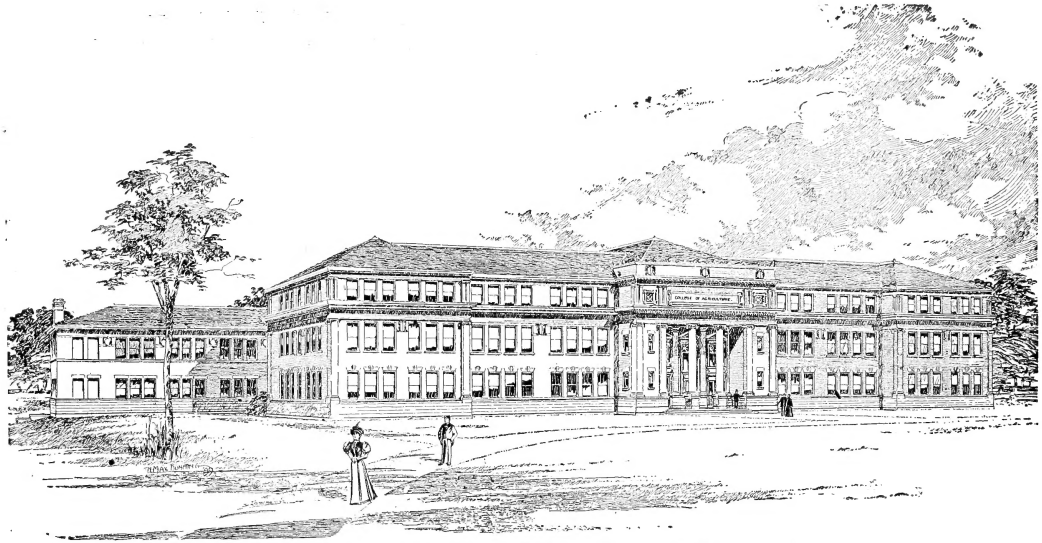


NEW AGRICULTURAL BUILDING.
University of Illinois.

Twenty-Sixth Annual . . . Report . . .

of the Illinois State Dairymen's Association

Convention held at Belvidere, Illinois, January 9th, 10th and 11th.

COMPILED BY

GEO. CAVEN, Secretary

STENOGRAPHIC REPORT BY MISS E. EMMA NEWMAN

NEWS-ADVOCATE PRINTING AND BINDING HOUSE
ELGIN, ILL., 1900

Letter of Transmittal

Office of Secretary
Illinois State Dairymen's Association.
Chicago, Ill., 1900.

To His Excellency J. R. Tanner, 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-sixth annual meeting, held at Belvidere, Illinois, Jan. 9, 10, and 11, 1900.

Respectfully,

GEO. CAVEN, Secretary.

List of Officers, 1900

President—

GEO. H. GURLER, De Kalb.

Vice President—

S. G. SOVERHILL, Tiskilwa.

Directors—

GEO. H. GURLER, DeKalb.
JOSEPH NEWMAN, Elgin.
S. G. SOVERHILL, Tiskilwa.
JOHN STEWART, Elburn.
J. H. COOLIDGE, Galesburg.
R. R. MURPHY, Garden Plain.
J. R. Biddulph, Providence

Treasurer—

H. H. HOPKINS, Hinckley.

Secretary—

Geo. CAVEN, Chicago.

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 is 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 sufficent 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 money 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 condition 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-Sixth Annual Meeting

OF THE

ILLINOIS STATE DAIRYMEN'S ASSOCIATION

Held at Belvidere, Ill., January 9, 10, 11, A. D., 1900.

The Illinois State Dairymen's Association met in annual session in the hall at Belvidere, January 9th, 1900, at 10 o'clock a. m.

President George H. Gurler in the chair.

Prayer

REV. D. M. TOMPKINS, BELVIDERE.

O Lord, it has pleased Thee to so constitute us that we find ourselves in the universe. Let us so remind ourselves that we give consideration to our surroundings. Thou hast placed us on the earth in Thy wisdom.

We beseech Thee this morning, as we are gathered together representing research, utility and science, to draw near to us. We ask Thy blessing to rest upon us, and upon all Thou hast done for us, and on all we have been able to discover, to disclose in reference to our own good and those about us.

We ask Thy blessing to rest upon us in our investigations. Give us the wisdom from above that we may appreciate Thy blessings day by day.

Bless the services rendered to Thee by word of mouth and the deepest convictions of our hearts. Bless this organization and the work it represents. Bless this great State at this time; command Thy blessing to rest on our Government, the President of the United States and his Cabinet and every one in official capacity in this nation. May the earth be blessed with universal peace, and the brotherhood of man with love and its choicest blessings.

Again we ask Thy blessing to rest upon the Association and all gathered here; we ask it for Jesus' sake. Amen.

Address of Welcome

In the absence of Mayor Moore, the address of welcome was given by P. H. O'Donnell, city attorney of Belvidere.

Members of the Illinois State Dairymen's Association. It now becomes my most pleasant duty to extend the right hand of welcome and offer you the freedom of the City of Belvidere.

In selecting Belvidere as a place for holding your deliberations, you honor us exceedingly, and we earnestly desire to show our appreciation, and to wish you a successful termination of this session.

It is especially gratifying from the fact that we have here with us members of this Association from every portion of the State, and that eminent men from seats of learning of three States will take a conspicuous part in this convention.

These deliberations mean much for the dairy industry throughout the State of Illinois. Since it has reached such immense proportions, it is obvious that much careful consideration for its welfare and greater efforts will be put forth by those immediately interested, so that the consumer and the dairyman may be benefitted and protected. The combined knowledge and experience of those who have given this subject a careful consideration and have thoroughly studied it, is of incalculable benefit to the dairyman who has not the facilities nor the time to pur-

sue his own investigations, or carry on his own experiments. This is where the United States is an important factor in its relations towards the people—by means of a well-equipped agricultural department and reducing research to a science.

The convention is one of the best means for educating the dairyman. It serves to bring them together nearer in their relations towards each other, and to exchange ideas as to the best means for fostering the industry and to mutually benefit through the interest.

The consideration of these questions should not be confined alone to the dairyman. They affect the consumer in the highest degree. There is scarcely a household throughout this entire land where the dairy products have not become a natural necessity. Consequently every step taken in the advancement and development of this industry is of the most vital importance to the consumer, and should receive his hearty co-operation and support.

I am told that it is now ten years past since this Association met in convention in the City of Belvidere, and that the pleasant treatment and cordial welcome accorded them in a great measure influenced them in returning.

At that time Belvidere was in the embryo of prosperity. Today we greet you as a municipal city, with a population of 10,000, and whose growth of commercial activity is unequalled by any other city of its class in this great State of Illinois.

Members of the Illinois State Dairymen's Association, it is with exceeding pleasure that I greet you in cordial welcome as guests of the people of the City of Belvidere.

Response

MR. JOSEPH NEWMAN, ELGIN.

Mr. Chairman and Representatives of Belvidere and the Members of the Illinois Dairymen's Association:

We return thanks, hearty thanks for being asked to come to this town.

When this subject was first approached among the Directors we sent out one or two men, good and true, to look over the situation, and they brought back to us about the same reports that the two men of old brought back, "The land was flowing with milk and honey"; that the farmers were anxious to have us come; that the town would treat us right, and we know from what friends we have here that that would be so, and we immediately decided to accept the invitation to Belvidere.

We, of course, expect, and we know we shall not be disappointed, that the citizens, as well as the farming community, will turn out, and it is, as the former speaker said, to the interest of the merchants as well as the dairymen. We in return expect to hear from your local speakers what they have learned in regard to the dairy interest; we may gather knowledge as well as give knowledge in that particular.

The dairy interests of the United States, and I take it from figures of Governor Hoard of Wisconsin, have reached eight hundred millions of dollars annually. Hence we have gotten to a point where the dairy interest of the United States is one of our greatest interests. Thus, this annual convention of the State should be attended to and carefully watched, that the right men are taking hold of it, and you farmers should take into consideration your influence in the city or town you live in, and remember every one is needed to help us in this work of lifting up the dairy still higher.

The city and country surrounding Belvidere I need not speak of to you, because we all agree there is no other valley under the bright sunshine, or on God's footstool that will surpass it in fertility, bright men,

and honorable men, who will help the dairy interest every time. We call on them for help, and if they don't do it, we look to you farmers living here, when it comes to balloting, that they are relegated to the rear.

We have a fight before us in congress, and every one of you can assist. You should be careful and see that the consumer gets what he asks for. When he goes to a store and asks for a pound of butter, see that he gets butter. A child or a grown up person; your child or my child, when they go to a store to purchase butter should get what they pay for, and we can have it so if we send the right persons to represent us in the Legislature and in Congress.

I want to remind you of this. Every one sitting here is a voter and has influence with other voters. We know that oleomargarine or butterine should not be put out of sight, but should be sold for what it is. It is for the manufacturer's benefit to sell it so. If it is for the laboring man's interest to have oleomargarine I ask you to sell it for a shilling per pound, and that allows 25 per cent profit. We say, yes, sell it for what it is; leave the butter color out of it, then your child and my child will know that they are buying lardine, or any other "ine" you are a mind to call it. That is all that we ask on that matter.

I think, Mr. Chairman, as our session will be short, I will close in this response and thank the citizens of Belvidere and people here generally for their invitation, and we will ask them to see their neighbors and friends and merchants, and ask that they occupy these seats this afternoon, as there will be men of the highest learning, from some of our best institutions, to tell you how to feed, what to feed, when to feed, what kind of cows, and all about the dairy interests, and you may be able to impart some knowledge to them.

We thank you for inviting us here to Belvidere.

By the President: Any one having questions not dealt with in this program is requested to hand them to the Secretary, and the matter will be brought up Thursday afternoon..

Meeting now stands adjourned until 1:30 p. m.

Tuesday Afternoon, January 9, 1900

President's Annual Address

G. H. GURLER, DE KALB.

Before I begin my address. I have something else I would like to say. It may not be in order right here, but I wish to give it.

