the dawn of a new era of improvement and advancement in the opportunities and provisions made for a higher and better education for the people—for the tillers of the soil—that great army of workers who are developing the greatest of all industries and who have heretofore been supposed to do business on a very limited amount of that which is so essential to success in almost every other calling.

Through the inspiration of this hour are we encouraged to assert that the "world does move" and as an excuse for such rashness we have but to point to the magnificent new building—this day dedicated to agriculture—to the education of the boys and girls of Illinois in that which pertains to the farm and the business of farming.

That this great boon to agriculture—the greatest industry of Illinois—has been long delayed and many years over due, cannot be gainsaid, but the delay and anxiety incident to its safe arrival in port, with a goodly cargo in the shape of the finest building devoted to agriculture in the world, and a liberal appropriation for education and investigations, and a most able and efficient crew of workers and instructors, goes very far towards mitigating our complaints and gives us great hopes and encouragement for the future.

Today Illinois is to be congratulated on the advanced position it has taken with reference to agricultural education and proud may it be of the rank thus obtained.

Agriculture is the basis of all industry and education is the foundation upon which the superstructure must be reared to success.

The eyes of the people have been opened and their understanding quickened. Their conception of the business of farming has been broadened and expanded and it now means something more than just digging, drop and covering the seed and gathering the harvest.

The discovery has been made that farming is a business to be studied and learned and that it needs the trained mind as much as does any profession that places alphabetical endings to the names of graduates from literary or professional schools.

It has been aptly said that if John is sent to college to take a course in law, medicine or theology, and Tom must farm, that it is only fair and just to Tom that he be given a course in agriculture and that he receive the same training and have the same advantages for mental discipline and technical information along the line of his life work as his brother. Then will they not only be placed on an equality from a business standpoint, but they will be social equals, for it is not mere work that separates men socially; it is their mentality.

Farming in the past has been largely a matter of brawn but today the demand is for more brains. The situation was most aptly stated by ex-Secretary of Agriculture J. Sterling Morton, when he said that "The farmer shall succeed more by his head than his hands." It is with

pleasure that we can here proclaim the fact, and it is a matter of congratulation for the friends of agriculture everywhere that Illinois has at last awakened to a realization of the situation—has met the demands of the hour, and has made this occasion and these exercises possible, and not only possible, but an occasion for gratitude and pride to every farmer and every one interested in the great fundamental industry in the grandest agricultural state of the Union.

The awakening has come and Illinois has gone on record as favoring and seeking the highest and most advanced type of agriculture.

Less than three years ago Illinois stood far down on the list of states as regards her College of Agriculture—almost at the foot of the class—its instructors discouraged and disheartened—its friends and promoters disappointed and chagrined—its beneficiaries given over to ridicule and skepticism—its management doubtful as to the utility of its objects and uncertain and out of date as to its value and importance as an educational factor—a college in name only—sick unto death—a fit subject for resurrection and new life, when the people, the farmers, represented by the Illinois Farmers' Institute, came to the rescue, took up the fight and carried on the struggle that has ended in the finest building devoted to agriculture in the world and an agricultural college with more students enrolled during the present year than in all the previous years of its history combined.

Having put hand to the plow for advancement of agricultural education and the building up of a college and experiment station that shall be a credit and an honor, as well as a perpetual benefit to the state, there has been no turning back, but the past winter has witnessed the development of a new and heretofore unknown power for the promotion of public utility, in the concert and harmonious action of the various agricultural organizations of the state. The Illinois Live Stock Breeders' Association, the Corn Growers, the Corn Breeders' and Grain Dealers' Associations, the Illinois Farmers' Institutes, the Horticultural society, the Dairymen's and Sugar Beet Growers' Association—representing the bone and sinews of the land, the wealth and taxpayers of the state, the



DAIRY WING, AGRICULTURAL COLLEGE BUILDING
UNIVERSITY OF ILLINOIS.

solid substantial men, the veritable salt of the earth, united and determined in the promotion of such measures as shall benefit the people and add wealth to the state, is a power that cannot be resisted or turned down.

The times are propitious for the exercise of such a power. The people are sick at heart and nauseated with the babblings of would-be politicians and statesmen and the constant parading of the great bugbear economy not for economy's sake, but for the party's sake, when increased educational advantages and industrial knowledge and investigations for the benefit of the people are demanded.

The time was when the pioneer friends of agriculture entertained great hopes for the building up of a great industrial institution of learning in Illinois in which instructors in agriculture and kindred topics should be made as prominent as the superior agricultural advantages of the state demanded.

They were met with the rebuff that the people did not want it—that they were not asking for it, but above all the virtuous politicians and legislators were opposed to taxing the dear people to provide the necessary funds. Cheap reputation for economy, dearly bought at the price of ignorance, irreparable loss of fertility, delayed development and wasted opportunities. Such are some of the conditions that led the various agricultural organizations of the state to unite upon one common plan and concert of action and effort to secure that long delayed recognition for our College of Agriculture that shall place it in a position to creditably represent Illinois as an educational institution and successfully carry out the plans and fulfill the hopes of its founders.

In unity and numbers there is strength.

The individual farmer acting alone and for himself counts for very little in shaping public affairs, but as a member of an organized body of intelligent and thinking men, seeking only the best interests and welfare of all the people, and no private or personal gain, is in a position to exert a most powerful and salutary influence.

The agitation of one man or of any number of men not working in harmony can avail little, but when united with one common object and

purpose, and backed by numbers, by intelligence, by fixedness of purpose, and by standing as men of affairs, the influence wielded is immense.

Agriculture has never been accorded the position or received the recognition from our state government that its magnitude and importance entitles it. Farmers have been slow to assert their rights to push their claims.

Merit and justice have availed little or naught against united and organized effort.

The development of the past few months with reference to the powerful influences that can be exerted for the shaping and controlling of public policy or organizations, even of farmers—hayseeds if you like—is no less important than the objects already accomplished. The latent powers and possibilities of the people have been revealed and the feasibility of their employment demonstrated.

Through the influence and by the assistance of the agricultural organizations, Illinois can today boast of one of the finest, best equipped, and most thoroughly up-to-date agricultural colleges and experimental stations in the world, and if there is anything lacking to place them clearly in the lead they have only to make their wants known, for those organizations that are of the people and for the people, are enlisted in their services and behalf for all time to come.

The College of Agriculture belongs to the people and more particularly to the farmers of Illinois. It is their special institution of learning and source of inspiration—the place where the future husbandmen are to be disciplined and grounded in the fundamental principles of their calling and fitted for their life work. It is the fountain from which may be derived the latest information in regard to all farm operations—the place for study and investigation of all farm problems and experiments.

The farmers of Illinois, through their various organizations have assumed the right to say what kind of an institution it shall be and they have elected to say that from this time on it shall fitly represent the agricultural interests of Illinois, which means that it shall be second to no institution of the kind in the land.

I speak advisedly and know whereof I speak. I am aware that I am making the assertion in the presence of representatives of the best agricultural colleges in the United States, yet I have no hesitancy in saying to them, do your best—and we will go you one better.

It has taken time to educate the farmers of the state to a just appreciation of the value of an agricultural education and to remove from their minds the old prejudice against book farming or scientific farming or any kind of farming that savors of anything but brawn and muscle—tireless and never ending drudgery and a reckless waste of soil fertility.

Again, it has been the province and function of the agricultural organizations to bring the farmers and the agricultural college into closer communication and to a better understanding of the wants of the one and the benefits of the other.

Through the agency and by efforts of these organizations and embodying the ideas and suggestions of Col. Chas. F. Mills as expressed in resolutions introduced by him at the last meeting of the Live Stock Breeders' Association, it has been provided by statute that the work of the Illinois Experiment Station shall be carried out on lines to be agreed upon the Dean of the College of Agriculture and committees representing the various branches of agriculture, to be selected by the farmers themselves. Thus is the work of the College and Station, and the wants of the farmer brought into close and intimate relationship.

The Association of the leading farmers of the state and those who practice the highest type of agriculture, in organizations, for the purpose of leading the farmers of Illinois into better and more intelligent methods—of inculcating new ideas—ideas that will set them to thinking and studying and which when applied will result in the most advanced agriculture, is an object worthy of the highest commendation.

The success already achieved and the good accomplished by the agricultural organizations of Illinois acting in perfect harmony and unanimity of purpose and for the promotion and advancement of agriculture, makes them the pioneers and leaders in this work. They have demon-

strated the influence and power of the people—even the farmers, when organized for a purpose. They have set the pace for the good work all over the land. They have given an impetus to agriculture that nothing can check or stay. Illinois may have been a little slow in getting her machinery in motion, but she is now fully aroused as to her opportunities and possibilities.

With the best natural advantages of soil, climate, and location, with the best equipped College of Agriculture in the world, backed by the most intelligent and progressive body of farmers in the entire country, thoroughly organized and keenly alive to every move that may effect their interests, Illinois may be expected to forge to the front rank in everything that goes to constitute her material well being and the happiness of her people.

Hon. H. M. Dunlap's Address.

The University of Illinois, known at that time as the Illinois Industrial University, first opened its doors to students in 1868. In the fall of that year I, a green country boy of fifteen, entered the school in pursuit of an agricultural education. The school, and I believe I am safe in calling it simply a school, even in the presence today of one who was at that time a member of its faculty, consisted of a dozen teachers and ninety students. The equipment was a few books on "How Crops Grow" and "Chemistry of Soils."

As I drove through the University campus this morning on my way to this new and grand edifice erected for and to be consecrated to the uses of the College of Agriculture, I could not help but contrast the present with the past. Then there was the one building which served as a dormitory to house the student body, a few recitation rooms, a room for chapel exercises, and a room for a library. No equipments for the chemical laboratory or the engineering and mechanical departments. The department of science was handsomely furnished with a pair of bal-

ances a microscope of limited powers and a few rocks. How different this morning—the old building to which we have referred has disappeared and in its place is Illinois Field; at the south end of the old campus is Military hall; as we proceed southward on Burrill Avenue to the right and left are the electrical and mechanical engineering shops, the engineering building proper, the greenhouses, the President's house, the natural history building, the chemical building, which has outlived its usefulness and is to be succeeded by a more modern one, the handsome library building to the right and what is now known as the old main hall or building directly in our path. As we circle this latter to the right or left we come into full view of the Experiment Station buildings and barns, the astronomical observatory, and last but by no means least, this grand structure which we are here today to dedicate to the uses of Illinois agriculture. In addition to the buildings enumerated each of them is filled with apparatus and equipped for instruction and investigation second to none in the United States.

Now the student body is composed of 1700 students whose opportunity for education before entering the university is almost as far in advance of the opportunity of the students of the early day as are the advantages now offered by the University superior to those of the early day. As my memory reverts to that olden time I recall that student body as an earnest, rather poorly clad, enthusiastic, lively and mischief loving band of boys from the farm and village. Few were possessed of a high school education and many minus even that of a good common school. But they were earnest intelligent, and many have made their mark in life since the old college days. This demonstrates to my mind that if a student possesses capacity for an education it matters but little whether he is examined for entrance to the University or not. Previous opportunity has much to do with whether he can leap a pole set at a certain height on the field of mental gymnastics, but it has but little to do with his after success in University studies. Many good students eager for knowledge are frightened away because of their inability to pass certain requirements of admission set forth in the catalogue.

Domiciled in the old building which answered for all the departments of a great University, we went forth to study agriculture, "as she was taught." Daily the student body was assembled, counted off into squads of ten with a leader for each. There with professors to the right of us, professors to the left of us, instructors in front and rear of us, with hoes, rakes, wheelbarrows, baskets, spades, and all sorts of agricultural implements invented to tickle mother earth into bountiful harvest we went forth to study "that art which doth mend nature" for two hours each day. As a member of what the rest of the boys dubbed the "infant squad" I went out daily with the multitude and raked in such crumbs of practical agriculture as were scattered in my vicinity by the professors of ancient languages and literature or mathematics, or the instructor in military tactics, all of whom were expected to be equally expert in the science of agriculture as taught in those days. Since leaving the institution if I have made any success as a farmer it is due no doubt to the instruction in practical agriculture I received from the professor of literature and art of the best manner in which a hoe should be held in cutting down "Simpson" weeds. If I have made a success in horticulture it is due to the instruction I received in picking and packing tomatoes on the site of where the library building now stands, under the instruction of the professor of horticulture, one who from those primitive methods of instruction has advanced to a world wide reputation as a bacteriologist and to the position of dean of the faculty.

Our instruction in the class room consisted in having a chapter in "How Crops Grow" read and commented upon by the professor of agriculture. Wearisome hours were spent in this unprofitable work in reading books whose titles I remember if I have forgotten their contents. Thus it was that agriculture was taught in ye olden time, and the wonder was that agricultural education did not prove popular with the student. We can now see that the fault was not with the wonderful truths of nature but with the means and crude methods of their presentation. All of this was but a beginning of a better system of instruction, a grouping after better methods which have since taken the place

of this mistaken and immature beginning. All of this is not offered in criticism, but as an illustration of what has been accomplished in the past third of a century in the development of agricultural education. Of the instructors of those days be it said that "they did the best they could," and the student of that day got the best there was at the time. Some of those instructors have since risen to prominence and occupy foremost positions of honor in the University, and have reputations in their professions that are world wide.

Learning and labor was the watch word then as now and from this humble beginning has come a system of instruction in the class room and field laboratory that has caused the building of this immense structure for carrying forward the cause of agricultural education. We welcome the dawn of a better day along this line, more intelligent methods for investigation and instruction means better method in the treatment of our soils, our crops, and our live stock. It means a better home for the farmer, a higher standing in the social and economic life of the farmer, in his association with people engaged in other pursuits. The intelligent farmer of the future will occupy such position as he carves out for himself. The opportunity is his. If he respects himself and his calling others will respect him and it. Today we have reached a point where we can see that agriculture at the University of Illinois is what we make it. If it is popular it will be because the instruction is of the best, the instructors enthusiastic in their work and the methods of such a nature as shall interest and instruct intelligent students who "want to know" and want to know by the quickest and best route. From one or two text books you now have many; from one or two instructors you now count them by the dozen; from one room shared with other interests you have developed into an immense building, all our own, equipped with the best apparatus for instruction in the land. Agricultural education at the University of Illinois has left the past behind and must now press forward to the future. The methods of today while perfect as compared to early beginnings will be cast aside and regarded as obsolete in the near future. We cannot stand still, we must

press forward, for if we do not we go backward. The great agricultural interests of Illinois are watching you. New buildings, better equipments, improved facilities bring new responsibilities. While we have been satisfied in the past with moderate results, or none at all, we now expect great things of you. You must measure up to a new standard and we have faith that you will not be found wanting. If satisfactory results come from money wisely expended there is no doubt but what Illinois will take care of her own. Let it be remembered that there is much truth in the saying from the book of books, "To those that have shall be given and from those who have not shall be taken away." If you succeed much will be added, if you fail, much that you have will be taken away.

Agricultural development in the past twenty-five years has come largely through wise legislation. The establishment by the general government of State Universities and State Experiment Stations throughout the length and breadth of the land and the equipment, by the State, of buildings, apparatus, and means of instruction has done more in the past twenty-five years to bring the science of agriculture to its proper position than is generally known. Ernest men and women, Stock Breeders' Associations, Dairymen's Associations, Board of Agriculture, Horticulture Societies, Farmers' Institutes, Poultry Breeders' Associations, and kindred organizations are in great measure due to appropriations made by the legislature of this and other States. All of these organizations, made strong by state aid, have contributed much in securing proper recognition for agriculture at the hands of the general assembly of this State in the erection and equipment of this grand edifice.

To those in charge of this great work of agriculture education I wish to extend hearty congratulations, your success in the future will depend upon whether you keep close to the people interested—to what they need and require—to those things the knowledge of which will make them better farmers and better citizens—to those things that are practical as well as educational. If you will but carry out in good faith the motto of this great University and link "Learning and Labor" in very truth you will meet our expectations. Dignify labor with learning and make it intelli-

gent and self-respecting and you will bring about a new era in agriculture which will redound to the good of the State and of the people.

Some Inside History and Its Lessons.

BY DR. T. J. BURRILL.

Agricultural education and the direct application of science to the affairs of practical agriculture have come up in our country through great tribulations. A word now at the formal dedication of these magnificent buildings, erected in the interests of agricultural arts and sciences, and for the educational benefit of the people having to do with these developing departments of skill and learning—a word uttered here under the stimulating conditions and with augury of marvelous things to come—a word by way of contrast upon the early struggles connected with and inside of our own University, cannot be without its lessons upon this occasion. It is quite impossible to enter here upon a history of agriculture in the University of Illinois, but attention may be solicited to a few facts in that history.