One year ago in December, one of our men had two cows, and he wanted to see what he could get out of them, a black and a white cow. He wanted us to keep a record, and we did, and here is the result. First I will give the white cow:

Dec. 1898.....	1020	lbs. Milk	3.70	test	37.7	lbs. Oil	19	c per lb.	$7.16
Jan. 1899.....	1158	"	3.60	"	41.7	"	17	"	7.09
Feb. "	1123	"	3.70	"	41.6	"	19	"	7.88
Mar. "	1189	"	3.70	"	44.	"	18.2	"	8.00
Apr. "	1020	"	3.70	"	37.7	"	19	"	6.01
May "	1069	"	3.50	"	37.4	"	15.5	"	5.80
June "	936	"	3.50	"	32.8	"	16.5	"	5.41
July "	703	"	3.90	"	37.4	"	16	"	4.38
Aug. "	673	"	3.90	"	26.2	"	17.3	"	4.53
Sept. "	718	"	4.00	"	27.7	"	21	"	6.02
Oct. "	725	"	3.80	"	27.5	"	21.5	"	5.90
Nov "	722	"	3.80	"	27.4	"	23 5	"	6.44
	11056	"	373.4	"	410.1	"	18.3	"	$74.65
And 75 per cent. of 11056 lbs. at 15c per hundred, is.....									14.09
And one (1) calf at.....									5.00
Makes a total of									$93.74

This cow, gentlemen, was fed on what grew on the farm, corn and oats; did not buy a pound of any kind of feed. I wanted the man to buy some bran or shorts or gluten meal, or linseed meal. "Shucks," says he, "it don't pay."

He started with the black cow and milked her for six months, when she was taken sick. At the end of six months the black cow was just ten dollars behind the white cow in butter fat. I give these figures to show

what a cow will do if she has care. He thinks it is a wonderfully good cow, and there is no question about that.

He has started now with another cow, the poorest cow he's got in the herd, and he has kept a record for sixty days. He has got that cow up to 30, 33, and 34 pounds of milk a day. I asked him why he didn't feed all his cows? He is a peculiar man and he wanted to see what he could do with one or two. He doesn't know her breeding. He bought her for $17 three years ago, and previous to that she sold for $11.

Ladies and Gentlemen—It gives me great pleasure to meet with you at this twenty-sixth meeting of the Illinois State Dairymen's Association.

When locating the meeting of this association in the beautiful city of Belvidere, the officers felt assured that the meeting would be a success, and judging by the past, if that be a righteous judgment, it will be.

I well remember that the last meeting this Association held in this city was one of the best we ever held.

The surrounding country is particularly adapted to dairying, the dairy business has developed to such an extent that it supports a number of creameries and a condensing factory and from present appearances will support a Dairymen's Association as well.

We have met from year to year to deliver addresses, read papers, discuss topics, to examine dairy products and to become better acquainted with one another; these meetings have been productive of good, without a doubt; the reports of our meetings have been published and distributed very systematically throughout the state.

We have met here at this time to exchange experiences, ask and answer questions, and in every way within our power enlighten and encourage each other to develop the dairy industry of this glorious state.

If we could educate the dairymen of Illinois so they would produce one-third more milk from the cows they are now milking, I would feel that we had accomplished much good, and I am satisfied that this increase could be made by giving the cows proper care and judicious feeding, for I do not consider the cow power more than two-thirds developed in Illinois.

And just here I wish to say a few words regarding the quality of milk taken to the creameries.

There appears to be a disposition on the part of many dairymen to be negligent about the care of their milk and think anything is good enough for the creamery, and fairly force the buttermaker to take in milk that he knows is not in good enough condition to be received at a creamery. The man who takes the milk in should be allowed to be the judge whether the milk is good or bad, and should have the nerve to refuse to take bad milk, as it is an injustice to the patrons who care for their milk, as it should be; one lot of poor milk may spoil a day's make of butter; the creamery not only loses money by this day's make of poor butter, but also loses its reputation as well, and that is worse than losing the money.

Good butter cannot be made from poor milk, and when milk is once off in quality there is no power on earth that can restore it, and we never look for Divine aid in its behalf.

As soon as the milk is drawn from the cow, put the cans in a tank of cold water in a room free from taint or odors of any kind, stir it several times to let the animal heat escape, and I assure you that you will have no trouble with the creamery manager about poor milk, and the quality of the skim milk will be much better than if the milk had not had proper care when first drawn from the cow.

The people have their taste cultivated up to a high standard and want extra creamery butter; we should endeavor to keep up that standard and improve it if possible; we should not wait for the consumer to force us to do so.

There is no more promising field for intelligent work among the productive callings of life than can be found in the dairy business of Illinois today.

By dairy business I do not mean the keeping of a few half fed, scrub cows and producing butter of a quality that the consumer will say he would rather eat butterine than eat it. I mean intelligent dairying.

Dairying is now conducted on business principles, in sections where they make a success of it. Intelligent breeding, feeding, cleanliness, and skill are used in every way possible.

There is always something for a dairyman to learn in his business, as well as in any other industry. There are great improvements in the line of farm machinery developing from year to year, and why should there not be in the handling of cows?

We have on our program for this meeting some of the very best talent in this country. Farmers, whether dairymen or not, can ill afford to miss this meeting. There is not a farmer in this room that cannot make some suggestions or ask some questions.

We have come here to teach others and to be taught, and if we should happen to run against knotty problems there are men here who can solve them. I will venture to say that the average farmer can learn more practical knowledge by attending this convention, listening to the addresses and taking part in the discussions with the professional men in the different lines of agriculture and dairying, that will be on the program of this meeting, than he could work out on the farm in a lifetime. Gentlemen, life is too short for one man to learn everything by his own experience or labor; we must profit by the experience of others.

I believe the dairly business of Illinois will be advanced largely by the aid of the Dairy and Food Commissioner, Hon. A. H. Jones, and his assistant, the worthy J. H. Monrad, whom you all know and respect. The dairymen have the utmost confidence in the Commissioner and assistant and heartily approve of the appointments.

The Illinois State Farmers' Institute is doing good work in that line. County institutes are being held in counties where they were never held before, even in old dairy districts. I hope the good work will go on until there is an institute held in every County in the State, and if that won't bring the farmers out, I would like to see meetings held in the district school houses, and I firmly believe that much good could be accomplished by the latter method.

The Dairy and Agricultural interests of the State are to be congratulated on the recognition given them by the last legislature in the appropriation of $150,000.00 to be expended in building a State Agricultural and Dairy Building.

The State of Illinois will be on an even footing with her sister States in the line of Agricultural and Dairy buildings and, I trust, in men of brains to conduct them.

The time will soon come when our young men will not have to go abroad to attend dairy schools, as they have had to do in the past; Illinois will have as good facilities for educating our young men as the country affords.

The year just closed has been a prosperous one; not in the history of this country has there ever been such a revolution in every line of business. We have opened up new channels for our goods in all branches of our industries.

What was the cause of the low price of milk for the two years previous to last year? The reason was, because butterine or bogus butter had taken the place of pure butter, and to such an extent was this true, that the price of milk was driven down and dairymen claimed there was no money in milking cows, and as a result they have sold them for beef or let their calves run with them. They have now awakened from their lethargy to find that cows are high, butter is a good price, and milk is scarce.

The National Dairy Union is doing good work throughout the entire country in collecting funds to defray the expenses of getting national legislation on colored butterine. Ten thousand dollars seems a large sum of money to ask for or expect to raise by the dairymen.

The matter has been put before the public in such a clear light that the amount has been raised or guaranteed; now an effort will be made to get national legislation of ten cents per pound on colored butterine, as I understand, to reduce the tax on uncolored butterine to one quarter of a cent.

The butterine men are lining up their forces; it will be a fight to the finish; should we be defeated in getting a bill passed, we must renew the attack and keep up a continuous fight, else the dairy business of this country will be ruined.

Every man who is milking cows can afford to give something to help the good cause, for the dairymen are really the ones who will be benefitted.

It was said several years ago that the filled cheese bill could never be passed. It was, however, and I don't believe the good people of this country are going to stand with folded arms and let the greatest and noblest industry in the land be ruined by a fraud.

We must wake up, put our shoulders to the wheel, and help push the bill through.

Don't neglect to write letters or sign printed matter that may be presented to you by the National Dairy Union and mail to your representative at Washington; flood your representative at Washington with letters and postal cards until they cry "Enough."

Our worthy Secretary of Agriculture, Hon. James Wilson, strongly recommends a more rigid inspection of our export dairy products to counteract the injury that has been done in the past by unscrupulous dealers. This, I think, the people will concede is a wise move.

Our Secretary has offered some valuable premiums for butter and cheese exhibited in the butter room, making is an inducement for the Illinois butter and cheese makers to keep to the front in the improvement of butter and cheese making.

The Elgin Board of Trade has offered a valuable medal as a premium for the best tub of butter made by a member of the Elgin Board of Trade or a butter maker working for a member of the Board of Trade.

The Board of Trade offers this medal as an inducement for its members to make the best butter possible to win the medal. It is a trophy well worth working for, and whoever is fortunate enough to win the medal should be proud of it.

Elgin is known by its butter record from the north to the south and from the east to the west. As butter producers in the Elgin District we must try to lead the procession in the art of butter making in order to hold the reputation we now have.

There is a large exhibit of machinery, butter color, salt, etc., that will be of interest to you, in the hall below.

Our membership has been large the past few years, but I would like to see it much larger this year than ever before.

Everyone who becomes a member, pays one dollar; of course it helps to defray the expenses of the meeting, but you get value received, for every member will get a report of this meeting in full when published. The reports will be ready for distribution about August 1st next, and are worth the price of membership.

The success of this convention will depend on the spirit shown here; be prompt with your questions and your answers; the discussions are the life of the convention.

I am a firm believer in dairy papers, if the farmers would read more and use a little brain power to lubricate their joints with, I think in many instances good results would follow.

I trust that such attention will be given and such interest taken in the papers read and discussions on the various subjects here that good seed will be sown which will be carried away by each one of us, and which may spring up and yield a bountiful harvest that will be an honor and reward to the wise and honorable gentlemen who have so kindly and liberally given their services to make this meeting a success.

And in conclusion, I desire to express to the people of Belvidere the thanks and gratitude of the members of this Association for the kind reception and thoughtful attention that has been extended to us by you, and we assure you that our remembrance of this meeting will be brighter, as we think of it hereafter, in consequence of your efforts to make this meeting a pleasant one.

DISCUSSION.

By Mr. Johnson: In giving your statistics about bringing this cow up to full capacity, do you mean we can take a cow and double the product by care and attention?

A. No sir; this man, as I said, took proper care and it could be increased I thought one-third; but double, well, I don't know. This record

is a fact. We have the figures. I took them right off from the books, no guessing about it.

Q. I was in hopes you would stick to your first statement so I could tell my patrons Mr. Gurler said that you can double the quantity of your milk by care of your cows.

A. Your patrons would say Gurler was saying something that was not so. This was a little out of order to read that statement here, but we were a little short on our program this afternoon, and I thought I would give it.

Mr. Cahoon: Are you going to have a question box here?

A. Yes, sir. Questions can be handed in and they will be answered Thursday afternoon.

Q. Can't that be changed. Can't a man ask a question now and not wait until Thursday afternoon; it would not take but a few minutes, and it may be better for all concerned?

A. Well, all right.

Mr. Cahoon: I want to ask a question or two. I have it written down here so I can get it worded exactly as I want it. Here is question number one.

No. 1—In your judgment, or to your knowledge, what per cent of 100 men or maids who milk cows, wash their hands in the morning before they go to the barn to milk?

Mr. Andrews: I don't believe there is one.

Mr. Cahoon: How is that sir?

Mr. Andrews: I don't believe there is one.

Mr. Cahoon: This gentleman says there is not one that does or does not wash their hands?

By the President: He doesn't believe there is one that does.

Q. Is that right, Mr. Andrews?

A. I will say that I have never been to the barn to the milking that I didn't wash my hands in the morning; he was mistaken in one.

Mr. Cahoon: I have had to fight that question with my hired help, and when I presented that question to dairymen that had cows to milk

they pushed it off and did not think it of importance, while I think it is. My other question—but some one else had better ask one.

Mr. Cahoon: In regard to dairying. What per cent of the dairymen or men that milk cows do as well as they know? Who does the work as well as they know in regard to dairying? How to raise our methods to a better quality and better results and now how many of us do as well as we know?

By the President: Raise your hand all of you that do as well as they know how in milking cows. Please raise your hand?

(No hands raised.)

Mr. Johnson: I don't like the way that question is put. We believe we try to do as well as we can, but when the question is asked right square, are you as good as you might be, perhaps there are some creamerymen who had the cheek to say "Yes," but we farmers are too modest.

Mr. Long: I would like to answer that question. I believe they do as well as they know how. I think there are a larger percentage of men do it in dairying than in any other line of business.

Mr. Cohoon: I don't believe that either.

Mr. President: I don't see why you shouldn't.

Mr. Cohoon: I have one more question. In your judgment does not the following "ad," which is found in a leading paper, degenerate and undignify the profession of dairying, or is it true? This is it: "The cowy odor which is so prominent in much of the dairy butter and which is so offensive to many people, is the result of dirt, real fine dirt, that can't be strained out. The ——— Separator takes out all the dirt; produces a perfect flavor, and greatly increases the product." In your judgment does not the following "ad," which is found in a leading paper degenerate the profession, or is it true?

Mr. Soverhill: Isn't that true that those who are running separators would say that that wasn't true; that the damage was done before getting to the separator, and that the separator cannot do it.

Mr. Cohoon: Isn't it bad to have a man having a separator to run, trying to teach us if we dirty up our milk and take it to the factory

that he can cleanse it. Isn't that a bad teaching to the milkman or maid, that there is no necessity of being careful; no necessity of cleaning off our cows' teats; need not wash our hands, and when at the factory we can make it clean there. Isn't that a bad teaching to the farmers?

The President: It most certainly is.

Q. From the standpoint of cleanliness isn't it bad?

By the President: It is from any standpoint, and I don't think there is a separator man that really advocates it that strong.

Mr. Cahoon: That is an "ad" that I read; no matter whose it is?

Mr. Johnson: I have nothing to offer especially. I am surprised and am led to inquire what the trouble is around Belvidere if you all get into such filthy habits that not one in a hundred wash your hands before breakfast. In our country we all wash our hands and do something in that line, and we manage to keep the milk tolerably clean. If you have such habits around Belvidere I am glad you are getting stirred up like. I have noticed that advertisement, but have learned long since not to pay much attention to such "ads" as that. I don't think they do the damage that our brother from Belvidere thinks they will do; I don't think people believe very much of it. The amount of filth a separator takes out in running through 10,000 pounds of milk, if that were put back we would hardly call the milk filthy. You clean out a separator and get considerable filth from it, but when you distribute that among three or four thousand pounds of milk it is not as bad as some of us think it is.

Mr. Graham: I use a separator and have for ten years, and think there is quite an amount of filth, and I don't want that gentleman to think it all comes off my hands, because I think my hands and cows are kept clean. I was surprised at the amount of filth I would get out of the same milk by running it through the separator. I supposed milk was clean, but when I got a separator I found out there was more filth than I imagined, and it didn't come off my hands.

Mr. Cohoon: This is not satisfactory yet. There is too much filth in our milk. Men use poor pails, and I have had to wrestle with men for not keeping clean. They clean off the cows' teats and have the pails right

under. There isn't one man in a thousand that keeps things clean. At the factory you will find chunks of dirt in the milk. We do not milk right. You can get all the milk and all the strainers on earth and you cannot make it first-class unless you begin at the beginning.

Mr. Graham: I have been running a separator for ten years and if Mr. Cohoon thinks there is so much dirt, I would like to have Mr. Cohoon bring his milk to my place some time and I will run it through for him. I will run it through and surprise him. He has no idea until he tries it how much dirt will come out.

Mr. Fox: In answering Mr. Cohoon's question, I will tell what a woman told me. She lives in McHenry county. She said it took just a week to make a dirty milker a good clean milker, and I tell it for Mr. Cohoon's benefit. The way she did, her husband spoke to the hired man about how he should milk the cows. He spoke to him again, but he didn't pay any attention. He then said nothing more to him, but the last cow that man milked, he would say to him, "You bring about two quarts of that milk into the house." He took it in. This woman would strain that milk in his presence, and the next morning skim that milk in his presence, put it into the pitcher by itself, and turn that cream into that man's coffee. In three days after they done that, that man was a clean milker.

Mr. Crosier: The separator takes out lots of dirt I know, but before it gets to the separator the milk absorbs a great amount of that dirt.

Mr. President: It certainly has, I should say.

Mr. Harris: Cannot Mr. Cohoon ask something easier?

Mr. Cohoon: We want the hard question answered first.

Poultry and Dairying

BY E. D. BONE, MALTA.

Dairying and poultry keeping was to be my subject, but I know so little about dairying that I have dropped that much of the subject and will, at the risk of being tiresome, confine my remarks to poultry keeping, and try to impress on all my hearers the importance of constant attention to the needs of our hens.

My experience has been in the direction of breeding for color, typical shape, and the fancy points demanded by those who follow the poultry shows, but the same care, feed, and management is required to keep a farm flock productive and healthy.

The first thing required in a person who would keep hens is a love for pets, and a willingness to work—and it requires lots of work to keep their surroundings clean—and all their little but many wants supplied. Having found the right sort of person, I would advise that a visit to a poultry show be the next step; look the birds over; talk with the exhibitors, and read the poultry journals. Make up your mind which breed or variety will suit your requirements best, and then buy full-blooded stock. If you can't afford to start with a flock, buy a trio and so begin right.

Next, you will want a house. Any old thing will not do for a house, but it must have a tight roof, be wind proof, and have a reasonable number of windows. Face it to the south, and have the floor four (4) to twelve (12) inches above the outside ground. The floor must be dry and covered with straw or other rough stuff. Be sure that the house is large enough; ten square feet of floor space for each hen is not too much, and it is perfectly safe to build as big as you can pay for. But in case you intend to keep a large number, I would recommend dividing them into flocks of 50 to 75, and furnish a house for each flock, as it will lessen the

chances of loss by crowding and disease, and they can be sorted according to age and other conditions.

Having the hens and the house, give them good care and feed properly, and you will raise strong, healthy chicks and get a good return for the money spent and work done. By good care I mean in addition to what I have said about the house, provide a dust bath with dust in it; have plenty of roost room, and if the roosts are all on the same level it will stop the pushing and crowding that takes place every night where the roosts are built on an incline. Provide plenty of sharp grit in each pen or yard. The water supply must be looked after every day; keep the fountain clean and full of fresh water, and in cold weather it pays to give warm water and empty the dishes at night, as it is easier to do this than to thaw out the ice in the morning.

It will help to keep the house clean to have dropping boards under all roosts and clean them off each day into a basket and remove to the manure pile.

Provide plenty of neat boxes in the darkest corners; keep them free from vermin and renew the straw often. Never leave an egg for a nest egg; use one made of plaster of paris or glass, as they won't spoil if sat on over night.

If the house is large enough to accommodate the flock, it will pay to confine the hens on wet, stormy, and in very cold weather, giving exercise by scattering small grain in the straw.

By feeding properly, I mean feed enough, giving variety, plenty of green stuff in the shape of cabbages, beets, mangles or chopped clover hay steamed until soft. Give a little meat or beef meal two or three times a week; watch their appetites and keep them just ready for more, and they will be hungry and happy Dont feed too much, as in this lies the greatest danger. An over fat hen don't lay as many eggs as one not so fat, and her few eggs are seldom fertile. You can keep the fat down by feeding small grain in the straw or other litter, and cutting down the corn feed at night. My way is to feed wheat in the pens in the morning; green stuff at noon, and light feed of shelled corn at night. This forces the hen to work at least one-third of her time, which is about right.

It would pay to mark all chickens hatched, so that you could tell the age of any hen and dispose of all aver two years old each year. This plan would keep your flock down to pullets and one year old hens. These are the producers, and it would lessen the losses a good deal, as the older hens take on fat readily and are more subject to disease.

One of the worst drawbacks in the chicken business is the hen louse and the little red or gray mite, and every year dozens of good intelligent people ask me what to do for mites, as the hens are dying on the nests and we don't dare go into the house. My advice is always the same. Subscribe for and read a good poultry journal; buy and use a tried "lice killer," either liquid or dry. My own way is to have every thing in the house movable, and every two, three or four weeks go over the roosts, dropping boards, and nests with the sprayer loaded with Lee's lice killer, being sure to get into and behind everything. For setting hens I use Lambert's insect powder.. A 100 oz. package usually lasts through the season.