In the light of the discussions which led to the donation of land scrip by Congress and the founding of the institution by the state any one may clearly read in the wording of the acts by which these measures were accomplished, the intent and purpose to make agriculture and the matters inherently pertaining thereto the leading subjects of instruction and investigation in the new institutions. Mr. Morrill himself whether as representative or senator rarely spoke of anything else. In all his congressional speeches he but once emphasized the importance of mechanics and the need of aid in mechanical pursuits. He did dwell at length upon the necessity of special education for rural people and upon the crying need of better methods in farm management. So the land-grant colleges were most frequently spoken of as agricultural colleges. In Illinois pre-

vious to the passage of the founding act by the state legislature hardly any other name was used, and afterward for some years, the term agricultural college was more commonly heard as applied to this institution, as it then existed, than was the legal title, the Illinois Industrial University, but they thought of it and popularly called it the agricultural college. It is certainly true that a few persons and those who were most influential in determining the name and character of that which they instituted took a wider outlook and a better vision of the development which was sure to ensue. With them the name University was not a misapplication and that which they understood by the modifying term "industrial" was in proper keeping with the best interpretation of the entire movement—a movement which accounts in a considerable part for the splendid achievements of the later years. But when the trustees first met it was not strange that many, no doubt a majority of them, still thought of the charge newly placed under their care as an agricultural college. Here again the influence of a few dominating minds, and among them that of the first regent or president, is to be perceived. The minority, as determined by count, extended the plans for the new organization much beyond those which the majority would have adopted. No one, however, thought of displacing from the head and front of the list the agricultural interests. All were in hearty agreement in giving these chief place in the new institution, to be followed by others as possibilities permitted. In the first scheme of organization fifteen professorships were recommended, and the first one in the list, as it was adopted, is that of practical and theoretical agriculture, followed in order by those of horticulture, analytical and practical mechanics, military tactics, and engineering, civil engineering, etc. In this the professorship of ancient languages takes the thirteenth place and that of mental and moral philosophy the fifteenth place. When appointment came to be considered it was natural, under the circumstances just mentioned, that some one should be first looked for to fill the professorship of agriculture. That this appointment, together with that of horticulture, were not made before others, was not the fault of those upon whom devolved the responsi-

bility of securing a faculty. Three men for other departments were elected, before a selection was made for the place constantly first in consideration and deemed by all to be first in importance. A search for a man proved futile. It was currently said at the time that there was but one professor of agriculture, and that there was no other man fit for such professorship in America. However, something must be done. All felt that action of some kind should not be delayed, and on the very day of the inaugural exercises when the doors of the institution were first officially thrown open, Willard F. Bliss, of Nokomis, Illinois, was elected professor of agriculture. At the time he was the owner and manager of a large farm near the town just named; he was a graduate of Yale college, as that famous American center of learning was then entitled. He had traveled abroad, and had pretty well in command the Latin, Greek, and French languages. There were at the time in the country some men famed for attainments in science but not one of these had been trained in his specialty in an educational institution, though certain of their number had gained a start through the meager instruction then afforded at the principle seats of higher education in this country and abroad. Darwin's Origin of Species had been published almost a decade before the time now spoken of, but outside of theology and the realm of theoretical science little attention had been paid to the doctrines therein advanced. It certainly would not have been considered a matter to his credit if a candidate for the professorship in agriculture was known to have accepted these doctrines as a basis for his investigations and for his instruction. Indeed almost the only science thought to be of real worth to a man in the position named was chemistry. So his Latin and Greek and French languages and to his practical acquaintances with rural affairs the world of knowledge designated chemistry would have been considered a valuable addition. Barin von Liebig was at the splendid pinnacle of his well earned fame and the renown of his epoch-making researches was as great in America as in Europe. Had Mr. Bliss or any one else proposed to qualify himself for teaching scientific agriculture he no doubt would have endeavored to gain first a sitting at the feet of this highly revered

master, thought we now know he would have learned facts which were not facts, and would have had subsequently to unlearn a not inconsiderable amount of the coveted information so gained.

Professor Bliss took up the task assigned him with much hesitation. He knew the situation well enough to appreciate the difficulties in the way. He was by no means one of those who dared to tread where angels feared to go. Actual contact with the matters involved did not decrease the recognition of obstacles. The affairs of his own farm did not prosper in his absence, and at the end of his first year he considered it necessary to return to the less exacting if humbler duties at his own home, whence he has not since been tempted a way.

On November 27, 1867, Jonathan Priam was appointed head farmer, the first regular employe in the earliest instituted office of the University. He served in this capacity until March, 1869. During this time there arose some discussion as to the scope of his duties, resulting in adding to his title that of superintendent of practical agriculture, and he was told to report directly to the committee on agriculture of the Board. But his did not prove to be a path of roses, and he resigned after a service of one year and four months. Even in farm management there was too little unanimity of ideas to make life agreeable to one under employment, with several persons esteeming themselves higher in authority but differing with each other in views.

In June 1870, durnig the day upon which the resignation of Professor Bliss was accepted, the appointment of Dr. Manly Miles was made as professor of agriculture with the understanding that he should serve during the fall and winter months, thus dividing equally his time between the Michigan Agricultural College and this institution. No one else in America at this time enjoyed anything comparable with Dr. Miles in the public estimation of competency to give instruction in scientific agriculture. He it was said had been called the only professor of the subject in the country. The trustees and others considered themselves in great good fortune when it seemed he was to lead the way out of the dilemna in which they found themselves placed. But it was not to be. Arrange-

ments failed at the Michigan end of the line, and it was not until five years subsequently that he finally resigned at Lansing to accept here the double duty of professor of agriculture and of agricultural chemistry. The latter part of the title was added in good part because he was to draw two salaries compared with those usually paid. This time he entered upon service here with anticipations, at least on the part of others, of great accomplishments. The perplexing, disappointing, discouraging, and disagreeing condition of things in connection with the department and its work was to come to an end, and there was a justifiable basis for great hope of the future.

No other action by the authorities could have been taken which seemed so full of promise, so big in anticipated results. Alas! The transplantation did not succeed. Perhaps the roots were down too deep to permit the severance; perhaps the new soil was ill-suited to development of this second foothold. There was no lack in vigor, however. New growth was apparent enough in many ways, yet all ceased at the end of one year. This latter was largely due to radical differences of opinion as to what should constitute the curriculum of study in the University generally as well as to what should be attempted in the agricultural department itself. There was in a word too little knowledge and too much fanciful theorizing for any substantial unity of purpose or agreement in procedure. The storm ended by the professor's withdrawal.

When in 1870 or 1871 it came to be understood that Dr. Miles could not accept his first engagement strenuous efforts were made to fill the place. All this came to nothing. There was really no one to appoint, with any confidence in the outcome. Then it was said we must make a professor. Fortunately instructors in the biological and physical sciences gained rapidly in the new state institution. Laboratories were equipped as never before in our land. Laboratory methods soon largely supplemented or supplanted the lecture system of instruction in science. Students began to deal with things rather than with printed or spoken words. The change in educational procedure amounted to almost a revolution due not alone to the founding of the land grant colleges, but carried forward by

them with unequaled spirit and energy. The making of an agricultural professor was nearer possible than ever it had been before. The first class graduated from the Illinois Industrial University in 1872. One of the brightest of its members was made an assistant in the chemical laboratory and during his first year of service was selected in effect for the agricultural position. He went to Europe for a year's study shaped entirely towards his anticipated duty, and in 1874 was made instructor in agricultural chemistry. Perhaps personal reasons in this case more than in any other caused the termination of the engagement after the apparently established period of one year. It was at the close of this service that Dr. Miles entered upon his work. In the meantime the affairs of practical agriculture, as the phrase was, had been entrusted to the head farmer and to one or another employed as temporary directors of field experiments. The Regent and the various members of the faculty gave assistance, such as it was, in class instruction.

In 1876 George E. Morrow, then professor of agriculture in the Iowa Agricultural college, was elected to the chair in this institution, and in one respect, but by no means in all related things, the fateful troubles were ended. He retained his office during eighteen consecutive years, and was dean of the college from the time of its organization in 1878. So far as this early history reaches and with all it includes, there is no other name so important for what it recalls, so illustrious for what it denotes. In his memory the hall in which we meet is appropriately, and, let us trust, significantly named. Today as we triumphantly dedicate these buildings, we bring also our loving tributes and our laden testimonials to the service rendered memory of this service-giving man. He was singularly gifted in many ways, and these included qualifications needful in the arduous and difficult work which he undertook to perform. He harmonized opinions, co-ordinated interest, gained the confidence and good will of those in authority and of others with whom he worked. Himself an editor in his earlier career, he secured a favorable attitude on the part of the agricultural press. He was unequaled at the time as a lecturer at home and abroad upon agricultural themes, and his devotion to his sub-

ject was limitless in time and boundless in endeavor. He, too, however, had his professional troubles. He often went from his office at the close of the day with a heavy heart. His tired brain too frequently suggested: What is the use? Why prolong the contest? But the next morning he took up again his tasks with spirit and with continuous hope of ultimate success. There were encouragements as well as discouragements, but we are not attempting a complete story. At the close of his long career he could not say that in the actual and plainly observable condition of things his expectations had been justified or his favorable predictions fulfilled.

Turning now for a moment to horticulture in this rapid review similar statements might in part be made. After two years of inquiry the second professorship in the original list had not been filled. Here again no one in our entire country was really qualified for the proposed duties. In the emergency the Trustees turned to a young assistant professor of natural history in charge of a department so named, and which had been organized during the first year, and in March, 1870, he was made professor of botany and horticulture. That he continued in service was due, without doubt, to the connections with the first subject in the title. The horticultural duties were added. After the class room exercises were over for the day, drains could be located, ground laid out, trees planted, fruits gathered, plant disease studied, etc. It is almost certain no man could have long sustained himself in these practical affairs taken by themselves. The story would have been that already told.

Such in brief and in a rather one-sided account is the early history of agriculture in this institution in which the subject and the workers now have so prominent a part. Let us see if we can find the causes for this low and dearly-bought development.

In the first place we must understand that the history here is in no wise peculiar, neither can failure be attributed to any want of earnestness or purpose of honesty of mind on the part of authorities. What was true here was essentially the case elsewhere. As we have seen great things were anticipated; agriculture and agricultural people were to be

vastly and at once benefited by the new institution. Nothing else was to take precedence under any consideration. This first, other things secondary. The disappointment was attributable to causes such as the following:

1. Too much was expected. Too great things were to be accomplished. The public mind has been aroused to a condition of great expectancy without having concerned itself with the means of accomplishment or even without any well-founded reasons upon which the affects should follow. The inevitable result was disappointment and a disposition to blame somebody for it.

2. The ends sought were vaguely perceived. Everybody thought he knew what was needed to be done and perhaps how to do it, but the thinking was superficial; it was theoretical in the main and took color from the circumstances and characteristics of the individual. There was therefore clash of opinion with no standard of comparison or valuation.

3. Science had not been adjusted to the elucidation of the complex problems involved. The complexity and difficulty of these problems were rarely recognized. It had been proclaimed and believed that a chemical analysis of soil would infallibly indicate what crops would succeed thereon, or what definite substance or substances must be added to make certain crops a certain success. Almost no attention has been given the biological factors. As is the case with all those partially informed the men of science were over-confident. Their emphatic statements did not find support in practice, and science itself was discredited. The idea that a professor could teach agriculture was often held to be ridiculous, and there was some basis for this holding. In a word science and practice were too far apart and each esteemed the other too little.

4. There was woeful want of understanding in regard to what one man could and could not do. For a score of years only one department was thought of either by trustees or by professors. Each institution had filled its complement of officers with one professor of agriculture. He and his superiors thought it was his duty to develop and teach the whole

subject, or rather all the subject, suggested by the name. Superficially prevailed, but no one recognized it. We see it now well enough, but through advantages not then enjoyed. We will do well if with all our helps the agricultural departments are not too open still to this criticism.

5. No one began to realize the unavoidable cost of agricultural education given in anything like a truly sensible way. A lecture room with a desk, some chairs or settees (not very many), a few charts and pictures hung upon the walls—these constituted a professor's equipment aside from the things to be found in the barn or in the fields. Is it a wonder that students were few and that enthusiasm was at a low ebb? Chemical and physical laboratories were known to need large and varied supplies of apparatus and material, but that equivalent facilities should be furnished the teacher of agriculture no one, not even the latter, surmised.

6. Without further enumeration it may be said that the agricultural education of the first quarter of a century in our land grant colleges was poor and halting because it was before its time. The inertia of the ages was upon it. There was no self generation of power. A second birth was needed here as elsewhere, a birth of the spirit and of the understanding.

Let us be thankful for the tribulations of the past. Let us square ourselves to the new conditions, and by the new interpretations of requirements and of possibilities. Let us give due credit to those who, working in the dark and under restraints and limitations, made possible the dawning light we enjoy and straightened the path in which our feet may tread.

The Opportunity in Agriculture.

THOMAS F. HUNT, DEAN OF THE COLLEGE OF AGRICULTURE
AND DOMESTIC SCIENCE, OHIO STATE UNIVERSITY.

The history of education for, in, and by agriculture is always a fascinating subject and it is difficult to resist its recital. Its history is no part

of the theme for this afternoon, however, and, moreover, it has frequently been set forth at length by far more potent pens. If this address contains aught of history, it will be because of its bearing upon the present and the future.

The discussion of this subject forty or fifty years ago make it perfectly clear that the early agitators were concerned in education for agriculture rather than in agriculture or by agriculture. They were concerned in the education of all the industrial classes along lines which would make them the most effective "in the several pursuits and occupations of life," because they believed that the welfare of the State depended upon the education of the masses. This is, indeed, the only warrent for the taxation of the people for the personal benefit of the individual. We vote bread and meat only to the physically, mentally, or morally incompetent. We vote a free education in order to give every one a reasonable opportunity to earn his bread and meat, because the welfare of the State demands it. This proposition is too well understood to need more than the merest statement. The magnificent series of buildings which we are called upon to dedicate today, the most extensive in the world for the purposes for which they are intended, is evidence sufficient, if evidence were needed, that this proposition has lost not of its force in the nearly thirty-nine years that have elapsed since the congress of the United States, amid the most terrific civil conflict, passed the epoch making bill which prepared the way for the arts of peace. I wish here to congratulate my alma mater and all its officers who have promoted this undertaking, upon their splendid achievement and to thank the people of the great Empire State of Illinois who have so generously voted money, not only in their own interests, but in the interest of mankind for all time to come.

The farmer's need of education is a theme which I delight to discuss. It is the proposition that if man is going to be a farmer he of all men should have a thorough school training. The operations of the banker, the merchant, the manufacturer, the lawyer, the public speaker even, teach them much that they need to know to be successful. They

are taught to do by the doing. What does the spreading of manure teach a man concerning the chemis try of fertilizers? What does the planting and reaping of corn teach a man concerning the laws of plant-growth? The ordinary operations fo the farm do not teach the farmer the most important facts concerning his business. In order to get that information most necessary to his highest success the knowledge obtained from farming must be supplemented from some other source. The more you look at this question, the more avenues from which you approach it, the stronger it will appeal to you. The proposition was defended from this platform nearly seventeen years ago when the last act in securing a first degree from these profes—. No, I forget. It was not these professors. It was only seventeen years ago—only a few years ago, surely—but what changes! Since then many a platform has been occupied with moderate composure but here it is but a beardless boy, standinw with sinking heart before his fellow students, and as he walks out and makes his bow to President Peabody he casts a hurried glance down the row with that feeling of student reverence for his professors that should he live till he was three score and ten he could not out-live. But I have been dreaming. Let me look again. Morrow, Snyder, Crawford, Prentice, McMurtrie, Roos, Pickard, who said, "Miss Pierce, can you pierce that?" "No," flashed instantly the reply, "but I can pick hard at it." These are no longer present. Some have already gone to a deserved rest. But have they all gone? Let me look again. No, a few remain. Dear men and true—men who have seen this great University grow from a tiny seedling into a sturdy and ever expanding oak—still hold honored positions and influence in the faculty and affectionate places in the hearts of the alumni. Great, indeed, have been the changes in seventeen years. Then there were less than four hundred students; now more than two thousand five hundred. Then the faculty consisted of twenty-eight persons; now the instructional force consists of two hundred and fifty-eight persons. Then there were buildings devoted to instructional purposes worth with equipment less than \$350,000; now they are valued at one and one-third million dollars. The total annual

income from all sources was then less than \$100,000; now it is nearly half a million dollars, the climax being capped by the largest appropriation ever made by the legislature at one time for an educational institution.

I beg your pardon, ladies and gentlemen, for having allowed my personal feelings towards the old student home to lead me thus from the subject. The farmer's need of education is not, however, to be the theme this afternoon.

A passing thought cannot be resisted concerning that ancient argument in favor of the farm, viz., that the farm has been the source of presidents, statesmen, diplomats, eminent lawyers, doctors, ministers, ad infinitum ad nauseum. The logic of this is that the farm is a good place to be born if you only get away soon enough. This argument says in effect that the farm is a valuable breeding ground to furnish strong, healthy, vigorous stock for the nation, the most able and most intellectual of which are to be selected to supply the professions and manage the business interests of our cities, while the rest may go to the devil or become farmers. Apparently, in the minds of many, the two destinies are identical. I have no quarrel with this argument when it is stated frankly, but I submit it is not calculated to convince a young man that agriculture offers him an opportunity for a worthy career.