I have given up the practice of medicine in connection with my hens, and my new plan is to use the hatchet for all contagious diseases, as I think the breeding from cured fowls is the cause of such large losses of chickens at two to eight weeks old, and I believe that in the course of years this "survival of the fittest" will make a marked improvement in the general rigor and hardiness of the flock.

It is unnecessary that I should tell you of the great importance of the hen and her products, as it has been treated on in all the live-stock papers. There is one way to increase the usefulness of the hen, and that it, never sell a fowl or an egg that you can possibly use on your own table. This will cut down the supply and increase the price. Kill one hog less and eat fried chicken oftener. My only excuse for this "line upon line" in regard to how to treat a flock of hens is the remembrance of some houses and hens I have seen on otherwise well-conducted farms, and an earnest desire to better their condition, and at the same time add one more pleasure and beauty to a well stocked farm—a flock of pure bred hens, well cared for and profitable.

DISCUSSION.

Q. What do you feed your hens?

A. Wheat in the morning, green stuff at noon, and shelled stuff at night before going to roost. This makes the hen work one-third of the time.

Mr. Bone: In 1890 the American hen and her products were valued at $290,000,000.00.

Mr. Harris: Did this gentleman ever use kerosene to kill mites and lice on hens?

A. I have used gallons and gallons of kerosene. Kerosene has another use besides that. A very little of that put into the drinking water it will spread over the entire surface and in case of slight colds I have found it a first-class remedy. It prevents the mucous from closing the nostrils and in that way stopping the air passages. It is also good for scaly leg, one of the worst things. A little kerosene oil added to perhaps three or four times its bulk of sweet oil or lard and rubbed on the leg at intervals of two weeks in two applications, it will entirely come off. The trouble is caused by parasites.

Mr. Johnson: Did you say it required 100 square feet for one hen?

A. Ten square feet.

A. I was going to say—my wife runs the chickens—and she might want me to buy one or two more houses if she heard that.

A. There is no danger in getting too much room, but ten square feet is about the run.

Mr. Coolidge: Is a board floor better than ground floor?

A. I like it better for use during the winter. I can clean off the surface of the ground. It takes 18 pounds to renew the floors in my chicken house, and I find with boards it absorbs more or less of the filth and it is practically impossible to keep them clean. Another thing, the sand or gravel floor gives the chickens an elegant place to work.

Q. You prefer ground floor?

A. Yes sir, I do for that reason.

Mr. Crosier: How much would you consider enough feed for 50 hens for one day?

A. I never figured that. I think a pailful of shelled corn. If there are ten hens in the pen two years old I would give them a scant handful for each hen; if pullets an extra handful; and if cockrels a straight handful, and at the same time watch the dropping boards every morning. I find the first indications on the dropping boards.

Q. Wheat rather than corn?

A. If feeding for eggs rather than feeding for size or growth I should feed less grain and more meat, more vegetables, more clover hay and wheat in the morning, or wheat and corn morning and night; but cut down the grain feed and feed more soft stuff. Corn and oats ground and an equal amount of bran, and if mixed in a 10 or 12 quart pail put 75 pounds of beef meal, such as the stock yards make.

Mr. Johnson: You think it a detriment to let the hens get too fat. How are you going to know it?

A. You can't unless you keep them shut up on the farm.

Q. How are you going to tell when they are too fat. Do you have to catch them?

A. You can tell from the shape of the hen and its motion.

Q. I dont know whether other people can tell when a hen is too fat or not. I don't believe I know?

A. I can tell. When a hen sits around in the corner that hen is too fat or sick.

Mr. Soverhill: What is the matter with a cement floor?

A. The worst objection is the cost. That can be kept clean and by covering it from two to four inches deep with litter it is a first-class floor, better than boards, a great deal.

Mr. Coolidge: Do you find that feed has any effect whatever upon the color of the bird or plumage of the fowl. Would you feed yellow corn or would white corn be better to keep away the brassy color?

A. If a white fowl is from parentage showing straight color in the plumage it would, but if the parentage had a tendency to color I think yellow corn would be all right. I think in the judgment of the best

breeders of white fowls agree now that yellow corn feed is a detriment to the pure white plumage, in such fowls as Plymouth Rocks and Cochins. In black fowls it don't make any difference. It is more in the breeding than it is in the feeding, although the feed might affect it to show a slight change.

Mr. Holmes: What breed do you breed?

A. Plymouth Rocks.

Mr. Cohoon: Can you tell anything about the peacock?

A. Yes sir.

Q. How old are they before they begin to lay?

A. I can only answer that by saying I have kept peacocks three years now and the young female did not lay last year and she would be three years old this coming spring. I think that would tell you a little. In the young male the tail doesn't show any eyes until three years old and the same would apply to the female.

Q. How often does he lose his plumage?

A. Every year. The young male has a white breast like the old hen at first, and the only way you can tell the young male from the young female is by the lower or outside wing feathers; the outside three being red and brown color. At two years old the young male will show a black or bluish-black breast; the feathers in the back will turn green and some purple and the neck purple and blue, and at three years the tail begins to show its color and the eyes.

Q. The third year is the first time he loses his plumage?

A. No, no. Every year he loses his plumage. I have four now and they are just growing their tails, only out one-third of their length.

Q. Is there any market for the feathers.

A. I don't know of any. My wife has found a market for them this year. This spring brown feathers are very proper and every girl in Malta has a long brown feather in her hat.

Creamery Management

L. E. CAMP, ELMOVILLE.

Mr. President, Ladies and Gentlemen: Creamery management from the buttermaker's standpoint usually begins with managing the patrons, and ends with managing creameries, where I have spent most of my time. The buttermaker has a good deal to contend with, and his success depends on good management.

It doesn't make any difference how good a buttermaker he is, if he cannot get along with the people he comes in contact with, he is not apt to make a success of his business. He must manage to have harmony everywhere. He should have the confidence and good will of the patrons and his employers. He must manage to have the patrons bring the very best of milk to the creamery. This is not hard to do with the progressive dairyman. He keeps posted and if his milk should come to the creamery tainted he knows there is such a thing as tainted milk, and will, with the buttermaker's help, soon remedy the evil.

Not so with the patron who reads nothing but stock journals and raises steers, and milk a little as a side line. This man thinks as long as the milk is not thick it is as good as any. He milks in a wooden pail, which he rinses with cold water, if he cleans it at all, and then hangs it over the most convenient fence-post till next milking time. Then he uses it again. He will pour the morning's milk into the same can with the last night's milk, put the cover on tight, and thinks no more of it until it reaches the creamery; for he thinks he has done all that is required of him. But when the buttermaker opens his can of milk and finds it to be tainted, or we might say, rotten, and tells him of it, he will put up a big howl, say it is as good as anybody's milk, and that the buttermaker is getting altogether too particular—usually putting it in stronger terms than I have. If that buttermaker can tell that patron that it takes good sweet milk to make good butter, and tell him of his

faults, and how to remedy them, and have him go away in a good humor and satisfied that his methods have been wrong, I think that buttermaker understands the hardest part of creamery management and deserves better wages.

Creamery management is to manage the work in the creamery so that you can start the separators at a certain time in the morning, and have the patrons arrive so that you can start at that time, for it will create a better feeling among the patrons if they think you are interested in having them lose as little time as possible at the creamery; for most of them think it is a waste of time to come to the creamery at all, especially those who do not follow dairying as a business.

Creamery management is to educate the patron, show him that it pays better to feed the calves on skim milk than on whole milk; that some cows pay better than others; that some kinds of feed give better results than others; that he should test his cows, or, if he has no tester, bring each cow's milk to the creamery to be tested. If patrons have good milk, tell them of it—everybody likes to be told his product is good. If some have poor milk, encourage and show them how to better it. You will find very few not willing to listen, for they all want to better themselves and will, if shown how.

Creamery management in the creamery is to run the machinery to the best advantage with the least expense. To do this we must look into details, such as the amount of fuel we burn, oil used, keeping the boiler and flues clean, buying of supplies, weighing the butter before shipping it, to know if we are getting correct weights—for if we lose a pound of butter on each tub we ship, the company is liable to run short of a dividend when the year is up.

Last, but not least, he must manage to keep on the good side of directors and the manager in particular. If you do not agree with him, you are liable to hunt a job when your year is up. Much more could be said on this subject, but I will leave off here, hoping what I have said will do no harm if it does no good.

Cheese

S. G. SOVERHILL, TISKILWA.

Things have changed some since our last meeting. We feel a little more encouraged to stay by the old cow. Last year our President asked the question, "What are we going to do; shall we stick right to it and try and produce milk cheaper, or shall we change, and go to something else?"

And if we do change, please tell me what we will change to to better ourselves? We might have changed to raising broom corn, as we can see now, and come out all right, if we know how to do it as it should be done, but it takes time and study to make a success of most anything. And isn't this a good lesson for us all, that when we start into a business and stay by it, not getting easily discouraged, the change is sure to come. "It is always darkest just before it is light." The old saying goes and often comes true.

This has been one of the most successful years for cheese business we have had for ten years. The demand was such that we could not fill all our orders. Prices were good and continue good at the present, and the future seems to be encouraging.

If our laws can be enforced by having men of stamina behind them that means business and stand up for honesty, I don't care how much butterine or filled cheese is sold or made. If the purchaser gets what he calls for and really wants that kind let him have it.

Professor Davenport said last year at Princeton that the kind of beef we were fed on was old cows with the ribs pounded until they were sore, with a milk stool. Now I think that kind of business is about played out. We are kind of hugging the old cow and coaxing her with extra feed to give a good mess of milk. We have learned it does not pay to pound, or even scold, cows. Handle them kindly and they are sure to be gentle. When old cows are worth from twenty to fifty

dollars it pays to encourage them, when younger ones, we used to be glad to get half of that.

The best cows we have are raised from the calves we get, and when we can get forty to sixty dollars for them, it pays to raise all our heifer calves. The beef men are chasing after us for our steer calves at five to ten dollars at one to ten days' old. Two years ago they did not want them at any price and had to make veal of them.

They talk some about the Holstein steers, but they take them all the same; it's a steer and we have the milk.

We cheesemakers have to feed new milk to raise calves and cheese at twelve and fourteen cents makes us feel a little stingy of our milk to raise good steer calves.

One thing that makes us cheese fellows feel good is that we have been recognized as a part of this Association on the premium list. The last ten years I have had to come and carry my cheese on my back; the premium would not pay the express on them both ways.

It is true there is not much difference between the butter and cheese dairy to produce the milk the cheapest and get the best quality. That is what we are after. It takes good milk to make cheese as well as butter, and the richer the milk the more butter or cheese we can make.

The first time I met with this Association was at Elgin in 1871. I think then the cheesemakers had the lead. But skim and filled cheese got us under. Now we are coming to the front again. When we get for two pounds of cheese what you get for one pound of butter, we are getting the best show, as it usually takes about the same amount of milk to make a pound of butter as it does three pounds of cheese.

Song by Hon. Jules Lumbard.

I wish to assure this Association of the great pleasure I have in meeting you all once again. We have met for more than twenty years and that cannot go on forever. I am expecting any time to be promoted to a higher office and probably in a hotter climate. But will have a good time as long as I can and as long as I stay.

Responded to an encore, by saying he would sing again that evening.

Tax on Oleomargarine

MR. J. C. HARRIS, OWATONNA, MINN.

I will simply emphasize a few remarks that the President has made.

In the address of your President on the work of the National Dairy Union, Mr. Gurler made the statement that we had received about $10,000. It is a fact that we have received from membership fees and contributions about $12,000, and as we are carrying on a campaign of education we have spent a large amount of this money. I might state there are members in numbers of about 20,000 who have become members and paid their fee of fifty cents and distributed literature when sent them and circulars when called upon to do so. In a very few days we will call upon those 20,000, or rather nearly 30,000, and also a list of 20,000 names which has been furnished us by users of separators; we are going to furnish them with a petition and request them to write to their members of Congress and urge the passage of this bill taxing oleomargarine when colored to represent butter ten cents per pound.

At a meeting at the Sherman House last Saturday, through the advice of Congressman Tawney of Minnesota, who has introduced the bill placing a tax on colored oleomargarine of ten cents per pound, we have practically decided to center our forces on the Grout bill. He thought it would be better to pass the Grout bill than any other.

We feel more encouraged today than we have at any other time. Our forces are all at work. We have money enough at present, and there is no doubt but that the dairymen of this State will contribute to the fighting of this question to the end.

Our first mailing of letters will cost us about $1,500.00; in fact, I presume it will cost $3,000.00 for postage alone, just showing what a considerable amount of money it takes to carry on this fight.

Another thing I want to touch upon, and it is of a political nature. I will say to you that all the members of the National Dairy Union have their eyes centered on the politics of Illinois today. It seems that some of the leaders of the republicans have decided to put a man in the Governor's chair who has been so bitterly opposed to the Dairy Union that we are all interested in the defeat of that man. That man is Judge Hanecy, who has blocked the wheels of progress in the National Dairy Union. Through his rulings it has been impossible in this State to carry cases to the Supreme Court, and to place him in the Governor's chair would seem a continuance of what he has done in the past.

I don't know anything more to say at present, but any questions you may wish to ask, I will answer them.

DISCUSSION.

By Mr. Earley: I would like to ask if Judge Hanecy has been sustained in any of the higher courts?

A. He has stated his oleomargarine decision has been sustained in the higher courts. I am prepared to say he was not. If the gentlemen here would like to hear the ruling of Judge Hanecy, I think I have it in my overcoat pocket and will read it.

Mr. Long: I would like to ask if the anti-color law of the State of Illinois has ever reached the Supreme Court?

A. It never has, owing wholly to the rulings of Judge Hanecy; we could not carry the cases over his head.

Prof. McLain. Read that ruling.

A. "The legislature, in common with many others, speaks of butter as a product of nature. Butter is no more a product of nature than butterine. Both are manufactured. The principal ingredients of butter come primarily from the cow and pass through different processes of manufacture to its finished state. Science by various chemical processes extracts the principal ingredients of oleomargarine from the cow and kindred animals, and the products are practically the same in both cases. The legislature in this act says that one manufacturer of this article

called by different names may use annatto, or other harmless coloring to make his goods more salable; and in the same act says that another manufacturer, producing the same article but called by another name, shall not use annatto or other coloring in his goods. This, in our opinion, is an unfair and unjust discrimination in the act itself which is not justified in law and good morals, and is a violation of the individual rights of a citizen, which invalidates the act."

So you see his butter and oleomargarine are practically the same. If the gentleman can tell me what particular animal is owned on a farm that gives cotton-seed oil and other greases, as well as butter fat and milk, why I guess he's right. I think there is no such animal.

Prof. McLain: The first question to be decided is the question of good morals. To my thinking the first test in good morals is for a man to tell the truth. Butter is made direct from the cream. Oleomargarine is made of three different compound elements, all of which are by-products, lard, tallow, and cotton-seed oil.

Mr. Eaton: I would like to ask the question along this line of decision, if this legislation is here to stay as a permanent matter, on this dairy question. The question has sometimes arisen in my own mind in the difficulty of carrying the present Illinois law through, whether there is a valid ground. I wish we might hear from the Representative of the National Dairy Union whether they look on the form of law that we have in Illinois today as one which is likely to come out successfully. There must be a considerable difference between the law and its workings in Illinois and the same state of facts in Iowa.

Iowa, we are told in the last report of the State Pure Food Commissioner, had only one person in the State who was selling butterine or oleomargarine. In Illinois we are not that fortunate. Our butter market all goes to pieces because of the product of spurious butter in the markets. I never saw a man who would choose a substitute for farm butter. If it is consumed at all it is because of deception. We are following the right line in Illinois and we ought to stick to it, and see it through regardless of whom it hurts. If we are not right, we should not be wasting our time

by choosing a wrong campaign issue. If we are starting wrong laws let us start over again and start right.

Mr. Harris: In answering the question I don't know that I would be voicing the sentiment really of the National Dairy Union. I don't know that I am really conversant with the laws of this State, but we do know that through the rulings of Judge Hanecy the law has been a dead-letter so far as he is concerned.

You have referred to Iowa. I have spent some time in Iowa and had talks with Dairy Commissioner Norton and also with Ex-Dairy Commissioner Gates in regard to the situation in Iowa. Last fall, a year ago, in the city of Omaha I took dinner with Mr. Gates a few hours before he dropped dead while making a speech in that city. He stated to me that in his opinion it was impossible for him to detect who was handling oleomargarine in Iowa. He was elected dairy commissioner at a small salary. He was allowed one assistant; that assistant did the office work and kept the books, and Iowa is a large State. It is impossible for any one man to have gone through an inspection and found the amount of oleomargarine handled by that State.

You take New York, there is a vast difference. There they have an appropriation of $240,000 a year and six inspectors. It is much easier to keep bogus butter out of that State.

In Minnesota we have thirteen inspectors with quite a large appropriation back of them. We manage to keep oleomargarine out quite thoroughly, and still an inspector told me a few weeks ago that he had that week detected fifty-one handling oleomargarine illegally and proposed prosecuting the lot of them. The manufacturer sells oleomargarine to the jobber for just what it is. It is the retailers and jobbers we have to fight and fear. They are bound to impose upon the public and palm their goods off for butter; and so we feel we would like to see the laws of Illinois enforced and we would like to see a man in the Governor's chair who has the appointing power to see that these laws are enforced. We feel that would not be accomplished if Judge Hanecy was governor. We would not expect Judge Hanecy would enforce the law or appoint

men who would enforce it. We feel particularly interested in Illinois from the fact that three factories in Chicago are making such an output for November—265 carloads of this bogus butter—and fully 75 per cent is finally consumed and sold as butter. I don't know whether I have answered your questions or not.

Mr. Long: I would like to say in answer to the gentleman's questions that I was down to Springfield when this law was first introduced and assisted as far as possible the members of the National Dairy Union to frame a law and prepare it for the Legislature, and I want to say that the anti-color law of Illinois follows closely on the line of the anti-color law of Massachusetts, which has already been passed upon by the Supreme Court of the State of Massachusetts and been appealed to the Supreme Court of the United States, and in both cases had been affirmed by the Supreme Court of Massachusetts and the United States. Now you know gentlemen in this country the Legislature makes the laws, Congress interprets them, and the Executives enforce them, and the trouble in Illinois is our Executive officers haven't enforced the law for the reason that Hanecy sitting there in a case declared in the Circuit Court the law unconstitutional and when the State is defeated, the State cannot appeal, as I understand it, and consequently every court since then whenever a case has been brought up they have taken Judge Hanecy's decision as a basis and they have thrown the cases out of court. Now if today, gentlemen, we have no better protection in the State of New York, where the City of New York is located, no better in the State of Pennsylvania, where the City of Philadelphia is located, no better in the State of Massachusetts, where the City of Boston is located, against the fraudulent sale of oleomargarine than we have in this State of Illinois, butter wouldn't be worth over 20 cents a pound. I have followed the facts and followed these questions pretty carefully.

Prof. McLain: I have talked some with the officers charged with the execution of the law and they in substance told me this: We feel there is absolutely no use to begin prosecution when we are absolutely sure we are going to get knocked out of court. There is no encourage-

ment whatever to undertake to enforce the law when the rulings of the courts, headed by Judge Hanecy, have been uniformly against the enforcement of the law. It simply piles up a bill of expenses for no purpose whatever. Until we can have a fair interpretation of the law and honest men to interpret it, we shall have to keep on fighting as we are.

"Butter is no more a product of nature than butterine. Both are manufactured. Butter is the product of the gland of the cow, and butterine is the production of the tank in the packing house," says this decision. The principal ingredients of butter come primarily from the cow and passes through processes to its finished state. We would be very much obliged for some light on that subject of how it is done. "Science, by various chemical processes of manufacture, extracts the principal ingredients from the cow and kindred animals, and the products are practically the same in both cases." All of which statements are untrue. The idea of a man betraying such ignorance and expect him to set an intelligent interpretation of the law of a great State like this as applied to a great industry, one of the leading branches of husbandry in the State of Illinois!

Now I had hoped that I wouldn't have to get politics into DAIRY and CREAMERY, but when it comes to an issue like this, I guess we will have to have some politics in it. When it comes to electing a man like that you can count on the dairymen going against him.

The law we have in Illinois today would be sufficient to protect us if we had honest men to pass upon the law. We certainly as dairymen will not feel called upon to exercise our franchise in behalf of a man who will sit on the bench and interpret the law after that fashion.