The thesis of this address is, does agriculture (using the term in its broadest and proper sense) offer an opportunity worthy of an able, intellectual, ambitious young man. Can there be found there in a career worthy of an educated, broad minded man?

Last year a young man graduated from the course in Agriculture. He happened to be unusually young. He was but twenty. Almost immediately upon graduation he was appointed to a cadetship at West Point through the courtesy of Senators Hanna and Foraker. He was an able, intellectual, cultured student of excellent spirit, manner, and address. He has had, as I believe, a thorough, sound education. He was such a young man as any home or college might be proud to send into the world. As it happened, he had during his college course been very much

interested in the military drill, having occupied about every position in the battalion from private to adjutant, and had, in the absence of the commandant, during the Spanish-American war, had charge of the battalion and taught military tactics. Suddenly, he had two careers open to him. If he chose the one, the government would see to it that he suffered no real pecuniary need throughout his life time. His abilities are such as reasonably to assure promotion. He might even hope to occupy a position in the army second only to the President of the United States. If he chose the other career, and at that moment there was no immediate opportunity open to him, he must seek a career where there was ever present the ever unpleasant duty of providing bread and meat. He was up against (this is not slang) one of the great problems of life. He, of course, sought advice, but I believe he decided finally for himself. He does not lack in bravery and I do not believe he had any special sentiment concerning the agricultural life. He had chose the art of peace. Did he choose wisely? It may be of some significance to note here that he subsequently entered the government service, but it was in the Department of Agriculture and not in the Department of War.

This then, shall be the theme for a brief time this afternoon—Does the opportunity in Agriculture furnish a worthy career. I shall discuss it in two aspects, viz., the character of the education, which a course in agriculture offers, and the opportunity for one so educated. Nor is the subject to be treated from the agreeableness of the occupation. The beauty of sitting under your own vine and fig tree shall not enter into this discussion. No one will claim that the occupation of the President of the United States is a particularly pleasant one, but every man is ready to admit, if not by word at least by deed, that the position is worthy of the ambition of any American born citizen. Whether a man likes to wade around in the mud in the pure air rather than to walk on a carpet in the foul atmosphere (both literally and figuratively) of a criminal court room, is largely a matter of personal preference. It is a case of head vs. feet. I, each year, become more gratified that I did not choose the profession of law, because of personal dislike for

many of the circumstances surrounding a law practice, but that is not sufficient reason for others to avoid it and every one must recognize that the practice of law offers to an ambitious, educated, high minded young man an opportunity for a worthy career.

When these institutions first offered themselves to the public as agricultural colleges, a few men in their faculties did a little teaching for agriculture, still less teaching in agriculture, and generally no teaching at all by agriculture. This is not strange. The few noble spirits, who kept alive the fires that burned so feebly during the first twenty-six years and who essayed to teach the application of the sciences to agriculture, had not had, except in rare instances, any training in the sciences which they sought to apply, and, except in rare instances again did the men who taught the sciences preceive their relation to agriculture and some times cared less.

Some exceptions, however, are worthy of note. The first experiment stations, established through the zeal and self sacrifice of a small group of men, were the means of instructing and inspiring a few young men, who have become the leaders of scientific thought as it relates to agriculture. These men may not have all been thoroughly practical men, but they were deeply trained in the sciences relating to agriculture. On the other hand, there were few of our colleges that had the good fortune to secure as their so-called professor of agriculture, men of unusual vigor of mind, enthusiasm for the cause, and withal a wide knowledge of agriculture. In these institutions a few young men have been trained, which, meeting with their more scientifically but less practically trained brethren, have together helped to control the destiny of this cause during the past twenty years.

It was not, however, until ten years ago, which happens to be coincidental with the passage of the second Morrill Act, that the teachers of what may be called technical agriculture were at all generally men who had been trained in the sciences underlying agriculture. These men, be it observed, had received their training in technical agriculture from the men who had, themselves, for the most part, had no scientific

training. What I would like to have the thoughtful young man see at this point, is that most of the men who have been trained in agriculture by those who have themselves had a college training in agriculture have not been out of college more than five or six years and are, for the most part, less than thirty years of age. Boards of trustees are remorseless and, per haps, properly so and men of my training will soon be no longer needed.

It is fully recognized that the professorial field in agriculture is a distinctly limited one and it would indeed, be a sad commentary upon the cause if it was the only worthy field in agriculture open to a young man. But this much may be said that in the past ten years, while I have been expecting to see this theoretically limited field supplied, the opportunities have constantly increased in number and improved in character. An illustration from a single state university having eighteen courses of study which lead to a degree may be permitted. Twenty of its graduates during the last ten years are now in college positions other than alma mater. Seven of these are from the course in Agriculture. There has not been a year in the past five years that thoroughly trained and thoroughly able agriculturists have not been in demand for positions requiring the highest capabilities.

Teachers are the first necessity of a school of any kind, but only second to the necessity of teachers is the necessity for something to teach. The sciences have made great strides since 1870, especially the biological sciences. Chemistry had, indeed, a thoroughly established standing and the professor of natural science did the rest. However, mathematics and physics are not mechanics or engineering; physiology is not medicine, and chemistry is not agriculture, however fundamental these may be to the callings in question.

What did we know about dairying in 1870 that we now teach? Principally that cows would produce milk in the summer time if the pastures were good; that if we stirred some mysterious thing that came on the top of it, called cream, it would turn into butter; or if we added the juices of a calf's stomach to the milk, it would turn into cheese—all of

which had been known for four thousand years. Dairying is now a specialized industry requiring a special education and training to succeed in it. Among men of business judgment none others need apply.

In an article on "Harvest Implements" in Morton's Cyclopedia of Agriculture, published in 1871, the writer states that "Notwithstanding all the ingenuity, however, that has hitherto been applied to this subject, reaping has been and no doubt for many years, as we have said, will continue to be a manual operation." The writer then proceeds to describe the various forms of sickles with which it is proper to cut grain. This article was not written by an ignoramus. Morton's Cyclopedia of Agriculture was as standard in the field of agriculture as the Century Dictionary is in the field of letters. It is true that America had known something of the reaping machines for fifteen years, but the self binder was a figment of the dreams of a few inventors. What this means may, perhaps, be best emphasized by the startling but nevertheless true statement that if the small grains of the crop of 1901 in the United States had to be reaped by the method so gravely described by our English authority, it would take the combined efforts of every man of military age in the United States three weeks to accomplish the task. This has an important bearing upon what is to follow. Here emphasis is laid upon the fact that rural engineering is a different problem from what it was thirty years ago. Take an illustration from the field of animal industry that is just now for special reasons a very attractive line of work. In 1870 there were common in the United States one recognized breed of horses, three breeds of cattle, two or three breeds of swine, and, perhaps five breeds of sheep. Some other breeds of livestock had been introduced but they were practically unknown. At present we have at least eleven recognized breeds of horses, not including ponies, seventeen breeds of cattle, eleven breeds of swine, and fourteen breeds of sheep, with all of which a man must be more or less familiar before he can lay any claim to be an expert in the field of animal industry.

In the field of applied sciences, the changes have been no less profound. When the men who are now teaching the science of agriculture

were in college, it was taught as a demonstrated scientific truth that mankind, in no very distant future, must disappear from the face of the globe for lack of nitrogen in the soil. We know better now. So completely has this better knowledge been accepted and acted upon in agricultural operations that we have almost forgotten that we ever thought differently.

The year the speaker entered college Professor Burrill discovered the cause of pear blight. Pear blight still continues on its way, but how immensely has the horizon of our knowledge concerning plant and animal diseases widened. Not only has agricultural and horticultural operations been greatly modified but the practice of humane veterinary medicine have been revolutionized, and with it all, the mind of the human race seems to have expanded; reason has taken the place of superstition.

The establishment in 1888 of experimental stations in each of the states has furnished a fountain from which is flowing knowledge recognized to be of the highest importance to agriculture. Knowledge which now has some semblance at least of scientific accuracy. Knowledge which is as accurate as can be expected when we consider the great difficulty of the subject. The effect of this progress of which but a hint has been given is that little that is taught today of technical agriculture was taught fifteen years ago.

It is necessary to remember that the old type of classical college required only a building of moderate dimensions, and a department therein for equipment, a desk, a few chairs, a pointer, some chalk, and a number of erasers. Thirty years ago the necessity of equipment for the teaching of the pure science was but little recognized. The necessity for a fairly equipped chemical laboratory was indeed understood. A herbarium for the botanist, a few snakes and other specimens in alcohol for the zoologist, a number of cork lined boxes for the entomologist, a small collection of minerals and stones for the geologist, a manikin and a few bones for the physiologist was about all that was thought necessary. When it came to the department of agriculture, a few sam-

ples of grain, mostly worm eaten, a collection of patent office models, mostly of machines, which had never been used because of their visionary character, a few framed prints portraying animals of impossible conformation or in impossible attitudes, and a so-called model farm was considered the sine que non for an equipment. A properly equipped farm is, indeed, a desirable adjunct to an ideal equipped college of agriculture, but other things were more essential. A farm, however, to serve the highest purpose of instruction to say nothing of experimentation cannot be made a model for a farmer to follow any more than a university machine shop can be made a model for a shoe factory.

Just as the teaching of sciences has been found more expensive than the teaching of classics, so the teaching of the applied sciences has been found more expensive than the teaching of abstract science.

And of all the applied sciences the teaching of agriculture has been found to be vastly the most expensive, and it must, in the nature of the case, continue so. It is only during the past decade that the movement for the proper equipment of the colleges of agriculture has taken tangible form. The great State of Illinois has felt this movement and has bravely come to the front with the structures we are dedicating today, and with the equipment so soon promised will be second to none in the union.

It may not be out of place here to inquire why agriculture has been slow in coming to its own. It is because of the difficulty of the problems involved. The political economist has long ago divided people engaged in gainful occupations into four or five classes. Leaving aside the work of the serving class, the work of the world is divided into three classes, viz., changes in substance or natural products from which results agriculture and mining; changes of form, from which results manufacturing; and change of place, from which results trading and commerce. Did it ever occur to you that of all these great classes agriculture alone deals with living things. Why has the cause of pear blight and the metabolism of nitrogen in the clover plant been so long hidden from the human understanding? It was first necessary to invent a high power microscope.

Like the water that flows to the sea, civilization has proceeded along lines of least resistance. The science of agriculture, dealing as it does with living things, has because of the difficulty of understanding the processes of life, lagged behind those occupations depending for their development upon a knowledge of the physical sciences. The science of agriculture will not reach its highest development until the problem of life has been solved. No man dare prophesy the heights which it may yet attain.

The study of agriculture, therefore presents problems worthy of the most gifted and highly educated young man. A four-years' course in agriculture, or in any of its specialized branches, to day gives a man not only a training for agriculture, but in and by agriculture. It gives him a professional training as to fit him as a bread winner of the highest type. When he has finished he is fitted to do something somebody wants done. He has not only received a theoretical knowledge of the laws of nature, but such practical knowledge of their application that he can successfully use them on the farm, in the dairy, in the orchard, or in the garden. Not only are the hand and eye trained, but through the hand and the eye the mind is trained. In other words, the course in agriculture offers a sound education. Its graduates are not only educated farmers but educated men.

I am not ready to assert that the mental drill received from instruction in technical agriculture, as at present taught, is equal to that received by the study of Greek, Latin, or Calculus. It is freely recognized that the colleges of agriculture have large opportunities in this regard. The men who are teaching these subjects have had literally to dig their subject out of the ground and have, in some cases, been so absorbed in acquiring knowledge that they have neglected the pedagogic methods of imparting it. But I am ready to assert that the young men who are now being graduated from the courses in agriculture are, let the reasons be what they may, the peers of the graduates of any of the courses of our land grant colleges and their subsequent work is showing them to be such.

I am conscious that I have used a great deal of time in order to say to the young man that if you want a sound education, if you want an education that will fit you for a useful life, if you want an education worthy of the mental capacity of an Edison or a Pasteur, you can find it in the course in agriculture. If it will not serve your purpose in after life, do not take it. There are plenty of other courses that will give you as good a training. The variety of courses in the State Universities is such as to suit the most fastidious. But if you are interested in the problems underlying agriculture, if your artistic instinct leads you to prefer producing living pulsating models of plants and animals, instead of reproducing their counterfeit on canvas, if your scientific bent is toward organic rather than metallurgic chemistry, for botany rather than physics, if your business ability lies in trading in stock rather than in trading in stocks, if your love for excitement is better satisfied in the show ring than in the court room, you need not avoid a course in agriculture, because it lacks a training worthy of the highest mind. The dean of your general faculty years ago said that the digestive juices of education is interest. The fact that almost without exception those who have studied agriculture have been interested, not to say enthusiastic, has, in no small measure, added to their success.

But granting all this, after the education is acquired, will it produce bread and meat, and if so, is it sordid? Does it present an opportunity for a career, or will the possessors remain hewers of wood and drawers of water?

This is just as good a place as any to behold once more that hydra-headed monster, which asserts that agriculturtal colleges educate boys away from the farm. I happen to have the statistics concerning the alumni of a college of agriculture and of its ex-students since 1892. These statistics concern 399 young men who have spent more or less time in studying agriculture. The occupation of sixty is unknown. One hundred and seventy-four are farmers, gradeners, and dairymen, forty-eight are creamery operators, butter and cheese makers, eight are farm superintendents or employes, twenty-eight are employes of col-

leges or stations or of United States Department of Agriculture, three are editors of agricultural newspapers, and nineteen are students in other colleges. The total number in all other occupations is fifty-nine. Of 320 men who have settled occupation, 261 or 82 per cent are engaged in agricultural pursuits. I am repeating no set phrase, when I say that those who have become farmers are not only generally succeeding from a pecuniary standpoint but they are becoming leaders in the intellectual, social and political life of their respective communities. While a course in agriculture is not to be recommended as a means of political prosperity, yet it is probably quite within the truth to say that there is no surer road to political leadership even than success upon the farm by capable, broad-minded, well educated men. Three of the farmers in the last Illinois legislature were trained in agriculture at the University of Illinois and their alma mater has had no reason to be ashamed of them.

Particularly is success coming to those who have completed a four-year course. Many young men have taken a one or two-year course in agriculture and in some institutions a winter term course, and they have gone to farming and have had a fair measure of success, depending much, of course, upon their previous training. Many earnest and successful men have been trained in this way. There is, however, no greater error than to believe that if a man is going to farm a one or two-year course is sufficient, while if he is going to be a teacher or an experimenter he must have a thorough undergraduate and post-graduate training. Farming, in its several branches, is no exception to the rule that the greater the ability, the greater the success. Neither is there any question that many lines of farming now offer opportunities for the talented. The fact is that a training cannot be too severe for the man who intends to farm. No man needs a rigid training more; in no occupation may such training be made to count for more. A young man to be perfectly sure of success upon the farm should take a thorough undergraduate study, a year's post-graduate work, and then he should spend about three years as superintendent of a farm for some one else, or as a professor of agriculture in some land grant college. He then becomes

a trained agriculturist, worth a respectable compensation whether in business for himself or on a salary for others. What engineer, what lawyer, what doctor, or what professor of literature or art considers himself able to win success in his calling without an equal training. I tell you, ladies and gentlemen, that if the farms of the United States do not furnish worthy opportunities for men thus trained, the cause of agricultural education is well nigh hopeless. I am equally convinced that the farms of the United States do furnish such opportunities. By no means all the five million farms of the United States, but a large enough per cent of them to furnish opportunity for all the graduates that the colleges are likely to send out in the next twenty-five years.

Men of capital and business judgment are beginning to appreciate that the farms of this nation are distinctly limited and their money is being rapidly invested therein. Already those who have to do with such things are finding that there is a demand for persons to make the capital thus invested productive.

It is by no means asserted that a man must be college bred to be a man of ability or a superiorly trained agriculturist. Such a claim would be both untrue and foolish. It is claimed, however, that a college training is more necessary to a thorough knowledge of his business than to a merchant, a banker, or a manufacturer. It is asserted, moreover, that a college training is a short road to success. If you are in Chicago and want to get to New York, you may take a train or you may walk. Under present economic and social conditions, you had better take the modern method even if you have to borrow the money. As a final word on this phase of the subject, let me say if you cannot afford to prepare yourself to be a farmer, do not farm. Enter some other business where the business itself will teach you success. Far better be a corner grocer or a street car conductor.

As already suggested, numerous opportunities are now open to trained agriculturists aside from the business of farming. Of the 320 young men mentioned a moment ago, thirty-six have graduated from the four-year courses of the College of Agriculture during the past six

years. Seventeen are on salaries within their proper professional field. The average length of time that they have been out of college is about two and one-half years and their average compensation will be this year one thousand dollars. The illustrations given are from a single institution and the particular examples are used because the information is at hand.