President Gurler appointed the following committees:

Committee on Membership—George Reed, Herbert, Ill.; Charles Bennett, Belvidere, Ill.; Roy Cunningham, Belvidere; B. S. Herbert, Belvidere; O. F. Lucas, Flora, Ill.

Committee on Resolutions—Joseph Newman, Elgin, Ill.; Lovejoy Johnson, Stillman Valley; C. S. Fox, Belvidere; George Caven, Chicago.

Adjourned until 7:30 p. m., Tuesday, Jan. 9th, 1900.

Tuesday Evening, January 9, 1900

Music, "Three Fishers," by Hon. Jules Lumbard. Responded to an encore, "Maggie," by request.

Dairy Husbandry at University of Illinois

PROF. E. DAVENPORT, URBANA, ILL.

Mr. President, Ladies and Gentlemen: I assure you it is a pleasure to be before you tonight. I take it for granted that we are all interested in knowing what the University of Illinois is doing in dairy husbandry rather than listening to a speech. Then in the quickest way I am going to talk about it.

Last winter was a memorable one in the history of agriculture in Illinois. For the first time an appropriation was made for a building to accommodate this college. One hundred and fifty thousand dollars is a good generous sum of money to build that University a building, at least to accommodate technical agriculture.

Not only that, another thing that is of more significance in its way was this: In 1862 the Government, as you know or ought to know, appropriated 30,000 acres of wild land to each State for every Congressman it then had in Congress—480,000 acres of wild land in Illinois. This land was sold as the market came for it. The fund was to go for the founding of a college where those things that pertain to agriculture should be taught.

In 1890, what we call the second Morrill Bill should be paid to each State. That year $15,000 for the same purpose. The next year this should

be $16,000, and then $17,000, and $1,000 more each year until $25,000 a year was reached, and this year it is $25,000.

The University of Illinois is the beneficiary of two government endowments, for mechanical and agriculture purposes. From now on one-half the money that the University of Illinois receives from the land rent of 1862, not less than one-half, and not less than one-half received from the Morrill Bills, shall be set aside for instruction in Agriculture and Mechanics.

I will not take the time to show you that in few instances the money that came to these States from these funds served agriculture to any great extent. In very few States one-half of this money goes to such a purpose. Illinois can say that it was the first State to put upon the statute books a decree that one-half of this money should be used for this purpose and nothing else. A sum of $26,000 a year and one-half of each to be used to the betterment of this branch of dairy husbandry.

It is hardly necessary to tell you that this fund is about five times more than we have enjoyed before, and about one-fifth of what we ought to have.

First of all about the buildings being built. Here is a plan of it, a ground plan, that I hope you can all see:

This main portion of the building fronts the west down in the avenue. This portion of it through here, 284 feet, is the longest side of the building on the campus. These portions are 65 feet wide, and these several portions 100 feet deep. It is three stories high, and right in there on the first floor are the administration offices; on the second floor is the auditorium, seating 500 people, and right in there on the second floor is where this Dairy Association is going to meet some day in the near future. In the next room is the agricultural room and toilet rooms, and on this side a woman's club room, and when the livestock come and the poultry breeders to hold their meetings there they will find agreeable and suitable rooms for their purposes, and we will have ante-rooms and committee rooms will also be handy. In speaking in general, this portion of the building is devoted to offices, laboratories, for field agriculture, and horticulture, dairy culture, animal husbandry, etc.

The whole south end of the building is given up to horticulture and field agriculture, etc.

The north end to animal husbandry, dairy husbandry, laboratories, etc. Just over in this direction and about that spot will be an open court and three wings; one to the north; one to the south, and one to the east. The three wings are the same size, 45 by 116 feet, two stories high. Now this is the dairy work. I ought to say in this portion of the building dairy offices, class rooms, laboratories, and all that sort of thing. This room right here, 45x116, is the manufacturing room. Here is the milk room, cold storage under, the receiving platform, wash room, the cheese room, etc., and here is the boiler room. The engine that runs the machinery is put in here. The cold storage will be in the room here. Over this are rooms for domestic science, kitchen, and dining room and laboratories. In another part, two stories given up to operating rooms of veterinary science, and this portion of the room, 75 feet long, for veterinary clinic.

If we take a notion to break in colts, we will hitch up in here and break a colt in that space very easily. Breaking in to the saddle or the sulky. We shall do that kind of work. Here in another portion of the building is what we call machinery room. This building in both stories is farm machinery. In the lower floor reapers, binders, and mowers, engines, etc., and the upper floor the smaller tools of the farm, and in this room will be the workshop fixed up for the various shop work connected with farm machinery. It is a quarter of a mile around it; two acres of floor space, and it is a lot over 400 feet from this point to this point. Every room in the building will be in use. It is the first of its kind in this country, the greatest building for agriculture I know anything about. It has no more money put into it than some State has put in their buildings, but as much money as some States have put for this purpose.

The University of Lightfoot has $20,000 for agricultural instruction. This great study needs serious consideration. Some must be done on the farm and some in college.

About the teaching, which after all is the principal question. There are no use for buildings unless to use them. I want to say that the increase in the fund brought to us the possibility of doing what I have always hoped to do, and what did not seem possible until the last moment, and that is the reorganization of our course of instruction upon a new and a more reasonable basis.

The trouble with agriculture in schools is that we have had too few teachers. A professor of agriculture is supposed to know something of every other branch connected with an agricultural school, or that is the way it seems to be understood by the majority. That usually means, a professor who knows everything, and says he does, doesn't know anything real well of any one subject. He hits at random on a few subjects and does no good. I say this without hesitation, as I occupy the place myself. I did not come as a Professor of Agriculture; that is too big for me.

Some of us believe that you will never get ahead in agriculture until we subdivide the subjects, and take this man's statements for this thing, and that man's statements for that thing, and so on. Why, some of the professors were expected to know all about making butter and cheese, and the diseases of the hog, and I don't know what he didn't have to know, and how to breed and feed and everything else, and as long as we stood there, we did not get ahead.

So we have divided agricultural work into these subjects, that we know of today are things that ought to be taught. I have some cards that outline these subjects:

Fertility and Rotations
Comparative Agriculture
Crops of the Farm
History of Agriculture
Soil Bacteriology
Farm Management
Farm Machinery
Meteorology
Cheddar Cheese
Milk Production
Fancy Cheese
Cream Separation
Dairy Bacteriology
City Milk Supply
Butter Making
Vegetable Gardening

Soil Physics
Experimentation
Live Stock Management
Draft and Coach Horses
Domestic Animals
Dairy and Other Breeds
Sheep, Mutton, and Wool
Stock Judging
Beef, Cattle, and Swine
Stock Feeding
Stock Breeding
Light Horses
Testing of Milk
Creamery Management
Handling of Milk
Nursery Management
Plant Propagation
Landscape Gardening
Plant Houses
Grape Culture
Floriculture
Orchard Fruits
Small Fruits
Forestry
Veterinary Physiology
Sanitary Science
Veterinary Anatomy
Animal Diseases
Materia Medica
Weekly Clinic

I said one day that there was just about as much difference between fruit growing and stock feeding in my opinion as between lathing and civil engineering. We have outlined the 46 subjects, and they are not enough. We could put in as many more if we could teach them. In place of one man we have twelve to teach there. Please go away and tell there are twelve to teach agriculture, and no two of them teach the same thing; eleven of them teach nothing but agriculture. Prof. Ward teaches Soil Bacteriology. Shannon on Crops. We are making more of the study of corn than ever made before.

Prof. Holden teaches Farm Management, farm and the general topics of fertility.

Animal Husbandry teaches stock feeding, etc., by Prof. Kennedy, and managing of the farm herd.

In the department of horticulture there are three men, two of them giving their entire time to the subject, Profs. Blair and Lloyd. Prof. Blair teaches all about fruit.

In the department of dairy husbandry which we are especially interested in tonight are in the care of Profs. Fraser and Erf. Each one of

these men understand their subjects. Mr. Fraser is the head of this department. The subjects he teaches are not those of butter making and cheese making, but rather the examination or managing of the dairy farm, and dairy bacteriology. These cards give the course of instructions in dairy husbandry.

The first subject on the card is Milk. What we study and what the students understand. The student learns first of all what the composition of milk is; how to test it with Babcock test, and tell rich milk from milk that is not rich. How to standardize milk; the amount to give this man if you are going to sell milk, and what kind of milk it is; 3½ per cent or 4 per cent, or something different, and the student must learn to take out ½ per cent or put it in, if necessary. What the cow don't do, the separator must. They have to find out the contamination that milk is liable to, from the milk to the table. It is a hard subject and must be studied carefully. We have to take some of the boys to other barns besides their own; tell them how to handle milk and keep it clean; dairy for the table or for butter and cheese, and we give a full semester.

The next is the management of dairy farms by Prof. Fraser. These are certain questions peculiar to the dairy farm. Some think they ought to be taught by the stock feeding or stock judging. That it not it. The dairy must be taught from its own standpoint. Mr. Kennedy does teach about the judging of dairy cows, but he does not prepare himself to tell how the dairymen gets his hard times. Every one of these subjects must be taught by the man that follows that business. That is why this question of dairy farm management taught as a separate subject by Prof. Fraser. He teaches the establishing of the dairy herd and the economic production of milk as depending upon the systems of feeding, the efficiency of the individual cow, and the housing and general care of the herd.

Cream Separation and Butter Making. They go together. They must separate the cream before they make the butter. In this cream separation, which is taught by Prof. Erf, the student is not simply to operate a separator, but he is taught how to get the cream out of milk, and get it out clean,I mean get it all out. The student would compare

the result from milk in a pan from the deep setting, or cold water from the separator, and the different kind of separations, and the milk at different temperatures. He also studies the different kind of separators; the different grade of butter, and the different ways of making butter. These two studies of cream separation and butter making are critical studies of different systems of cream separation as to rapidity and efficiency, and the comparison of different machines, especially centrifugal separators; designed to be taken in conjunction with course 4. Course 4, butter making, is the ripening, churning, washing, packing, and scoring of butter.

Course 5 is Factory Management. This contains the question of cheese factories and creameries and the planning of all kinds. Co-operative and company creameries and cheese factories. Planning, construction, equipment, and operation of plants, including care of engine and boilers, and is taught by Prof. Erf.

I believe there are men who would put in a factory where a cow could not get in, if they could get the money. The study of these questions by any who understand it, will show there is plenty of room for study in that.

Course No. 6, City Milk Supply, and is taught by Prof. Fraser. Those of you who know about the milk supply of large cities, know there is room for study. It has been a problem and is still, but the time is not far ahead when men will make a study of supplying large cities with milk and the present system will be overhauled. Prof. Fraser teaches the source of milk, together with methods of shipping, handling, and distributing, and of securing a healthful product for large cities.

Course No. 7, Dairy Bacteriology, will explain itself. The study of organic life in milk and what it does. Bacteria in their relations to milk and its products, which is taught by Prof. Fraser. He also teaches cheese making. Practice in curing and judging cheddar and fancy cheese.

Those are the subjects taught and the way they are taught.

Now as to the admittance of students. Some of us believe that the time has come for a different system of admittance of students for study.

The old-time college with its four-year course of one kind of course which all students took, was one thing; a modern university is another thing. If a university teaches one course of study and all begin and all graduate on the same day, they must all have had the same entrance condition. That is the way with the old institutions of learning; each teaching a single course, each requiring certain set rules for admitting students. We have broken away from that.

We have gone as far as we could go at present to the Leland Stanford idea. What the Leland Stanford institution requires of a student going there to study is: That he must be of a certain age, showing that he is fitted to be away from home, and take his certain studies by himself. He must be able to read and speak and write the English language. What else? Simply that he should be a decent American citizen and want to learn something. That is not saying that every class is open to those students. He can go to work and study certain of these studies that is necessary to him.

If a boy is 16 years old and is a decent sort of a fellow, he can come to the University of Illinois and take all these things that he is able to study. If he has had a whole lot of schooling, he can have everything we have; if only a little, he can take some of them. He will first learn about milk and the Babcock test and standardizing milk and study contamination of milk and the different things about milk that it is necessary for him to learn. He does not need to know Greek to enter that department. If that kind of boy comes along, we will put him in the study of milk.

If another boy comes along who has had a whole lot of experience in some of these matters; he has studied them a good deal and wants to study about the operation of a dairy farm, that boy can come and do so.

Another man says: "I would like to study dairy bacteriology." I ask him, "Do you know what bacteria are?" "No." "Every study any botany?" "No." "Any zoology?" "No." "Any living things and how they do?" "No." I should tell him he would have to study other things besides bacteriology and have to take some other work first, and will

have to wait a year or so. Is there any reason why a man must know Latin before Mr. Kennedy can teach him stock judging? Each one of these forty or fifty studies stands on its own base. The student must meet our requirements. If he wishes to study bacteriology, he must first take a year of botany if he needs it and then take up bacteriology.

We do have a class of dairy stock management which treats of the ordinary care and feeding and management of farm work that any one can take. He talks about balancing up the ration and the protein and all that sort of thing.

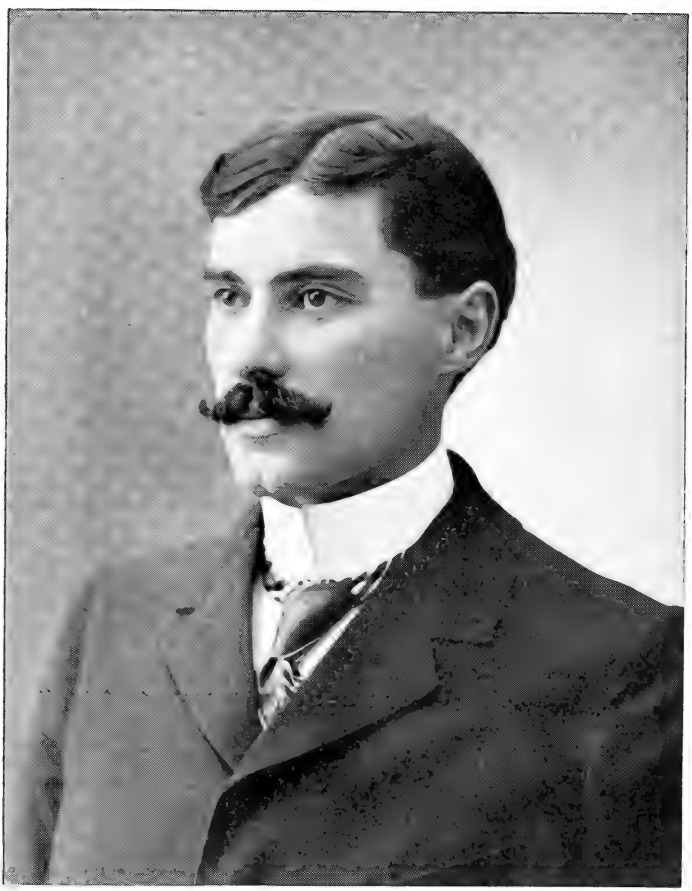
Mr. Kennedy blazes away and teaches a lot of stock grading, and will teach them to get a good steer for their herd. If boys are going to study the most intricate question of feed; if they are going to study evolution, they have got to study two years of university work first before they can take up such things. We are making it possible for a student to study things he is able to study. We don't call it a short course. We have one man take a course and when he has taken 130 credits, and he ought to get 15 every half year, if he has taken sufficient number in agriculture and science and balance up his studies, we graduate him. We give him a degree of Bachelor of Science.

So far we have 75 new students. We have special students who are doing remarkably good work. Mr. Erf is here, Mr. Kennedy is here, Mr. Fraser is here. They all teach. Talk to them and ask them any question you want to.

One thing more. We are able to do this much because we got more money than ever before. We have been able to get these buildings on this cut. We have gotten these twelve men and have subdivided our studies, and can do so much better. It is only when you get right after a subject that you get the inside of it, and it is only then that you make a subject powerful.

If a student studies one subject four months we give him an invitation to go home for a while.

Did you ever hear the story of the southern preacher. He said I had a dream last night, and I am going to preach. I saw G. P. C. on the wall



PROF. OSCAR ERF

College of Agriculture and Experiment Station, Urbana, Ill.

and he said that means go preach Christ, and I am going to do it. His friend says "Are you sure?" "Oh, yes; don't you think so," the preacher said. "What does it mean?" "Go pick cotton." So if a boy comes to us and won't study, he can go home and pick cotton; but if he has got the work in him we would like him to study.

What the University cannot do in agriculture will depend on two things, or really one: The support the people of Illinois will give the College, and I say I don't know of any State in the Union where the farmers all over the State are supporting the College of Agriculture as the farmers of Illinois. The infection is working. I guess it is a disease, but you would be surprised if you was in the office and saw all the letters that come. The office work has doubled within a year, quadrupled in three years. Last year we nearly killed our stenographer. This year we have two and are pretty nearly killing them with office work now.

The farmers institute was instrumental in going over the State and selecting for us in each community, a boy of the right stuff and recommending him to the trustees, and we have got nearly 100 of them. Mr. Coolidge, he sent us six or seven of the right kind. Some of these boys say, "I thought I would come and stay a month or two and see." Well we would get them to work and I heard from several of them that wrote home. "I believe you know more about agriculture than all these fellows," writing home and saying: "There are quite a good many things and I guess I will stay." And the next time his father told me one of the boys said: "I guess I will stay in this semester." He will stay the whole year and we are pretty sure he is going to stay four years.

Agriculture is tremendously expensive. You have done something that no other State has ever thought of doing. This good work will go on. As we put in experiments and teach things, it will take more money. We have not got all the money we will ever need. When the time comes that we can do more than the funds will allow, we will have to write to get more. If we don't do right, let us know. Every citizen is on a free footing for open correspondence with everybody. This is new business.

We do more work in opening up new subjects, I think, than ever before. We do not pretend to be all-wise. If this Association comes to the conclusion that there ought to be another subject offered there, they ought to let us know and let us hear from them, and if it is possible under the funds that we have, we will do it.

I thank you for this opportunity to come before you in this way and tell you about these things and tell you what we are trying to do.

DISCUSSION.

Q. How is it possible for one boy from every community to get a scholarship.

A. At the request of the State Farmers' Institute these scholarships are given to the first 7 congressional districts, making 100 scholarships altogether. Now these scholarships will not be given by the board until they have been assigned by this Farmers' Institute by the executive committee. The executive committee will not recommend the scholarship until recommended by the directors of his congressional district. You are in a certain congressional district. Let him write to his director, if he knows who he is. His Farmers' Institute Director in his congressional district. If he don't know he can write to us at the University or write directly to A. B. Hostetter at Springfield, and he will tell who he is. Has he got to pass an examination? No. All he has to do is to write this director of the Farmers' Institute, and he must satisfy the executive committee of the Farmers' Institute that he is 16 years old, and that the people in his neighborhood believe in him. He must have a letter of recommendation. He must convince this Farmers' Institute officer that he is the one kind of a boy that should have the scholarship. There are a few left yet, and if any one wants to he must be getting after one. If the one is taken in his community, he can be assigned to another community.

Mr. Newman: When will the new building be ready.

A. The contract reads the first of September next. They may not be able to do it. They are having trouble to get material. Everything

is done above the grade line and they are working on the first story of this room, and we hope to have it done by the first of September.

Mr. Gramm. I would like to know if we farmers that have not had the advantages, can feel free to write to you for advice.

A. By all means, yes sir. "There is nothing so cheap as advice," says Josh Billings. "It is hard to give and easy to take." Any information the University has at hand is to be given to any one in the State, or outside that writes for it. We cannot answer all questions that come up. we will answer these letters out of the experience and knowledge of the men who are there and the literature we have at hand. Some letters come that we cannot answer.. Write and ask us anything you want to. We are writing over 10,000 letters a year now and a few more will make no difference.

Music by the Apollo Mandolin Club of Belvidere. Responded to an encore.

The Southern Illinois Dairy

L. S. DORSEY, MORO, SECRETARY MADISON COUNTY FARMER'S INSTITUTE.

Mr. President: I do not come to you this evening as a dairy teacher, or as one who has mastered the art of caring for the cow and her products. I am here as a representative of the Southern Illinois dairy interests. I am here to tell you the little I have learned from associating and working along dairy lines.

I shall not attempt to tell you very much, for if I did I would be telling you more than I know.