The United States Department of Agriculture at Washington is also a good illustration of opportunities open to graduates of agricultural colleges, both in the way of positions and further training—the latter quite as important as the former. Within the present fiscal year twenty-two college graduates have been appointed in a single division of this department at salaries ranging from \$480 to \$1200.

As indicative of the rapidity of promotion, it is stated that ten recent graduates who entered the department last year and this year at \$480 per annum are, soon, to be advanced to \$1000, while within the year an equal number of similar promotions will follow. Another division, it is authoritatively stated, will need the coming year fifteen to twenty young men, preferably graduates of agricultural colleges. The Department of Agriculture at Washington is rapidly becoming a great post-graduate school of agriculture with scholarships and opportunities for rapid promotion. The department has just sent graduates of agricultural colleges thus trained to Hawaii and Porto Rico to take charge of experiment stations there at a salary of \$3000 each, one of whom, Frank D. Gardner, was of the class of 1891 of the University of Illinois. After all, however, past and even present opportunities are important only as they indicate the future. The important question to a young man choosing a career is not so much what is the present opportunity, but what are the future prospects. Not how well will he begin his career, but how well will he end it. The average expectancy of a man who has reached the age of twenty-one is forty-one and one-half years. The question in preparing for the work of life is not alone, therefore, what is the opportunity today or what will it be four years hence when the young man has completed a course in college, but what is it going to be during the next forty years.

For 250 years we have called ourselves an agricultural people. While it is certainly true that we have been and still are, though in less degree, an agricultural people, our chief problems have not been those of the agriculturalist. They have been chiefly the problems of the engineer. We have, it is true, made some real progress in the science of living things. Our animal and vegetable forms have been improved and thereby has the vigor and healthfulness of the human race been increased. I would, in no way, minimize the importance of this improvement, but after all, it has never become a serious question. Much of this improvement has been unconscious and much of it has been done by people who found pleasure in doing it. The large problems that have required serious thought have been the mechanical means of subduing nature, of planting, harvesting, manufacturing, and marketing the crop. At no time in its history scarcely has the nation suffered for food, clothing, and shelter. At no time has these things been more abundant than in the past generation. Nature has been so prodigal that the surplus to the producer has been enormous, provided only that the mechanical means could be obtained to handle her bounty. Harvesting machinery, including the cotton gin, and steam transportation have not only unlocked nature's wealth, but so cheapened the cost of production as to allow a large part of the population to busy itself with other matters of the highest importance to the present and future welfare of the race. Only during the present generation have we known two of the greatest of these agencies, viz., the self binder and transcontinental railways. The result has been that we of the present generation have enjoyed comforts and luxuries beyond the fondest dreams of former generations. At no time has our prosperity been greater apparently than at the present moment. However ungracious it may seem to say it, it is to be feared that we have been so busy talking about our prosperity that we may not have noticed the slight quiver that proceeds an earthquake.

It has recently been my privilege to discuss at some length the outlook for agriculture in this country and were there time such an array of facts and figures could be presented as to be, I believe, both con-

vincing and impressive. Two hundred and fifty years ago the Puritans started in to subdue a continent. "By 1800, the United States no where touched the Gulf of Mexico and nowhere crossed the Mississippi," much less had our agriculture and our civilization reached these limits. By 1850 we had acquired our present continental territorial limits, Alaska excepted, but the great west and northwest was agriculturally yet an undiscovered country.

In 1875 central Iowa, at present one of the finest agricultural areas in the world, was a wilderness. Since that time we have swept the continent with our agricultural operations. We have rolled up against the Pacific coast with such force that the shock has sent us thousands of miles across the sea.

The elements that have entered into the problem have been a great, fertile, treeless, and easily subdued plain, in a climate admirably adapted to cereal production, one of which, maize, produces twice the food per acre of any cereal known to the civilized nations before the discovery of America; improved machinery, including the steel plow, the mower, the self-binder, and the thresher; transcontinental steam transportation, and a people of high intelligence and great energy.

Do all the elements in the problem still exist? Let us look a moment. The animals upon the farms and ranches of the United States increased with such rapidity between 1785 and 1892 that in the latter year we had not only the largest number of animals but much the largest number in proportion to population we have had in forty years.

Now look at the other side of the shield. Since that time the animals upon the farms and ranches of the United States have decreased with such almost lightning rapidity that in 1900 eight years later, we had not only less, but much less live stock in proportion to population than we have had at any time in forty years.

The increase in acreage of cultivated crops between 1870 and 1890 was likewise greater than the increase in population. The increase in acreage of cultivated crops in the past thirty years is greater than was the total acreage in 1870. In other words, we have subdued more of na-

ture to the uses of man since 1870 than we have been able to do in the two centuries of our history hitherto. In the last thirty years we have doubled our population and we have more than doubled the area of our cultivated crops.

Shall we be producing two blades of grass in the place of one that grows today when the population has again doubled? Or will our inability to produce the two blades prevent population from doubling?

It is not here asserted that the two blades of grass will be produced. I believe however, it is possible to do so, but if it is to be done, it must be done in a vastly different way than it has been done in the past thirty years. The problem will be vastly different. The problems will be solved by those who have studied organic chemistry and the sciences relating to life rather than by those who have studied mathematics and the laws of physics. In short the problems of the future will be the problems of the agriculturist rather than, as in the past, the problems of the engineer. The great engineering professions need no defense from me and I will certainly not be misunderstood by this comparison as minimizing their importance or that of any other form of useful knowledge to the welfare of future generations.

Is there any immediate evidence that the cultivated area may fail to keep up with the increasing population. The evidence is found in the statistics of the Department of Agriculture at Washington. The cultivated area has not actually decreased as has the number of farm animals but the area has decreased in proportion to population, about 10 per cent since 1890, and is now less in proportion to population than it has been at any time in twenty years.

But how this be? Regard for a moment our unparalleled prosperity. If this is the effect of a decrease in acreage, by all means let us have some more decrease. The reply is simply that the seasons have been propitious. Not since the last half of the decade of the seventies has this country had such yields per acre as during the years 1895-99. In no other five years since has the farmer received such large returns in crops for labor expended. A single illustration will indicate what this really

means. The average yield of corn per acre for the five years, 1895-99 inclusive, was 3.2 bushels more than the five years just preceding that period. This is an increase of 14 per cent. This means an annual increase of two hundred and fifty million bushels of corn from the same acreage. If used in place of wheat more than half enough to bread the nation. All the golden metal mined in the same period in the United States would not begin to buy today merely the increase in this golden grain—the gift of prodigal nature.

It would be indeed pleasing in this connection to relate that this increase in yield has resulted from the investigations of our experiment stations and the teachings of our agricultural colleges. To make such a statement would be to make the wish father of the thought. Doubtless such agencies may have modified slightly and when the teachings of the stations are put into general practice, will largely affect the result, but as surely as the rains fall and the frosts come we may expect a series of unpropitious seasons. Some fine morning we will wake up to find the scare heads of our "No breakfast is complete without it," newspaper, have been changed and that accounts of wars and industrial combinations have been relegated to the second page.

It is well known to scientists that the existence of all animal life and hence of the human race upon the globe is dependent upon the fixation of carbon through the influence of the sun's rays. It is also well understood that the nation's material prosperity is due to those mechanical inventions that have made available to recent generations the stored up fertility of the soil and the stored up carbon in coal, oil, and gas. How the conquest of Asia, Africa, and South America may affect the world at large, no one can with certainty predict, but it seems reasonably certain that so far as the United States is concerned trapping carbon or bottling sunshine is to be a much greater problem than it has been in the past.

Does this mean that famine stares us in the face? Does the fate of Egypt, Greece, and Rome await us? Such an inference is by no means necessary. I am no pessimist. The human race has solved its problems

as it has come to them with varying degrees of success, but generally for the better. During the past two hundred and fifty years this nation has solved some of the greatest problems of the race. The nation has greater problems to solve than it has yet encountered, but it was never before so well able to solve them. We need have no hesitation about our posterity. In all probabilities they will attend to their affairs better than we have attended to ours. All that is here asserted is that during the coming generations, men will be needed who have delved deeply into the sciences relating to life. The problem will not be so much the methods of harvesting, manufacturing, and marketing the one blade that now grows, but rather what the life processes by which two blades may be made to grow. To the men who have prepared themselves to solve these problems of life will come the opportunities of the future.

It is curious to note how unconscious the nation is concerning the matter. In the very years when its soil was yielding her harvests most abundantly, congress passed laws which have started the most stupendous enterprise for scientific research relating to the life and welfare of the nation that the world has ever seen. The federal government this year appropriated for the work of its Department of Agriculture, including the state experiment stations, over four and one-half million dollars, to say nothing of the provision that is made for teaching or that is made by the several states to the same objects. Even before there has come an apparently pressing demand for it, the nation is deep into the work.

This, then, is the message, which I bring to the young men of today—the nation's workers of tomorrow. The Colleges of Agriculture are teaching the sciences relating to life in a practical manner, so that he may become useful both to himself and to mankind. It is an education for agriculture, in agriculture, and by agriculture. It is a sound education worthy of the deepest intellect. The present and the future demand men prepared to solved the greatest of problems—the problems which concern living things. Who knows why clay soils are sticky, and

sandy soils are not? Who can answer this fundamental fact with which the farmer is daily associated? Why can not a stalk of Indian corn be successfully matured in a pot? Whoever answers this, answers some of the fundamental but still unknown questions concerning plant growth. One acre in every three that is plowed in the United States is planted to Indian corn. If all the pig iron mined in the United States had been made into steel rails in the record breaking year of 1899, they would not have purchased the corn crop the same year. Yet each year one-fifth of this great crop is lost in the curing. He who gives the reasons and applies the remedy, will acquire fame and the gratitude of his fellowmen. Neither may the value be placed upon the results which may come from him who changes the chemical composition of this beneficent grain. Of two cows treated exactly alike as far as human endeavor is concerned, one will produce 30 pounds of butter and the other 150 pounds. He who solves this mystery will solve the mystery of the mysteries. Notwithstanding the improvement in labor saving machinery, the greatest endeavor of the human race is still to produce food. If a penny saved is a penny earned, what shall we say of him who makes the potential energy of this vast force more available. Three centuries ago the yield of wheat in England is said to have been not more than six bushels per acre. The same soil is rained upon by the same rains and sunned by the same sun, yet today the yield is thirty bushels. Who in this country will point the way to sixty bushels of wheat instead of twelve or one hundred bushels of corn instead of twenty-five?

The problems are unlimited but the greatest of them are yet beyond the vision of man. To him who has prepared himself to solve these life problems, will come the opportunities of the future. The world waits for him. Its rewards will not be meagre.

Greatness in Agriculture.

BY HON. L. H. KERRICK.

Mr. President, Ladies and Gentlemen:

If I should say that agriculture is the first—the greatest—the most honorable business of the world, I would only be saying again what the best and wisest men of every age have said before.

But a great number of people do not so regard agriculture; they are prone to look upon it as a useful, possibly as a necessary business, albeit a very simple one suited to the ability and uncultured tastes of plain people.

This mistaken view of agriculture is not universal, but it has been and is still far too general.

In the common mind agriculture is the inferior—other callings the superior. The largest case in all history of "cart before the horse," is that one wherein so great a part of mankind have so persistently put agriculture to the rear—in the less honorable place, while other vocations are put to the front in the position of honor.

In the whole hook-up of our civilization this "wrong end too" position of things is strongly in evidence.

This common under-estimation of agriculture, and the common aversion or distaste for agricultural pursuits, and the general trend or pull of people and institutions away from the farm and farm life, have long been noted and deplored by observing and right thinking men.

They have profounding effected all social, political, and economic relations and conditions. They have upset the proper balance of city and rural population. There are too few people on the farms, too many in the cities. There are not enough people on the farms to do the work well, while in the city there are three times as many as are needed to do the work there. There is boundless room and unlimited living employment

in the country, while there is crowding and poverty and strife and strikes in the city, for lack of living employment.

A few years ago there was a great strike in Chicago. I do not now remember just what precipitated it—no matter, at bottom the cause of all strikes is too many people needing the same job. During this particular strike the storm for a while centered about some grain elevators. Thousands of men threatened to pull down the elevators and help themselves to the wheat. At that time the elevators were filled with the cheapest wheat that was ever raised in the world; but there were so many people in Chicago who had no business there—no living business—that they could not all earn enough to eat of the cheapest bread the world ever had.

This pulling away from the farms could not affect every other condition and institution and leave our great institution, our school, unaffected. And what a country of schools is this! Who can count our schools? They are like the stars which no man can number.

But our schools, big, little, and medium, public and private, have been dominated in their organization and in their teaching by this same anything but farming spirit.

They have taught our farmers' boys and girls about everything under the sun except those very things they need and must know to make their work and business attractive, satisfying, successful.

The attitude of the schools toward agriculture has been something like this: Anybody can farm. You do not have to learn how to farm. You just know it without having to learn. There is not much to learn about it, anyway. There is no science, no art about farming. You do not go to school to learn how to farm better, you do not have to. You go to school to learn how to do something else, so you may not have to farm. Only those people who cannot do something else, work at farming. Strange! All this is passing strange, since if we but think for a moment we know that had it not been for the farming which went before them never a book would have been written, never a schoolhouse built on the earth. Agriculture is the science of sciences, the art of arts.

When every other art and science shall have been thought and wrought out to its utmost limit, the science and practice of agriculture will still present boundless unexplored fields for work and research and reward, wherein every faculty of mind and body with which man is endowed may find the fullest, the most satisfying, the most inspiring exercise and employment.

Do not misunderstand me, I say nothing against our schools. They are good. They do their work well. That such a system of public and private schools as ours with its mighty teaching force and its vast material equipment should have been evolved in so short a period of time, is a matter to excite our wonder and to compel our highest admiration.

For zeal, for self-sacrificing, for untiring labors in behalf of our youth, that they may become intelligent worthy men and women and patriotic citizens, I say of our whole great army of teachers, from the presidents of our universities and colleges to the humbler but not less useful district school teachers, there live no better, nobler, more helpful men and women than they.

But just as earnestly I say that our schools and our school teachers have been nearly all looking one way, and that way has been away from the farm. Is it anybody's fault? No; it is everybody's fault. It is the colossal fault of our time and our generation, to underestimate the dignity, the beauty, the profit, and the honor of farming and farm life.

This strong attitude of our schools toward agriculture has of course tended strongly to draw young people from farm life to professional life. The schools have been turning out too many doctors, too many lawyers, too many professors; there is no need for them all, but they have been taken too often from the farm where there is need of them. The professors have rather the best of it because they go on helping to turn out more doctors and more lawyers and more professors.

To say the so-called learned professions are full, pressed down, and running over, is only hinting of their actual condition.

Something over a year ago I read in a Chicago paper an account of graduating exercises which took place at Chicago University. Let me

quote you verbatim a part of President Harper's address to the graduates as it was reported:

"You are now entering the world and you will find that poverty will be the strongest opponent to overcome. You who are entering life as lawyers need only to look at the papers today to find that the average lawyer does not earn his salt. Those who will become physicians will find that their only companion for a few years to come will be the wolf at the door; while those who go forth to teach, need only to witness the struggles of the school teachers in this city. The school is beset with howls and wails for an increase of salaries."

This in that great and rich and growing metropolis, Chicago, a city affording as great or greater and more opportunities for men and women trained for the learned professions than any other city; yet even there the prospect held out to these graduates by the president was years of starvation. If some other fellows had not the strength to fast as long as these graduates then they might eventually get the other fellow's place.

The first duty of an educated able-bodied man is to make his own living. The man who is not in some way, at some point doing an amount of the world's necessary work, equal to that required for the support of one man, is a burden on society.

Imagine President Draper or Dean Davenport saying to a class graduating from this agricultural college: "Gentlemen, you are going out to the farms. You have not mastered the whole of agricultural science, that will not be done by any living or yet to live; but you have done your work well in the college and you are well equipped for your business; however, I feel obliged to say to you that poverty will be the strongest opponent you will have to overcome. The average farmer is not earning his salt—that is, for his personal consumption, mind you, let alone the cattle and horses. The only companion you will have for some years to come will be the wolf at the door."

I just as much expect to read of such a speech as that, having been made here, to a class graduating from this agricultural college, as I expect to find myself tomorrow morning, sitting on some distant star read-

ing that last night the cables of gravitation parted down here and the whole planetary outfit fell to everlasting smash-up.

Thirty-four years ago there was organized here an Industrial University. Not a university of the general sort, but of another sort, a new kind of university. A university differing in its organization—differing in its leading studies and in its aims and purposes from those already established in many parts of the country. The courses of study in the colleges and universities existing when this new university was organized were adapted only to fit men for the so-called learned professions, law, medicine, etc. In this new university the leading studies were to be those related to agriculture and the mechanic arts. Whereas the other universities tended to withdraw their students from the pursuits of industry, this new university would aim by linking learning more closely to labor and by bringing the light of science more fully to the aid of the productive arts, to enamor the sons and daughters of the farmer and the artisan with their pursuits. There is no law in Illinois establishing a university of the general or older sort. There never has been such a law. There is a law establishing an industrial university. If this university has any legal existence or standing, it is an industrial university. By the intention of its founders, by its organic law, by its lawfully authorized course of study, by the will of the people of Illinois, it is an industrial university, not less, not more.

In his address delivered on the occasion of the inauguration of the Illinois Industrial University, that great man, Dr. Newton Bateman, said: "What then is the grand distinguishing feature, purpose, hope of this university? In my view it is to form a closer alliance between labor and learning—between science and the manual arts, between man and nature, between the human soul and God, as seen in and revealed through his works.

"It is to endeavor so to wed the intellect and hearts of the students we educate, to the matchless attractions of rural and industrial life that they will with their whole soul prefer and choose that life and consecrate to it the results of skill and power that may here be gained. These

I hold to be the aims of this university. And we hope to attain them, not by a less extensive and thorough course of instruction than is given in other universities, but by a somewhat different course and more especially by emphasizing from the beginning to the end those studies and sciences which look away from literary and professional life and toward the pursuits of the agriculturalist and the artisan."

Congress in 1862 made a liberal grant of land scrip to each state of the union for the endowment, support, and maintenance of at least one college in the several states accepting the benefits of the grant, whose leading object should be to teach such branches of learning as related to agriculture and the mechanic arts, without excluding other scientific and classical studies, and including military tactics, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.

This act of Congress was the origin of our university. The legislature of Illinois by an act providing for the organization and maintenance of the Illinois Industrial University re-enacted the act of congress in identical words.

The State of Illinois might have organized and provided for the maintenance of a university of the established or general sort, having colleges of law, medicine, etc., etc., including a college of agriculture and mechanic arts, but she did not, and has not. The perfectly obvious intent of the legislature was to establish a peculiar university, contradistinguished from that other kind, in that its leading studies should relate to agriculture and the mechanic arts, other classical and scientific studies being permissible when and to the extent that they might subserve the single great purpose, namely, the thorough and liberal and complete education of the farmer and the artisan; this end and purpose being accomplished, the whole purpose of the university is accomplished. It was deemed by the founders that there were enough of the universities of the other kind and that more were not needed. If no need in '67 of establishing a university of the general sort, what need now can there be when within the borders of our state there is building by private

beneficence, without charge to any taxpayer, what will with scarcely a doubt, soon become the most completely equipped, the most comprehensive in its round of learning and the most richly endowed university of the older kind in the world.

About three years ago when this university had been here more than thirty years, when in all there had been expended upon it \$4,000,000 or \$5,000,000, the Illinois Farmers' Institute appointed a committee to visit the university and see how it was faring with agriculture here.

The committee made its visit and investigation and reported that they found an agricultural plant worth about \$7,000—\$7,000! Shades of the founders! Excuse us farmers for what we could not help and forgive us for what we could have helped but did not.

But my friends I doubt very much if Turner and Bateman and Gregory and their co-laborers would have any harsh words for us if they could communicate with us. They saw how the educational wind was blowing from the farm to the town, from agricultural to professional life, before they went. It was only a breeze in their day, but maybe from their spirit homes they have seen that breeze increase to a blizzard, sweeping things toward the town and toward the occupations of the town, as that other kind of blizzard sweeps the snows of the plain upon the hamlet in its path.

I am ready to believe that those good men if they thought we could hear them, instead of chiding us, would say, boys, you "done noble" even to hold down your little cow barn in such a gust.

I have not much to say about the \$7,000 plant. When the farmers heard about it, a movement to right things, general, intelligent, determined, irresistible was begun. This great agricultural building is one of the fruits of that movement. The generous appropriation by the last legislature for better equipment of the plant, and for other purposes of the college is another fruit of that movement. There will be other and perennial crops of good fruit which that movement will bear.

Farmers are conservative; they are not easily moved individually, and are harder to move en masse, but when they move, other things will

be moved that need moving. If the university ship has been turned from its right course, little or much, or if it has been turned right about and headed the wrong way, the farmers will surely swing her around again and send her on her appointed way. They know her mission; it was clearly mapped out from the beginning, and knowing it they will see to it that she have a chance to accomplish that mission.

Lest some might think otherwise, let me say I have not spoken a word intended as an arraignment of anybody for what may have been done or left undone in or concerning this university.

There has been lack of information and consequent misunderstanding and disagreement among the people as to the true and lawful character, scope, and purpose of our university. I have deemed it my right, perhaps my duty as a citizen and farmer, to set forth here those purposes. And let no one infer from any utterance of mine that I take an unfavorable or gloomy view of matters and events in general. I believe that the preponderance of human intention and human effort is toward the good. I believe that the prevailing course and tendency of human institutions is toward the better. They may travel sometimes obliquely—zigzag—wrong end foremost—up side down—or even at times seem to go backward, but altogether they seem to get onward and upward.

Good things—better things—the best things come not at once, but by evolution, step by step from imperfection to excellence.

Agriculture is the peculiar science; in its beginning simple indeed—simplest of all; in its higher development we shall see it growing complex, comprehensive, drawing to its aid, assimilating and rendering subservient all sciences and becoming in its fullest development the Master Science.

Since the children of men however simple and unlearned must live and maintain themselves on the earth, and since they could live only upon the products of the tilled field, it was necessary that they be able to provide the means of sustaining life by the simplest methods of field culture.

The kind providence which cares for all living things, so ordered his laws that the field by rude and simple means could be made to yield the necessities of life.

But since we live by agriculture, we have been wont to look upon it simply as a means of living. He who finds in his vocation only the means of living, becomes a joyless drudge and his vocation stagnant drudgery.

May we not see in this the reason why myriads have tired of farming and have turned away from the farm to other pursuits and professions. And in this turning away of so many from the farm, to other pursuits and professions, may we not find and see the cause of that marvelous development of other arts and sciences which so distinguishes our time. I do not doubt it. The excessive interest in these, the excessive number engaged in them, and the excess of energy expended upon them, could have no other result, but to push their development to an amazing degree of perfection.

But now on every hand we see the signs of another turning, a returning to agricultural pursuits. Other sciences and other arts are ripe now to serve their highest purpose in the development of the master sciences, agriculture. The professions are full—crowded as we have seen. They no longer pay, to put it short, but that it not all nor most important; men and women conscious of power to aid in the world's needed work and inspired by sublime desire and ambition to add by their labors something to the world's comfort, happiness, and betterment, disdain to waste their needed powers where not needed. We see that if place, success, and competence are to be gained for themselves in professional life it must too often come by displacing and defeating others.

With the condition of unskilled laborer and the artisan in the city we are familiar. Living employment is uncertain; there are too many. The mechanic, for self-preservation, is compelled to limit the number of apprentices in his craft, even to the exclusion of his own son. Professional men are hesitating to bring up their sons to their own calling. How is it with trade and commerce? There is war between individuals

and corporations for trade, of which there is not enough to go around; and nations that once fought for liberty and honor are now ready to fight for trade.

The way out of it all is, to the farm. To the farm is the place to go now, and to the farm is the thing to go. People see it; not only plain men now, but schooled, educated, learned men see it and the more they know the better they see it. Necessity may be the ointment that is opening their eyes, but they see it all the same. When questioned by my young friends from the schools as to what field for effort is now most promising, I answer, the cornfield.

We are about to return—we are returning to agriculture. We are taking another step in the evolution of better things for mankind.

To the half employed, to the disappointed, discontented, striving, struggling millions in other over-crowded pursuits, agriculture says, come unto me and I will give you employment; I will give you food and clothing; I will give you homes; I will give you contentment and honor; I will give you peace.

But we are returning to a new agriculture lighted and glorified by science. To the new agriculture the agricultural college will be the main gate-way.

The agriculture college and experiment station is one of the wisest conceptions of this or of any age.

It should not be regarded as merely a help to agriculture or an aid however valuable; such an estimate falls far short of the truth. It is a necessary, an indispensable agent in the development of a better and more profitable and more engaging agriculture. The farmer cannot experiment profitably. Agricultural experiments for the most part require some years for their completion. There must be parallel experiments under varying conditions. Exact records must be preserved. Expensive apparatus is often required. I need not recount the obstacles to successful experimentation by individual farmers; they are numerous and practically insurmountable.

If for no other reason, a college or association of some kind is necessary, because experiments if left dependent upon the life and health and inclination of private persons, would almost certainly fail.

Although comparatively new institutions, colleges of agriculture have abundantly proved their value. The railroad is not more to transportation than the Agricultural College and experiment station will be to agriculture.

There is but one opinion among those acquainted with their work; they must be maintained. Any farmer and all farmers who will watch the work done in these institutions and who will apply to their own work what may be applicable, will soon become their enthusiastic friends.

A reasonable amount of public money judiciously expended in one agricultural college will return a hundredfold to the common good.

A wise public policy will surely give liberal support to the agricultural college and experiment station.

We are met here to dedicate this great building, the largest agricultural college building, I believe, in the world. It is consistent—we are the greatest agricultural community, and this building stands in the center of the largest tract of the most productive land comprised in any single state. It will be well equipped. We have here a corps of instructors many of them already renowned for eminent services to agriculture, all are learned and skilled in the art, and devoted to it.

To the great art—the greatest—we dedicate this splendid building.

Dairy Laws of Illinois.

Laws of 1879, page 111. (Hurd's Revised Statutes, chapter 38, sections 9-9e.)

AN ACT to regulate the sale of milk, and to provide penalties for the adulteration thereof. (Approved May 29, 1879.)

Section 1. That whoever shall, for the purpose of sale for human food, adulterate milk with water or any foreign substance, or whoever shall knowingly sell for human food, milk from which cream has been taken, without the purchaser being informed or knowing the fact, or whoever shall knowingly sell for human food, milk from which what is commonly called "strippings" has been withheld, without the purchaser thereof being informed or knowing the fact, or whoever shall knowingly sell for human food milk drawn from a diseased cow, knowing her to be so diseased as to render her milk unwholesome, or whoever shall knowingly sell for human food, milk so tainted or corrupted as to be unwholesome, or whoever shall knowingly supply, or bring to be manufactured into any substance for human food, to any cheese or butter factory or creamery, without all interested therein knowing or being informed of the fact, milk which is adulterated with water or any foreign substance, or milk from which cream has been taken, or milk from which what is commonly called "strippings" has been withheld, or milk drawn from a diseased cow, knowing her to be so diseased as to injure her milk, or milk so tainted or corrupted as to be unwholesome, or whoever shall knowingly, with intent to defraud, take from milk after it has been delivered to a cheese factory, or butter factory or creamery, to be manufactured into any substance for human food, for or on account of the person supplying the milk or cream, or shall, with like intent, knowingly

add any foreign substance to the milk or cream, whereby it, or the products thereof, shall become unwholesome for human food, shall be guilty of a misdemeanor, and for each and every such misdemeanor shall be fined not less than twenty-five nor more than one hundred dollars or confined in the county jail not exceeding six months or both, in the discretion of the court.

Sec. 2. Any person who shall adulterate milk, with the view of offering the same for sale or exchange, or shall keep cows for the production of milk for market, or for sale or exchange, in an unhealthy condition, or knowingly feed the same on food that produces impure, diseased, or unwholesome milk, shall be deemed guilty of a misdemeanor, and, on conviction, shall be punished by a fine of not less than fifty dollars nor more than two hundred dollars, for each and every offense.

Sec. 3. Any person or persons who shall, in any of the cities of this State, engage in or carry on a retail business in the sale, exchange of, or any retail traffic in milk, shall have each and every can in which the milk is carried or exposed for sale or exchange, and the carriage or vehicle from which the same is vended, conspicuously marked with his, her, or their name or names, also indicating by said mark the locality from which said milk is obtained or produced, and for every neglect for such marking, the person or persons so neglecting shall be subject to the penalties expressed in section 2 of this act; but for every violation of this act, by so marking said cans, carriage, or vehicle, as to convey the idea that said milk is produced or procured from a different locality than it really is, the person or persons so offending shall be subject to a fine of one hundred dollars.

Sec. 4. Any person who shall, in any of the cities in this State, offer for sale any milk from which the cream or any part thereof shall have been taken, shall offer for sale and sell the same as skimmed milk, and not otherwise, and shall have each car or vessel in which such milk is carried, or exposed for sale, plainly and conspicuously marked with the words "Skimmed Milk." Any person violating this section shall be subject to a fine not exceeding fifty dollars for each and every violation.

Sec. 5. Upon the rendition of judgment imposing a fine as provided in the foregoing sections, it shall be the duty of the justice of the peace or other court rendering said judgment, also to render a judgment for the costs, and forthwith to issue a *capias* or warrant of commitment against the body of the defendant commanding that, unless the said fine and costs be forthwith paid, the defendant shall be committed to the jail of the county, and the constable or other officer to whose hand said *capias* or warrant shall come shall, in default of such payment, arrest the defendant and commit him to the jail of the county, there to remain, as provided by section 308 of "An act to revise the law in relation to criminal jurisprudence," in force July 1, 1874, unless such fine and costs shall sooner be paid.

Sec. 6. The addition of water or any foreign substance to milk or cream intended for sale or exchange, is hereby declared an adulteration. Any milk that is obtained from cows fed on distillery waste, usually called "swills," or upon any substance in a state of putrefaction, is hereby declared to be impure and unwholesome. Nothing in this act shall be construed to prevent the addition of sugar in the manufacture of condensed or preserved milk.

Sec. 7. Section nine of division one of an act entitled "An act to revise the law in relation to criminal jurisprudence (approved March 27, 1874); and all other acts and parts of acts inconsistent herewith are hereby repealed.

Laws of 1883, page 54 (Revised Statutes, chapter 5, sections 29.32.)

AN ACT to require operators of butter and cheese factories on the co-operative plan to give bonds, and to prescribe penalties for the violation thereof. (Approved June 18, 1883.)

Section 1. That it shall be unlawful for any person or persons, company or corporation, within this State to operate, carry on, or conduct the business of manufacturing butter or cheese on the co-operative or dividend plan until such person or persons, company or corporation, shall have filed with the circuit clerk or recorder of deeds of the county in which it is proposed to carry on such business a good and sufficient

bond, to be approved by such circuit clerk or recorder of deeds, in the penal sum of six thousand dollars, with one or more good sureties, conditioned that such person or persons, company or corporation, proposing to carry on such business will, on or before the first day of each month, make, acknowledge, subscribe, and swear to a report in writing, showing the amount of product manufactured, the amount sold, the prices received thereof, and the dividends earned and declared for the third month preceding the month in which such report is made, and will file a copy of such report with the clerk of the town or precinct in which such factory is located, and will also keep publicly posted, in a conspicuous place in such factory, a copy of such report for the inspection of the patrons thereof, and that such dividends shall be promptly paid to the persons entitled thereto.

Sec. 2. Such bond shall run to the people of the State of Illinois, and shall be for the benefit and protection of all patrons of such factory; and suit may be had thereon by any person or persons injured by a breach of the conditions thereof by an action of debt for the use of the person or persons interested for all damages sustained by them.

Sec. 3. Such bond shall be recorded by the circuit clerk or recorder with whom the same is filed, and all such reports so filed with any town or precinct clerk shall be preserved by him and held subject to the inspection of any person or persons interested.

Sec. 4. Any person who shall willfully violate any provision of this act shall be liable to a fine of not less than two hundred dollars nor more than five hundred dollars, or imprisonment in the county jail for not less than thirty days nor more than six months, or both, in the discretion of the court.

Laws of 1879, page 11 (Revised Statutes, chapter 38, sections 39a-39c.)

AN ACT to prevent frauds in the manufacture and sale of butter and cheese. (Approved May 31, 1879.)

Section 1. That whoever manufactures, sells, or offers for sale, or causes the same to be done, any substance purporting to be butter or cheese, or having the semblance of butter or cheese, which substance is

not made wholly from pure cream or pure milk, unless the same be manufactured under its true and appropriate name, and unless each package, roll, or parcel of such substance, and each vessel containing one or more packages or such substance, have distinctly and durably painted, stamped, or marked thereon the true and appropriate name of such substance, in ordinary boldfaced capital letters not less than five-lines pica, shall be punished as provided in section 3 of this act.

Sec. 2. Whoever shall sell any such substance as is mentioned in section 1 of this act to consumers, or cause the same to be done, without delivering with each package, roll, or parcel so sold, a label on which is plainly and legibly printed, in Roman letters, the true, and appropriate name of such substance, shall be punished as is provided in section 3 of this act.

Sec. 3. Whoever knowingly violates section 1 or section 2 of this act shall be fined in any sum not less than ten nor more than three hundred dollars, or imprisoned in the county jail not less than ten nor more than ninety days, or both, in the discretion of the court: Provided, That nothing contained in this act shall be construed to prevent the use of skimmed milk, salt rennet, or harmless coloring matter, in the manufacture of butter and cheese.

Laws of 1881, page 74 (Revised Statutes, chapter 38, sections 9f-9g.)

AN ACT to prevent the adulteration of butter and cheese, or the sale or disposal of the same, or the manufacture or sale of any article as a substitute for butter or cheese, or any article to be used as butter and cheese. (Approved June 1, 1881.)

Section 1. That whoever manufactures, out of any oleaginous substances, or any compound of the same other than that produced from unadulterated milk, or cream from the same, any article designed to take the place of butter or cheese produced from pure, unadulterated milk, or cream of the same, and shall sell, or offer for sale, the same as butter or cheese, or give to any person the same as an article of food, as butter or cheese, shall, on conviction thereof, be fined not less than twenty-five dollars nor more than two hundred dollars.

Sec. 2. All acts or parts of acts inconsistent with this act are hereby repealed.

Laws of 1881, page 75 (Revised Statutes, chapter 38, sections 9h-9o.)

AN ACT to prevent and punish the adulteration of articles of food, drink and medicine, and the sale thereof when adulterated. (Approved June 1, 1881.)

Section 1. That no person shall mix, color, stain, or powder, or order or permit any other person in his or her employ to mix, color, stain, or powder any article or food with any ingredient or material, so as to render the article injurious to health, or depreciate the value thereof, with intent that the same may be sold; and no person shall sell or offer for sale any such article so mixed, colored, stained, or powdered.

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Sec. 3. No person shall mix, color, stain, or powder any article of food, drink, or medicine, or any article which enters into the composition of food, drink, or medicine, with any other ingredient or material, whether injurious to health or not, for the purpose of gain or profit, or sell, or offer the same for sale, or permit any other person to sell or offer for sale any article so mixed, colored, stained, or powdered, unless the same be so manufactured, used, or sold, or offered for sale under its true and appropriate name, and notice that the same is mixed or impure is marked, printed, or stamped upon each package, roll, parcel, or vessel containing the same, so as to be and remain at all times readily visible, or unless the person purchasing the same is fully informed by the seller of the true name and ingredients (if other than such as are known by the common name thereof) of such article of food, drink, or medicine, at the time of making sale thereof or offering to sell the same.

Sec. 4. No person shall mix oleomargarine, suine, butterine, beef fat, lard, or any other foreign substance, with any butter or cheese intended for human food, without distinctly marking, stamping, or labeling the article, or the package containing the same, with the true and appropriate name of such article, and the percentage in which such oleo-

margarine or suine enters into its composition; nor shall any person sell or offer for sale, or order or permit to be sold or offered for sale, any such article of food into the composition of which oleomargarine or suine has entered, without at the same time informing the buyer of the fact, and the proportions in which such oleomargarine, suine, or butterine, beef fat, lard, or any other foreign substance has entered into its composition. Provided, That nothing in this act shall be so construed as to prevent the use of harmless coloring matter in butter and cheese, or other articles of food.

Sec. 5. Any person convicted of violating any provision of any of the foregoing sections of this act shall, for the first offense, be fined not less than twenty-five dollars nor more than two hundred; for the second offense he shall be fined not less than one hundred nor more than two hundred dollars, or confined in the county jail not less than one month nor more than six months, or both, at the discretion of the court; and for the third and all subsequent offenses he shall be fined not less than five hundred dollars nor more than two thousand dollars, and imprisoned in the penitentiary not less than one year nor more than five years.

(Section 6, which made ignorance of the provisions of the law a defense against prosecution, is repealed in the food commission bill.

Sec. 7. The State's attorneys of this State are charged with the enforcement of this act, and it is hereby made their duty to appear for the people, and to attend to the prosecution of all complaints under this act, in their respective counties, in all courts.

Sec. 8. All acts and parts of acts inconsistent with the provisions of this act are hereby repealed.

Laws of 1897, page 3 (Revised Statutes, chapter 38, sections 39d-39n.)

AN ACT to regulate the manufacture and sale of substitutes for butter.

(Approved June 14, 1897.)

Section 1. That for the purpose of this act every article, substitute, or compound other than that which is produced from pure milk or cream therefrom, made in the semblance of butter and designed to be used as a substitute for butter made from pure milk or its cream, is hereby de-

clared to be imitation butter. Provided, That the use of salt and harmless coloring matter for coloring the product of pure milk or cream shall not be construed to render such product an imitation.

Sec. 2. No person shall coat, powder, or color with annatto or any coloring matter whatever any substance designed as a substitute for butter, whereby such substitute or product so colored or compounded shall be made to resemble butter, the product of the dairy. No person shall combine any animal fat or vegetable oil or other substance with butter or combined therewith or with animal fat or vegetable oil or combination of the two, or with either one, any other substance or substances, for the purpose or with the effect of imparting thereto a yellow color or any shade of yellow so that such substance shall resemble yellow or any shade of genuine yellow butter, nor introduce any such coloring matter or such substance or substances into any of the articles of which the same is composed: Provided, Nothing in this act shall be construed to prohibit the use of salt, rennet, and harmless coloring matter for coloring the products of pure milk or cream from the same.

No person shall, by himself, his agents, or employes, produce or manufacture any substance in imitation or semblance of natural butter, nor sell, nor keep for sale, nor offer for sale any imitation butter, made or manufactured, compounded or produced in violation of this section, whether such imitation butter shall be made or produced in this State or elsewhere. This section shall not be construed to prohibit the manufacture and sale, under the regulations hereinafter provided, of substances designed to be used as a substitute for butter and not manufactured or colored as herein prohibited.

Sec. 3. Every person who lawfully manufacture any substance designed to be used as a substitute for butter shall mark by branding, stamping, or stenciling upon the top and side of each tub, firkin, box, or other package in which said article shall be kept and in which it shall be removed from the place where it is produced, in a clean and durable manner, in the English language, the word "Oleomargarine," or the word "Butterine," or the words "Substitute for Butter," or the words "Imita-

tion Butter," in printed letters in plain, Roman type, each of which shall not be less than three-quarters of an inch in length.

Sec. 4. It shall be unlawful to sell or offer for sale any imitation butter without informing the purchaser thereof, or the persons or persons to whom the same is offered for sale, that substance sold or offered for sale is imitation butter.

Sec. 5. No person, by himself for another, shall ship, consign, or forward by any common carrier, whether public or private, any substance designed to be used as a substitute for butter, unless it shall be marked or branded on each tub, box, firkin, jar, or other package containing the same, as provided in this act, and unless it be consigned by the carrier and receipted for by its true name: Provided, That this act shall not apply to any goods in transit between foreign States across the State of Illinois.

Sec. 6. No person shall have in his possession, or under his control, any substance designed to be used as a substitute for butter, unless the tub, firkin, jar, box, or other package containing the same be clearly and durably marked, as provided in this act: Provided, That this section shall not be deemed to apply to persons who have the same in their possession for the actual consumption for themselves or their families. Every person who shall have in his possession or control any imitation butter for the purpose of selling the same, which is not marked as required by the provisions of this act, shall be presumed to have known during the time of such possession or control the true character and name as fixed by this act of such product.

Sec. 7. Whoever shall have possession or control of any imitation butter or any substance designed to be used as a substitute for butter, contrary to the provisions of this act, for the purpose of selling the same, or offering the same for sale, shall be held to have possession of such property with intent to use it in violation of this act.

Sec. 8. No action shall be maintained on account of any sale or contract made in violation of or with the intent to violate this act by or through any person who was knowingly a party to such wrongful sale or contract.

Sec. 9. Whoever shall deface, erase, or remove any mark provided by this act, with intent to mislead, deceive, or to violate any of the provisions of this act, shall be guilty of a misdemeanor.

Sec. 10. Whoever shall violate any of the provisions of this act shall be punished by a fine of not less than fifty nor more than two hundred dollars, or by imprisonment in the county jail not to exceed sixty days, for each offense, or by both fine and imprisonment, in the discretion of the court, or the fine alone may be sued for and recovered before any justice of the peace in the country where the offense shall be committed, at the instance of any person, in the nome of the people of the State of Illinois as plaintiff.

Sec. 11. It is hereby made the duty of the State's attorney of each county in this State to prosecute all violations of this act upon complaint of any person, and there shall be taxed as his fees in the case the sum of ten dollars, which shall be taxed as costs in the case.

AN ACT to protect the public from imposition in relation to canned or preserved food. (Approved June 27, 1885.)

Section 1. That it shall hereafter be unlawful in this State for any packer or dealer in preserved or canned fruits and vegetables or other articles of food to offer such canned articles for sale after January 1, 1886, with the exception of goods brought from foreign countries, or packed prior to the passage of this act, unless such articles bear a mark to indicate the grade or quality, together with the name and address or such firm, person, or corporation that pack the same or dealer who sells the same. The firm, person, or corporation labeling such goods shall be considered the packer or packers.

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Sec. 3. Any person, firm, or corporation, who shall falsely stamp or label such cans or jars containing preserved fruit or food of any kind, or knowingly permit such false stamping or labeling, and any person, firm, or corporation who shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and punished with a fine or not less

than fifty dollars; in the case of vendors, and in the case of manufacturers and those falsely or fraudulently stamping or labeling such cans or jars, a fine of not less than five hundred dollars nor more than one thousand dollars, and it shall be the duty of any board of health in this State cognizant of any violation of this act to prosecute any person, firm, or corporation which it has reason to believe has violated any of the provisions of this act, and after deducting the costs of the trial and conviction, to retain for the use of such board the balance of the fine or fines recovered.

PURE FOOD COMMISSIONERS' BILL.

For an act to provide for the appointment of a State Food Commissioner and to define his powers and duties and fix his compensation, and to prohibit and prevent adulteration, fraud, and deception in the manufacture and sale of articles of food, and to repeal certain acts or parts of acts therein named.

Section 1. Be it enacted by the People of the State of Illinois represented in the General Assembly: That the office of State food commissioner for the State of Illinois is hereby created. Within thirty days after this act shall take effect such commissioner shall be appointed by the Governor, by and with the advice and consent of the Senate, and his term of office shall be for two (2) years from the date of his appointment and until his successor is appointed and qualified. Thereafter the term of office of the commissioner shall be for four years and until his successor is qualified. The salary of the commissioner shall be twenty-five hundred dollars (\$2,500) per annum and his necessary and actual expenses incurred in the discharge of his official duties.

2. Such commissioner may, with the advice and consent of the Governor, appoint two assistant commissioners, each of acknowledged

standing, ability, and integrity, one of whom shall be an expert in the matter of dairy products, and the other of whom shall be a practical and analytical chemist, who shall be known as State analyst. The salaries of such assistants shall not exceed eighteen hundred dollars (\$1,800) each per annum and their necessary and actual expenses incurred in the discharge of their official duties. In case of the absence or inability of the State analyst to perform all the duties of his office, the commissioner may appoint some competent person to assist in the same temporarily.

3. The food commissioner shall have authority to appoint necessary inspectors not exceeding six in number to assist in the work of the food commissioner at such times and for such periods of time as may be required in the enforcement of the dairy food laws of the State. Such inspectors shall have the same right of access to places to be inspected as the commissioner. The compensation of such inspectors shall be three dollars (\$3.00) per day for each day of actual service, and their necessary and actual expenses when so employed.

4. It shall be the duty of the commissioner to enforce all laws that now exist or that may hereafter be enacted in this State regarding the production, manufacture, or sale of dairy products, or the adulteration of any article of food, and personally or by his assistants to inspect any article of food made or offered for sale within this State, which he may, through himself or his assistants, suspect or have reason to believe to be impure, unhealthy, adulterated or counterfeit, and to prosecute, or cause to be prosecuted, any person or persons, firm or firms, corporation or corporations, engaged in the manufacture or sale of any adulterated or counterfeit article or articles of food contrary to the laws of this State.

5. It shall be the duty of the food commissioner to carefully inquire into the quality of the dairy and food products, and the several articles which are foods or the necessary constituents of food, which are manufactured for sale or sold or exposed or offered for sale in this State, and he may in a lawful manner procure samples of the same, and direct the State analyst to make due and careful examination of the same, and report to the commissioner the result of the analysis of all or any

such food or dairy products as are adulterated, impure or unwholesome, in contravention of the laws of this State, and it shall be the duty of the commissioner to make complaint against the manufacturer or vender thereof in the proper county, and furnish the prosecuting attorney with the evidence thereon and thereof to obtain a conviction for the offense charged. The food commissioners, or his assistants, or any person by him duly appointed for that purpose, shall have power in the performance of their duties to enter any dairy, creamery, cheese factory, store, sales-room, warehouse (excepted bonded warehouses for the storage of distilled spirits), where goods are stored or exposed for sale, or place where they have reason to believe food is stored or offered for sale, and to open any cask, tub, jar, bottle or package containing, or supposed to contain, any article of food, and examine or cause to be examined the contents thereof, and take therefrom samples for analysis. The person making such inspection shall take such samples of such articles of product, in the presence of at least one witness, and he shall, in the presence of such witness, mark or seal such sample and shall tender, at the time of taking, to the manufacturer or vender of such produce, or to the person having the custody of the same, the value thereof, but if the person from whom such sample is taken shall request him to do so, he shall, at the same time and in the presence of the person from whom such property is taken, securely seal up two samples of the article seized or taken, the one of which shall be for examination or analysis under the direction of the commissioner, and the other of which shall be delivered to the person from whom the article was taken. Any person who shall obstruct the commissioner or any of his assistants by refusing to allow him entrance to any place which he desires to enter in the discharge of his official duty, or refuse to deliver to him a sample of any article of food made, sold or exposed for sale by such person, when the same is requested, and when the value thereof is tendered, shall be guilty of a misdemeanor, punishable by a fine of not exceeding fifty dollars (\$50.00) for the first offense, and not exceeding five hundred dollars (\$500) or less than fifty dollars (\$50.00) for each subsequent offense.

6. It shall be the duty of the state's attorney in any county of the State, when called upon by the commissioner or any of his assistants, to render any legal assistance in his power to execute the laws and to prosecute cases arising under the provisions of this act.

7. The State board of health may submit to the commissioner, or to any of his assistants, samples of food or drink for examination or analysis, and shall receive special reports, showing the result of such examination or analysis.

8. It shall be unlawful for the State analyst, while he holds his office, to furnish to any individual, firm or corporation any certificate as to the purity or excellence of any article manufactured or sold by them to be used as food or in the preparation of food.

9. The salary of the commissioner shall be paid from the fund appropriated for the payment of the salaries of State officers, and his assistants shall be paid out of the State treasury from the same fund and in the same manner as the salaries of other employes of the State are paid, and their official expenses shall be paid at the end of each calendar month upon bills duly itemized and approved by the Governor, and the amount necessary to pay such salaries and expenses is hereby appropriated.

10. The commissioner may, under the direction of the Governor, fit up a laboratory, with sufficient apparatus for making analysis contemplated in this act, and for such purpose the sum of fifteen hundred dollars (\$1,500), or so much thereof as may be necessary, is hereby appropriated; and for the purpose of providing materials, and for necessary expenses connected with the making of such analysis, there is also hereby appropriated so much as may be necessary, not exceeding six hundred dollars (\$600) annually. The appropriation provided for in this section shall be drawn from the State treasury upon certified bills approved by the Governor.

11. The commissioner shall make an annual report to the Governor on or before the first day of January in each year, which shall be printed and published. Such report shall cover the doings of his office for the

preceding year and shall show, among other things, the number of factories, creameries, and other places inspected, and by whom; the number of specimens of food articles analyzed, and the State analyst's report upon each one when the analysis indicates the same to be contrary to law; the number of complaints entered against persons for violation of the laws relative to the adulteration of food; the number of convictions had and the amount of fines imposed therefor, together with such recommendations relative to the statutes in force as his experience may justify. The commissioner may also prepare, print and distribute to the newspapers of the State, and to such persons as may be interested, or may apply therefor, a monthly bulletin containing results of inspections, the results of analysis made by the State analyst of articles offered for sale contrary to law, with popular explanation of the same, and such other information as may come to him in his official capacity relating to the adulteration of food and drink products and of dairy products, so far as he may deem the same of benefit and advantage to the public; also a brief summary of all the work done during the month by the commissioner and his assistants in the enforcement of the laws of the State, but not more than ten thousand copies of each of such monthly bulletins shall be printed: Provided the necessary printing shall be done by the State printer, and all expense for stationery and printing shall be audited and paid from the same fund and in the same manner as other State printing and stationery.

All fines, penalties and costs recovered for violations of this act and other acts now enacted or hereafter to be enacted prohibiting or regulating the adulteration of foods shall be paid into the State treasury to the credit of the general fund of the State.

12. No person shall, within this State, manufacture for sale, have in his possession with intent to sell, offer for sale, or sell any article of food which is adulterated within the meaning of this act.

13. The term "food," as used herein, shall include all articles, whether simple, mixed or compound, used for food, candy, drink or condiment by man or domestic animals.

14. An article shall be deemed to be adulterated within the meaning of this act:

First—If any substance or substances has or have been mixed with it so as to depreciate, lower or injuriously affect its quality, strength or purity.

Second—If any inferior or cheaper substance or substances has or have been substituted wholly or in part for the article.

Third—If any valuable necessary constituent or ingredient has been wholly or in part abstracted from it.

Fourth—If it be an imitation of and sold under the name of another article.

Fifth—If it is mixed, colored, coated, polished or powdered, whereby damage or inferiority is concealed, or if by any means it is made to appear better or of greater value than it really is.

Sixth—If it contains any added substance or ingredient which is poisonous or injurious to health.

Seventh—If it consists wholly or in part of a decomposed, putrid, infected, tainted or rotten animal or vegetable substance or article, whether manufactured or not, or, if it is the product of a diseased animal, or if of an animal that has died otherwise than by slaughter: Provided, that an article of food that does not contain any ingredient injurious to health, and in the case of mixtures or compounds, which may be now, or from time to time hereafter, known as articles of food under their own distinctive names, or which shall be labeled so as to plainly indicate that they are mixtures, combinations, compounds or blends, and not included in definition fourth of this section, shall not be deemed to have been adulterated. Provided, further, that all manufactured articles of food offered for sale shall be distinctly labelled, marked or branded with the name of the manufacturer and place of manufacture, or the name and address of the packer or dealer who sells the same.

15. No person shall manufacture for sale, offer or expose for sale, sell or deliver, or have in his possession with intent to sell or deliver, any vinegar not in compliance with the provisions of this act. No vine-

gar shall be sold as apple, orchard or cidar vinegar which is not the product of pure apple juice, known as apple cider and apple, orchard or cider vinegar upon test shall contain not less than one and three-fourths per cent, by weight, of cider vinegar solids upon full evaporation at the temperature of boiling water.

16. All vinegar made by fermentation and oxidation without the intervention of distillation shall be branded with the name of the fruit or substance from which the same is made. All vinegar made wholly or in part from distilled liquor shall be branded "distilled vinegar." All fermented vinegar not distilled shall contain not less than one and one-fourth per cent, by weight, upon full evaporation (at the temperature of boiling water), of solids contained in the fruit from which said vinegar is fermented, and said vinegar shall contain not less than two and a half tenths of one per cent ash or mineral matter, the same being the product of the material from which said vinegar is manufactured. All vinegar shall be made wholly from the fruit or grain from which it purports to be or is represented to be made, shall contain no foreign substance, and shall contain not less than four per cent, by weight, of absolute acetic acid.

17. No person shall manufacture for sale, offer for sale or have in his possession with intent to sell, any vinegar found upon test to contain any preparation of lead, copper, sulphuric acid or other mineral acid, or other ingredients injurious to health. All packages containing vinegar shall be marked, stenciled or branded on the head of the cask, barrel or keg containing such vinegar, with the name and residence of the manufacturer or dealer, together with the brand required in section 16 of this act.

18. No person shall offer for sale, sell or deliver for food or drink purposes, ice, natural or manufactured, containing any decomposed, putrid, infected, tainted or rotten animal or vegetable substance or any ingredient which is poisonous or injurious to health. If intended for food or drinking purposes shall not be composed of water of lower standard of purity than that required for domestic purposes by the state board of health.

19. Any person or persons manufacturing for sale or selling or offering to sell any candies or confectioneries adulterated by the admixture of terra alba, barytes, talc or other earthy or material substances, or any poisonous colors, flavors or extracts or other deleterious ingredients detrimental to health, shall, upon proper conviction thereof, be punished by a fine of not less than ten nor more than one hundred dollars, or imprisonment in the county jail not less than ten nor more than thirty days, or both such fine and imprisonment, in the discretion of the court.

20. No packer or dealer in preserved or canned fruits and vegetables or other articles of food, shall sell or offer for sale such canned or preserved fruits and vegetables or other articles of food, unless they shall be entirely free from substances or ingredients deleterious to health, and unless such articles bear a mark, stamp, brand or label bearing the name and address of the firm, person or corporation that packs same, or dealer that sells same. All soaked or bleached goods or goods put up from products dried before canning, shall be plainly marked, branded stamped or labeled as such, with the words "soaked" or "bleached goods" in letters not less than two-line pica in size, showing the name of the article and name and address of the packer or dealer who sells same.

21. No person shall manufacture for sale, have in his possession with intent to sell, offer or expose for sale, or sell as fruit, jelly, jam, or fruit butter, any jelly, jam or imitation fruit butter or other similar compound made or composed, in whole or in part, of glucose, dextrine, starch or other substance, and colored in imitation or fruit jelly, jam or fruit butter; nor shall any such jelly, jam or fruit butter or compound be manufactured or sold, or offered for sale, under any name or designation whatever, unless the same shall be composed entirely of ingredients not injurious to health; and every can, pail or package of such jelly, jam or butter sold in this State shall be distinctly and durably labeled "imitation fruit, jelly, jam, or butter," with the name and address of manufacturer or dealer who sells same.

22. Extracts made of more than one principle must be labeled with the name of each principle or else simply with the name of the inferior or adulterant.

In all cases when an extract is labeled with two or more names, the type used is to be similar in size and the name of any one of the articles used is not to be given greater prominence than another. The word compound cannot be used. Extracts which cannot be made from the fruit, berry or bean, and must necessarily be made artificially, as raspberry, strawberry, etc., shall be labeled "artificial. Chocolates and cocoas must not contain substances other than cocoa mass, sugar and flavoring and will not be required to be labeled "compound" or "mixture." Prepared cocoanut, if so labeled, shall contain nothing but cocoanut, sugar and glycerine, and shall not be classed as compound or mixture.

23. Whoever shall falsebrand, mark, stencil or label any article or product required by this act to be branded, marked, stenciled or labeled, or shall remove, alter, deface, mutilate, obliterate, imitate, or counterfeit any band, mark, stencil or label so required, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than twenty-five nor more than two hundred dollars, and costs of prosecution, or by imprisonment in the county jail for not less than thirty days nor more than ninety days, or by both such fine and imprisonment in the discretion of the court, for each and every offense.

24. The taking of orders, or the making of agreements or contracts by any person, firm or corporation, or by any agent or representative thereof, for the future delivery of any of the articles, products, goods, wares or merchandise embraced within the provisions of this act, shall be deemed a sale within the meaning of this act.

25. Every person manufacturing, offering or exposing for sale or delivery to a purchaser any article intended for food, shall furnish to any person, or analyst or other officer or agent appointed hereunder who shall apply to him for the purpose and shall tender him the value of the same, a sample sufficient for the analysis of any such article which is in his possession. Whoever hinders, obstructs or in any way interferes with any inspector, analyst or other officer appointed hereunder, in the performance of his duty, and whoever wilfully neglects or refuses to do any of the provisions of this act, shall be guilty of a misdemeanor, and

upon conviction shall, where no specific penalty is prescribed by this act, be punished by a fine not exceeding two hundred nor less than twenty-five dollars, or by imprisonment in the county jail for a period not exceeding ninety days, or by both such fine and imprisonment, in the discretion of the court.

26. All acts and parts of acts consistent with this act, and Section 6 of an act entitled "An act to prevent the adulteration of butter and cheese, or the sale and disposal of the same, or the manufacture or sale of any article as a substitute for butter or cheese, or any article to be used as butter and cheese," approved June 1, 1881, be and they are hereby repealed.

27. For the purpose of enabling dealers in products affected by this act to dispose of same without loss, it is hereby expressly provided that the penalties of this act, and prosecution under the same, are suspended until the first day of July, 1900.



Tuberculosis in Cattle.

REPORT OF A MEETING OF ILLINOIS DAIRYMEN.

A lengthy report of interest tall dairymen was printed in compliance with a resolution passed at a mass meeting of dairymen and stock breeders in Chicago, Ill., Dec. 31, 1901, and at a similar meeting held in Elgin, Ill., Jan. 25, 1901. The Elgin meeting was attended by 200 to 300 dairymen and was a representative meeting, great interest being taken in the subject.

The report was made by a committee consisting of Samuel I. Pope of Libertyville, Ill., E. J. Fellows of St. Charles, Ill., and W. A. Goodwin of Crystal Lake, Ill.

It begins with the first official recognition of the tuberculin test in Illinois, tells how it grew and the ruling on the question together with the trouble it caused and the heavy losses of cows to the dairymen. It regarded the matter largely as a conspiracy of veterinarians to get fees for applying the test to cows, and points out the dangers due to the conditions under which tests were made, and also the improbability, and almost impossibility, of getting correct results. It also reviews the expense of making the tests while the State Board of Live Stock Commissioners were doing the work, the number of cows slaughtered and the loss in money to the owners of these cows. It was claimed in the report that the tuberculin test had been used in a manner that has injured some apparently healthy cattle, and that it develops and hastens the disease in the cattle that react to the test. The report continues as follows:

Your committee is decidedly of the opinion that laws for the suppres-

sion and prevention of contagious diseases among domestic animals are necessary and beneficial and that the state should have a board of Live Stock Commissioners who will wisely use the great discretion with which they are necessarily clothed. They recommend that the present laws on the subject be amended so as to embrace the following principles in regard to tuberculosis in cattle:

1. The appraisal shall be the full market value of the living animal at the time of making the examination.

2. That the owner shall receive such full appraised value for condemned animals if they are not found to be tuberculous on post mortem examination, and 75 per cent of such appraised value if they are found to be tuberculous on post mortem examination.

3. No animal shall be condemned, quarantined or slaughtered as tuberculous without the owner's consent in writing, unless it shall be found to be tuberculous by a physical examination.

4. No animal shall be condemned or slaughtered on account of tuberculosis without the owner's consent in writing, after the state appropriation for making compensation as above is exhausted.

Progress is change, and yet change is not always progress. It is the part of wisdom to make haste slowly in matters where the most efficient investigators disagree.

The cattle owner will welcome improvement when it is shown to be improvement. His property, his markets, his health and the health of his family are at stake. To do otherwise would be but to injure himself.

The utility of a general enforcement of the tuberculin test with the conditions that go with it, has not yet been demonstrated. In fact, such a course has been condemned by New York and Massachusetts, the states of all others that have had most experience in its use.

And yet there is something in bacteriology, there is something in sanitation. Patient study of first principles has changed the world in a hundred years. The scourge no longer depopulates cities. The ounce of prevention will preserve the herds on the hills and plains. Let there be light, air, cleanliness, exercise in moderation, wholesome food and

drink without undue exposure to the elements, especially sudden changes from heat to cold, and without overtaxing those physical powers which have their limits in all living things as well as in the machines which man constructs.

Briefly stated the objections to the use of tuberculin may be summed up as follows:

1. The temperature of healthy animals and those affected with other diseases sometimes rises after the injection of tuberculin.
2. Some tuberculous animals do not react to the tuberculin.
3. Tuberculin does not determine the stage of the disease, but condemns animals which might live for years and possibly recover.
4. Tuberculin may produce the disease in healthy animals and certainly hastens its progress in those affected.
5. It is claimed that identically the same action as that of tuberculin can be produced by the injection of the extracts of other products of various bacteria, even such as are known to have no disease producing properties.
6. Tuberculin is a poison and it is not desirable to inject a poison into the circulation of a cow that is giving milk for human use.
7. It develops the germ it was intended to kill; adding poison to poison, it is cumulative in its effect.
8. The particular cases have been too few to warrant a general conclusion. Because it has apparently caused no injury to some healthy cattle it can not be assumed that it is harmless to all healthy cattle.
9. The expert skill, knowledge of the herd and entire control of all the conditions which made the reputation of tuberculin as a diagnostic at the experiment stations are unattainable and impossible in its general application.
10. So-called tuberculosis can be stamped out in any herd of cattle without using the tuberculin test.
11. The compulsory slaughter of cattle under the tuberculin test has been condemned and abandoned wherever it has been tried to any great extent. This is notably true in the states of New York and Massachusetts.

12. It is a vain attempt to eradicate a disease by removing the effects while leaving the proximate cause, unsanitary conditions and harmful methods, in full operation. The last germ could not be caught and destroyed without altering the entire plan of creation.

The great dairy and stock feeding industry of the state requires for its successful prosecution a large amount of raw material in the shape of imported living cattle. For this reason the universal quarantine against the cattle of the outside world bears most heavily upon the industry here. Such quarantine can only be justified on the ground of stern necessity for the protection of private property and the public health. But if it be true as claimed that but few, if any, have been condemned as tuberculous out of the thousands of imported cattle that have been tested with tuberculin, it would indicate a remarkable health condition of live stock in those regions that furnish the supply. This importation, then, would be a source of purification and not of infection, if it could come in "pure and undefiled" by tuberculin. But it is a grave question whether the injection of tuberculin into the blood of every animal (without which they cannot come in) may not itself be dangerous to the public health. The large herds of the Fox River Valley and the entire milk shipping district where cows are crowded to their full capacity every day in the year, require a constant supply of fresh material to maintain the health and efficiency of the dairy. This supply for cow-consumers comes from cow-producing sections with small herds, kept largely in the open air, where tuberculosis in cattle is seldom or never found. To shut off the fountains that supply a living stream is to leave it to pollution and decay. It is suggested that quarantine be restricted to regions known to be affected with some dangerously contagious disease.

We believe that the State Board of Live Stock Commissioners are acting under a wrong interpretation of the statute: First, in regarding tuberculosis in cattle as a "dangerously contagious or infectious disease" of a character that would justify the destruction of private property without fair compensation to the owner; and second, in adopting a slid-

ing scale which gives the owner the dead value of a dairy cow instead of the living value, fixed from her appearance at the time of appraisal as the law intended.

Our report would not be complete without some reference to Bulletin No. 1 on Tuberculosis and the Tuberculin Test, issued by the State Board of Live Stock Commissioners on March 29, 1900, and incorporated in their annual report for the year ending October 31st, 1899. We believe it to be a most unwise, unfair, and misleading document, in that it gives but one side of the question and that greatly overdrawn.

The question of transmissibility of tuberculosis from animal to man is still unsettled. Many investigators claiming that it is possible, but after years of study and search are not able to point to a single authentic case of a person having contracted tuberculosis through the beef or products of the cow.

Another set of scientists claim that there is a difference in the bacilli of human and bovine tuberculosis and that the germ of one cannot exist in the other.

A fact that strongly corroborates the latter is that during the past fifty years while the use of beef and dairy products has greatly increased, tuberculosis in the human family has decreased 40 per cent. And people who use most of the products and are most in contact with cattle have least of the disease.

There is still another set of scientific theorists who claim that the germ is the product and not the cause of the disease.

The live stock board by a series of experiments with milk from tuberculous cows on guinea pigs, by inoculation, have tried to demonstrate the theory of transmissibility. This is manifestly unfair. The guinea pig is a very delicate, short-lived little creature, valuable perhaps for certain lines of experiments, but not for one involving the question of tuberculosis, because of its susceptibility to the disease. In fact, tuberculosis is its greatest enemy, and then there is no way of knowing whether or not the conditions shown upon the postmortem examination existed before the inoculation was made.

It has been almost universally conceded that there could be no germs in milk unless the udder or mammary glands of the cows were affected, and they were finding so very few thus affected, that it was necessary to do something to scare this feeling of relief out of the people. Their report shows one cow that re-acted to the test; but no tuberculous lesions were found in the body, but tubercle bacilli were found in the milk and cream. Here is certainly grounds for a suspicion that if these germs were found in this cow's milk the old cow was not the guilty party.

Their report makes no mention whatever of the thousands of cows imported into the state under the proclamation of Gov. Tanner, which had to be tested at great inconvenience and cost to the owner, and in many cases to the ruin of the cattle.

Another point in connection with the milk which these experiments were made is the manner in which the samples were secured. One member of this committee was present at the slaughtering house at the corner of Butler and 40th streets, Chicago, where these cattle were to be slaughtered and saw the samples of milk taken from the cows, out in the pen adjacent to the slaughter house. No precautions were taken to cleanse the udders or in any way to prevent the contamination of the milk from other sources.

Just think of it, taking forty-one cows two or three weeks after they had been injected with tuberculin and condemned in the country, put in a car and shipped to Chicago, standing around in filthy pens for several hours, having missed at least two previous milkings, cornering them up in the yard to secure a sample of their milk, then injecting the concentrated fluid in large doses into the over-sensitive, delicate little guinea pig, and then putting their findings into a report to prove the transmissibility of tuberculosis from the bovine to the human.

SAMUEL I. POPE, Libertyville, Ill.

E. J. FELLOWS, St. Charles, Ill.

W. A. GOODWIN, Crystal Lake, Ill.

The remainder of the report is made up of affidavits from authorities in support of the position taken by the dairymen of the state against the regulations as applied by the Live Stock Commission of Illinois.

DR. KOCH'S CONCLUSION.

Dairymen of the state will be interested in a report before a medical congress in London, Eng., by Dr. Koch, the great German scientist, and leading authority at the present time on tuberculosis. The doctor asserts, after long experiments, that tuberculosis cannot be transmitted from the cow to the human. A special cable on Dr. Koch's address before the medical congress is given in the Chicago Tribune of July 23, 1901, as follows:

"Dr. Robert Koch's address on Tuesday at St. James' hall before the Tuberculosis congress was extraordinary in many respects, but chiefly in the hopeful view he took of the curative possibilities achieved by science. In elaborating this idea he pointed out that, according to his experiments and observation, the chief source of contagion was from the human sputum. This was brought out when he made the declaration that the transmission of tuberculosis through milk was inconsiderable, and that heredity had little to do with the spread of the disease.

"The chief source of human tuberculosis, he said, was the diffusion of sputum, and the natural preventive measures were to remove patients from the small, overcrowded dwellings, the establishment of special hospitals for them, the compulsory notification to the health authorities of all cases of tubercular disease, a systematic disinfection of sick rooms, and the founding of sanitariums where cures could be effected.

"This hall was crowded with medical men, and there was a group of scientific experts on the platform when Dr. Koch was introduced by Lord Lister with the simplicity becoming such a great man of science. He was welcomed with British heartiness. His address occupied about eighty minutes, and was followed with intense interest. Dr. Koch read it in English with deliberate and painstaking effort to repress the marked German accent, but with no lack of emphasis when the controversial passages were reached. He is a tall, full habited man with a high forehead, large spectacles, and stooping shoulders—the embodiment of German scholarship and thoroughness in scientific investigation.

"Dr. Koch's main theme was the best method for fighting tuberculosis in the light of his experience gained in combating the bubonic plague, cholera, hydrophobia, and especially leprosy, which he described as caused by a parasite closely resembling the tubercle bacillus.

"He pronounced hereditary consumption to be extremely rare, and considered the sputum of a consumptive patient the chief source of infection. He gave an account of recent experiments in Berlin, which served to prove that human tuberculosis could not be transferred to animals. Lord Lister subsequently admitted that the evidence seemed satisfactory, and Dr. Koch had also satisfied himself that the converse proposition was also true and that human beings were not susceptible to bovine tuberculosis communicated through milk, butter, and meat. This conclusion Lord Lister was unwilling to accept on the evidence cited by Dr. Koch, and several experts from the continent talked over the matter with various results.

"Dr. Koch himself declared that infection by milk and the flesh of tubercular cattle was hardly greater than by hereditary transmission, and that measures against it were inadvisable.

"Dr. Koch took a hopeful view, both of preventive and curative measures, and explained how much good work had been done by the consumptive hospitals in England. He also highly praised Dr. Briggs' system and organization in New York as worthy of study and imitation by all municipal and sanitary authorities.

The associated press cable to the Chicago Record-Herald reviews Dr. Koch's address as follows:

"The feature of today's session of the British congress on tuberculosis was Dr. Robert Koch's paper, which was listened to with the deepest interest by a big gathering in St. James' hall. Lord Lister (professor of surgery in the Glasgow and Edinburgh universities and one of the British vice presidents of congress) introduced the noted German professor to the assembly with highly complimentary words.

"During his address Dr. Koch said his experiments had satisfied him that human tuberculosis and bovine tuberculosis were radically different

diseases, and that he had amply demonstrated cattle could not be infected with human tuberculosis. The counter proposition that human beings were not liable to infection from bovine tuberculosis was hard to prove, the doctor said, owing to the difficulty of experimenting upon human subjects, but personally he was satisfied such was the case.

"After reciting at length post mortem evidence supporting this belief, Dr. Koch said if this point were conceded, it remained to determine the chief source of contagion. He said human immunity to bovine infection disposed of the belief of infection through dairy products, and he considered this source of danger so slight as to be unworthy of precautionary measures.

"Heredity was also an important factor in the transmission of tuberculosis, in his opinion, though the contrary had long been believed. Dr. Koch said the chief danger of contagion lay in the sputum of consumptive patients and that a remedy was to be found in a law preventing the consumptive from strewing contagion about him.

"Several methods to this end were available, said the doctor, the surest of which being that of isolation in sanitariums. This, unfortunately, was impracticable, but he strongly urged the establishment of special consumptive hospitals and the obligatory notification of the authorities of the existence of the disease, the disinfection of their quarters whenever consumptives changed their residence, and the dissemination of information of the people concerning the true nature of consumption to aid in avoiding and combating it.

"Dr. Koch highly complimented Dr. Hermann M. Briggs (pathologist and director of the bacteriological labors of the New York City Health Department) upon the representative measures concerning tuberculosis taken in New York City, where, he said, the mortality from tuberculosis had been reduced 35 per cent since 1896. He recommended the system organized by Dr. Briggs in New York to the study and imitation of all municipalities.

"Dr. Koch closed his remarks by expressing his belief that the ultimate stamping out of tuberculosis was possible."

MEMBERSHIP LIST FOR 1901.

A

Atchison, M. G., Woodbine.	Allen, Fred J. (C., M. & St. P. R. R.).
Alexander, C. B., Chicago (Star Union Line).	Anderson, C. A., Altuna.
	Ardrey, R. G., Oakdale.

B

Beede, Mrs. Chas. Chadwick.	Becker, Chris, Elgin.
Bates, J. G., Chicago (Worcester Salt Co.).	Buelter, Henry, Batavia.
Biddulph, J. R., Providence.	Barkley, A. C., Elgin.
Barwell, J. W., Waukegan.	Bueler, Anton, Bemes.
Boethke, Wm., Elmhurst.	Betts, H. S., Rockford.
Barrett, F. E., Union.	Boehmer, H., Barrington.
Bloyer, Otto, Elkhorn Grove.	Bagley, F. R., Chicago (Francis D. Moulton & Co.).
Bloyer, George, Harper.	Breed, G., Galesburg.
Burton, D. C., Kaneville.	Bloomfield, R. A., Mt. Sterling.
Brundige, Mrs. Emma, LaFox.	Burton, G. F., Mt. Carroll.
Blood, F. J., Chicago (Wells, Richardson & Co.).	Baldwin, Geo. H., Mendon.
	Beatty, Frank, Fairhaven.

C

Clapp, C. E., Quincy.	Crosier, Eli I., Utica.
Carpenter, K. B., Thomson.	Carlson, John, Aurora.
Crippen, G. E., Portage, Wis.	Caven, George, Chicago.
Charles, A. D., St. Charles.	Christ, John, Washington.
Cheesman, James, 2112 Michigan ave., Chicago.	Cook, F. L., Lyle.
Carr, George S., Aurora.	Cooper, Miss Mae, Steward.
Coolidge, J. H., Galesburg.	Carr, J. W., Aurora.
Camp, L. E., Potsgrove (Carroll Co.).	Carr, F. A., Aurora.
Crissey, N. O., Avon.	Carpenter, H. E., St. Paul, Minn.
Cooley, Fred A., Yorktown.	Cooley, J. H., Hillsdale.
	Collyer, W. D., Chicago.

D

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| Dubois, F. S., Rockford. | Deitz, E. J. W., Downers Grove. |
| Davis, S. E., Elgin. | Davenport, Prof. E., Urbana. |
| Davis Bros., Fairfield. | Duel, H. R., Sandwich. |
| Danielson, Peter, McConnell. | Dunlap, Mrs. Theodore, Abingdon. |
| Davis, C. W., Woodstock. | Dorsey, L. S., Moro. |

E

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| Eastman, H., Shabbona. | Eaton, E. N., Chicago. |
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F

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| Finch, N. W., Victor. | Fulrath, P. G., Bristol. |
| Frein, H. P., Smithton. | Fourbain, B. C., Belvidere. |
| Freund, S. H., Johnsburgh. | Fraser, Prof. W. J., Urbana. |
| Francisco, M., Wauconda. | Fredericks, Andrew, Manhattan. |

G

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| Gurler, H. B., DeKalb. | Goodrich, C. P., Ft. Atkinson, Wis. |
| Gurler, G. H., DeKalb. | Green, S. F., Aurora. |
| Gullickson, Martin, Frankfort Station. | Grout, A. P., Winchester. |
| Grover, W. J., Belvidere. | Gibbons, P. H., Elgin. |
| Gray, Samuel, Hastings. | |

H

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| Herman, G., Manhattan. | Hardfker, F. H., Chicago (Merchants' |
| Haughland, A. C., Little Turkey, Ia.
(Heller & Merz.) | Despatch Transportation Co.). |
| Hopkins, H. H., Hinckley. | Hoisington, S. S., Stillman Valley. |
| Hollister, W. S., Pana. | Haecker, Prof. T. L., St. Anthony |
| Hoppensteadt, Geo. W., Eagle Lake. | Park, Minn. |
| Hostetter, W. R., Mt. Carroll. | Harvey, W. R., Clare. |
| Hostetter, A. B., Springfield. | Hicks, J. E., Thomson. |
| | Henry, R. J., Millersburg. |
| | Hawthorne, G. E., Elgin. |

J

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| Jennings, A. A., Chicago. (Star Union
Lines). | Johnson, Lovejoy, Stillman Valley. |
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K

Knigge, L. H., McHenry.
Kendall, George, Forreston.

Kirkpatrick, J. R., Oakdale.
Kilbourne, C. S., Aurora.

L

Ludwig, Mat, Goodings Grove.
Lally, W. A., Chicago ((Erie Despatch
Transportation Co.).

Long, M., Woodstock.
Lucas, O. F., Belvidere.
Lloyd, W. B., Glen Ellyn.

M

Mann, W. E., Kaneville.
Metzger, F. L., Millstadt.
McNish, F. J., Chicago (Creamery
Package Mfg. Co.).
Moore, W. S., Chicago.
Muller, F. J., Milledgeville.
McCredie, Wm., Elgin.
Mallory, Grant, Freeport.
McFarland, Frank, Big Rock.

Myers, O., Little Rock.
McNurlin, Wm. L., Stewart.
Mason, J. P., Elgin.
Mason, J. L., Elgin.
Mylie, Dr. R. C., Aurora.
Murphy, R. R., Garden Plain.
Monrad, J. H., Winetka.
Musselman, S. L., Brookville.

N

Nowlan, Irvin, Toulon.
Nelson, Peter, Creston.
Nolan, H., Hinckley.
Newman, Joseph, Elgin.

Newman, John, Elgin.
Nolting, E. L., Elgin.
Nolting, August, Elgin.

O

Olson, Chas., Kirkland.

P

Poplett, C. A., Dunlap.
Powell, J. W., Peoria (Merchants'
Despatch Transportation Co.).
Petit, Peter, North Aurora.
Patterson, J. P., Plainfield.

Peak, S. W., Winchester.
Powell, L. A., Bowen.
Phillips, Louis, Germantown.
Patton, R. A., Hanna City.

R

Redpath, R. C., Baldwin.
Rutter, Geo. F., Sr., Libory.

Reed, Geo., Belvidere.
Rotermund, H. F., Bemes.

Reed, Oscar W., Lebanon, O.
Rawson, Frank E., Sugar Grove.

Rice, H. B., Lewiston.

S

Shearer, A. J., Aurora.
Sykes, Josiah, Kaneville.
Sudendorf, E., Elgin (Wells Richard-
son & Co.).
Spicer, C. W., Edelstein.
Spicer, J. G., Edelstein.
Steidley, A. B., Carlinville.
Spencer, C. V., Chicago.
Sawyer, J. Y., Chicago.
Swanzy, L. M., Ridott.

Schlattmann, Fred, St. Libory.
Springer, Mrs. Eva H., Springfield.
Slouborg, Thomas, Savanna.
Smith, Albert, Springfield, Wis.
Soverhill, S. G., Tiskilwa.
Sears, Howard O., Garden Prairie.
Spanger, E. E., Big Rock.
Sloggett, John, Hinckley.
Stewart, John, Elburn.

T

Thompson, A. E., Poplar Grove.
Thompson, Frank B., Greenwood.
Tindall, W. K., Malta.
Thompson, M. H., Elgin.

Thurston, Henry F., Chicago.
Tripp, F. A., Chicago (Heller & Merz).
Taylor, W. H., Stillman Valiey.

V

VanPatten, David, Plainfield.

W

Wright, F. W., Joslin.
Wood, R. L., Woodhull.
Wilson, Geo. R., Monmouth.
Welford, R. G., Bed Bud.
Williams, C. H., Elgin ((Genesee Salt
Co.).
Wilson, E. L., Manhattan.
Wilder, C. R., Manhattan.
Waspi, J. S., Spring Grove.
Woodard, C. H., Kaneville.

Woodring, F. H., Elgin (Creamery
Package Mfg. Co.).
Winton, W. W., Madison, Wis. (C. St.
P. & M. R. R.).
Waterman, Geo. E., Garden Prairie.
Wentworth, E. M., Davenport, Ia
(Star Union Lines).
Willson, D. W., Elgin.
Wright, S. N., Elgin.
Woolverton, D. C., Chicago.

Y

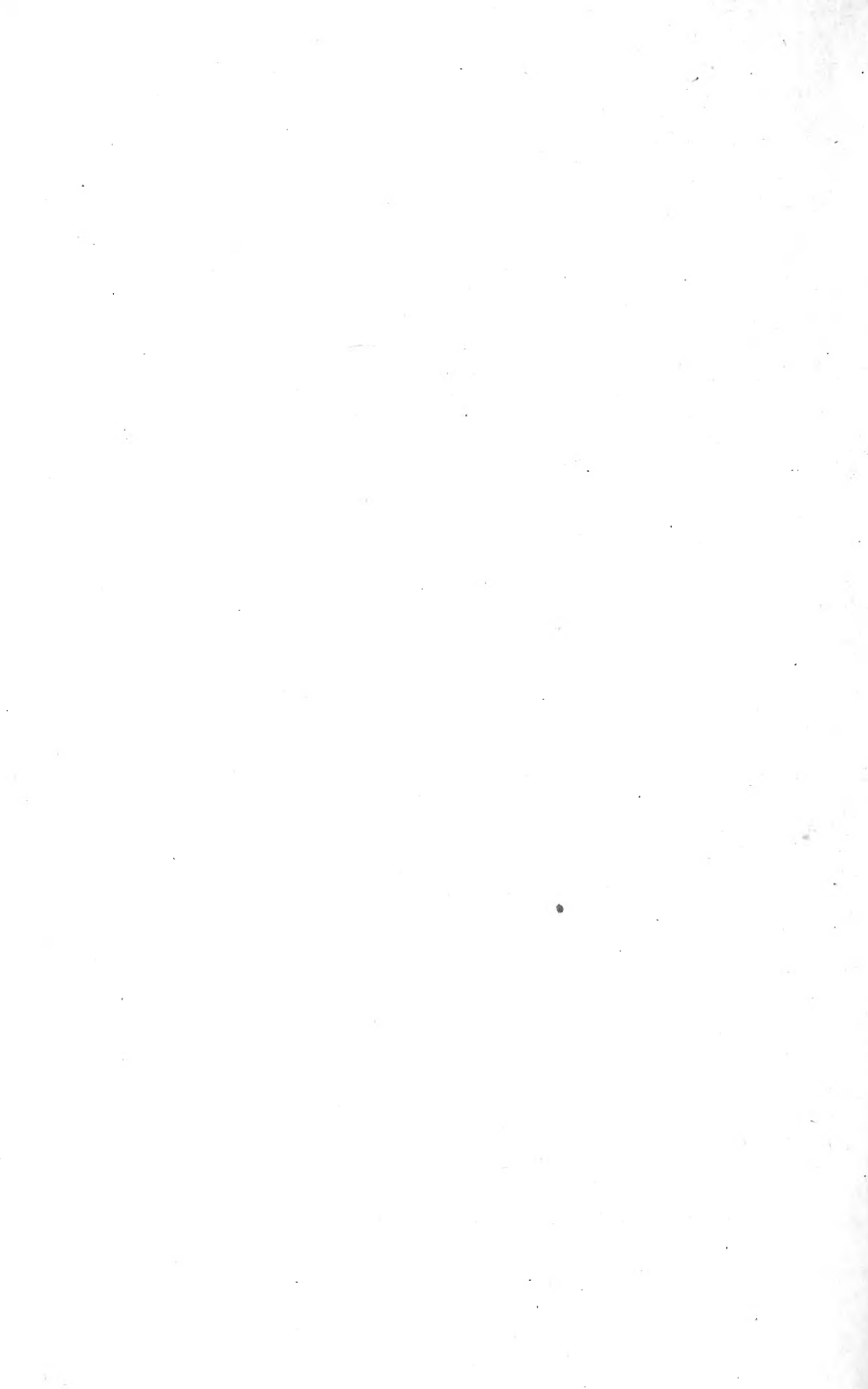
Young, W. H., Aurora.

Young, F. L., Kaneville.

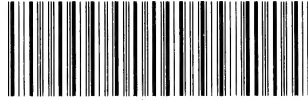
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