It seems to me there has come a change in agricultural matters in our State. Two years ago the State Experimental Station sent Prof. Frazer

down to the Red Bud convention. Last year I do not know if there was any one on the program from the State University, but I do know that for this meeting, the coldness, the lack of men, or means, or all three seems to have gone. For look at them, the speakers from Champaign University, and they are all here, Davenport, Frazer, Kennedy, and Erf, and the dairymen of Illinois should lose no time to get all they can from the practical experiments of these men.

Now to get to my subject. The State dairy districts as made up by ex-Sec. Monrad in 1898, gives 104 creameries in the thirty-four southern counties and about four times as many creameries and cheese factories in the thirty-four northern counties.

Now I don't know whether you expect me by this time to tell you that the south end of the State is producing as much milk as the northern portion, or why it is that it does not, or should not.

If the figures given for the Chicago production of oleomargarine for November, 1899, are true; that is, 5,460,000 pounds, or at the rate of over 65 million pounds annually, while the production for 1898, on the same basis was 22 million pounds less, it is not so much a matter of how to increase the dairy herds of southern Illinois, as it is of how to secure safe and sure markets for what is produced.

Southern Illinois is not strictly speaking a dairy section, and as insignificent as the number of creameries may seem, I am inclined to believe that if the number was cut in two, and I was to say that there were fifty working creameries in the thirty-four southern counties, that the number would be about right.

In my own county two years ago twelve creameries were reported; today there is but one or two in operation, and that is run on the gathered cream plan.

Southern Illinois is not destined to become a great dairy section. Its record is being made, as a fruit country. Apples, peaches, plums, pears, and all small fruits are grown in abundance. The acreage in fruit trees is being increased annually. The thin soil of many of the counties and the climate seems to be better adapted to this line of produce than any other.

There is no form of organization among southern Illinois dairymen, even all attempts to organize a St. Louis shippers union has proved a failure.

I know of no reason that should keep the dairy industry from increasing, that has more real argument in it than the condition that the public highways are in at times during the winter season. I have known dairymen in the past year to be two hours on the road making two miles with two cans of milk. Others have got stuck and actually had to give up their trips. We are in that section of the country where long freezes don't come, and all winter long we don't seem to be quite satisfied if it is not continually freezing and thawing, and good road improvements come slow.

"Every cloud has its silver lining.' I would not have you put me down as a pessimist. I have only been trying to state facts as they are.

On the other hand there are many farmers who have come out to be good, practical and progressive dairymen. They are of the class that Mr. Hostetter spoke of at the Galesburg meeting last year. Those "who have taken a number of cows and given them a fair chance and now will not attempt to farm without them."

We have but few men that we can point to and say, "There is a man who made his fortune dairying." There are many farms to which we an go and find a nice house and many comforts of life, good improvements all around, and the dairy farm is the one where these comforts and improvements are the more numerous.

The work of the Illinois Dairy Association, the State Experimental Station, and of the Farmer' Institute are having a telling effect upon our dairymen. While it is true that comparatively few take an active part in the proceedings or discussions or reports of these concerns, there are many who are watching with both eyes wide open, the practical ideas of those who do attend and are profiting thereby.

The day has gone with us when to buy anything that gives milk, or someone else's mistakes, is thought to be the proper thing to do. While t is true that few of the most successful dairymen have ever raised a

cow, the buying idea is fast going out of date, unless a man is a born trader.

Many good dairy herds have been established in my district by securing a good sire and saving the heifer calves from the best cows.

While the creamery is not the success it should be in Southern Illinois, nor the success it may be made, there will soon come a day when our creameries must pay Elgin prices for cream. I tell you when we get guaranteed Elgin prices and good roads and oleomargarine out of the way, we will make a good showing.

The lack of creameries in my county is doubtless due to the fact that the demand upon us from the city of St. Louis is too great to make a creamery pay. The milk that is in demand, the goods that are advertised, the thing that the people of St. Louis want is "Illinois milk," and the dairy companies of that city have enough business ability about them to get daily, from our side of the river, about 10,000 gallons of our product. While the prices paid, the sours made, the shortage reported, the cans lost, are not always the pleasantest things for the shipper to think about.

I do not hesitate, after ten years' of experience with these people, to say that there is no line of farming that I could have followed, that would leave the farm in as good shape as it is today, that would have enabled us—wife is in this too—to have as many comforts in our home, to pay off as much debt, to have so nice an account in the bank, as this. Moreover many neighbors, who were struggling along, have joined the ranks and joined the shippers' procession.

All has not been smooth sailing. When going into the dairy we thought there was nothing more to learn about the business, as farm work was the only thing we had ever followed. Now, after a practical experience of ten years, we look and wonder if we are only infants, and what the next ten years may bring forth.

Say! If you are a dairyman and don't like the business, get out of it.

Say! Are you kind to the cows? You should be in partnership with them.

Say! There are three good things about the dairy. It produces a regular farm fertilizer, regular work, and regular income.

Music by the Apollo Mandolin Club.

Responded to an encore.

Woman as a Factor in the Dairy

MRS. EVA SPRINGER, SPRINGFIELD.

Your committee has honored me with an invitation to address this meeting, and has suggested as a topic what the Buttermakers' Association of Sangamon County hope to accomplish. Inasmuch as this Association has made no little history of interest to dairymen, and, I might say dairywomen, of this and other States, an account of its organization may serve a good purpose. In a paper read before the Sangamon County Farmers' Institute, the startling statement was made that the merchants of Springfield purchased annually more than one hundred thousand dollars' worth of butter made outside of Sangamon county. The great importance of creating an interest among the farmers of the county in butter making was quite generally discussed at the institute, and at the suggestion of Col. Charles F. Mills, then secretary of the Illinois Farmers' Institute, the writer of this paper on June 21, 1898, presented the matter of calling a convention of the buttermakers of the county for the consideration of the dairy interests to the county institute. The gentleman named above secured the appointment by the county institute of a committee of five ladies, who were pledged the support of the county institute in the holding of a butter show in Springfield. The committee consisted of Mrs. Eva Springer, Mrs. W. B. Lloyd, Mrs. B. S. Magill, Miss Mary Tabler, and Mrs. Edward Sterling. The committee had several meetings in the office of Col. Mills, with others interested, and decided to call a mass meeting of buttermakers

in the court house. The attendance was large and at the meeting it was decided to organize the Sangamon County Buttermakers' Association, and later, December 8th and 9th, 1898, the first butter show, under the auspices of farmers' wives, was held in Springfield It was a great success, both as to the number and quality of the entries, and large attendance.

Prizes were offered for three-pound pail of butter, three pounds of print butter, and three-pound pail of Jersey butter, made in each of the twenty-five townships in the county. Nearly one hundred premiums in cash and merchandise for the exhibits, which numbered 234, were donated by the merchants of Springfield, who have manifested a lively interest in the enterprise from the inception of the movement. In order to complete the history of this undertaking, the names of the ladies having charge of the first exhibition are herewith given, viz: President, Mrs. Eva Springer; Vice President, Mrs. E. M. Coffman; Secretary, Mrs. E. A. Sterling; Treasurer, Mrs. James A. Stone; Executive Committee, Mrs. Marth Duval, Mrs. E. S. Johnson, Mrs. Ed Bradford, Mrs. Isaac Poorman, and Miss Mary Tabler.

The interest awakened by the large and excellent exhibit of butter, encouraged the association to hold meetings in all portions of the county for the discussion of all matters pertaining to the dairy cow, the best rations for butter, and the methods of caring for milk, cream, the making and selling of butter.

The meetings held in various portions of the county have been well attended, and interesting papers, containing much valuable and practical information on dairy matters, have been presented and discussed.

The meetings held during the summer have partaken of the order of a basket picnic, each family taking its lunch and horse feed, and all uniting and eating dinner on long tables arranged in the shade of trees. Recitations and music, interspersed with the exercises, have made the meetings entertaining as well as instructive.

The second annual exhibit of butter of the Sangamon County Buttermakers' Association was held November 7, 8, and 9, 1899, under the

direct management of the ladies in charge of the first exhibition and named above.

The classification for the second butter fair was much improved, and provided for four premiums, for three-pound crock of butter, for each of the twenty-five townships in the county, viz.: Old style make, not made with separator or the deep-setting process; second, butter made by the deep-setting process; third, butter made from cream separated by any make of separator, and fourth, butter made from the milk of a recorded Jersey cow.

The exhibit in each show was scored by an expert appointed by the Illinois Dairymen's Association and the service that each gentleman rendered served a valuable purpose in educating exhibitors in all matters pertaining to the making and exhibition of first-class butter.

The butter at the second exhibition scored much higher than at the first show, and confirmed the great value of such displays. In concluding reference to the county show will repeat that "the ladies composing the Sangamon County Buttermakers' Association have but one ambition to subserve in the continuance of the annual butter show, viz: To encourage the buttermakers of the county to produce more good butter, and to call the attention of the dealers and consumers of the excellence of the butter made by the wives of the farmers residing in Sangamon county."

This history has been extended to supply information that the writer has frequently been called upon to furnish to ladies residing in other counties, some of whom have organized similar societies and have recently held very creditable exhibits.

The Farmers' Institute, held in each county in Illinois, quite generally have exhibitions of fruits, vegetables, grain, etc., and need but little encouragement from the State Dairymen's Association to provide for a display of butter.

It is suggested that a committee appointed by the State Dairymen's Association might accomplish much good by directing the attention of County Institutes to the good that would result from the organization

of the ladies in each county for the purpose of holding annual exhibitions of butter, cheese, etc.

So much attention has been given by the agricultural press and State Dairymen's organizations to associated dairymen for many years past that farm or individual dairying has not received the consideration its importance demands.

By farm dairying we refer to that system which calls for not only the production of milk, but also its conversion into the finished products ready for the consumer or dealer before it leaves the farm. Hence, the individual dairy farmer must be a producer, a manufacturer, and a business man. The later, because he must market his product. We refer to butter, cheese, cottage cheese, ice cream, and under certain conditions, milk and cream as a finished product.

When the milk and cream are intended for family, hotel, restaurant, or any similar use they can be considered as finished products.

Dairying, we find, is an important factor in diversified farming, even when the milk is sent off the farm to be made up or sold to dealer or consumer. But when the entire process of manufacture into butter is conducted on the farm, it becomes a factor of still greater importance and worthy of due consideration at your hands.

It has not been the purpose of the writer of this paper to tell to this convention of experts the operations of dairy farming, but to present some suggestions that will prompt the State Dairymen's Association to aid myself and others engaged in dairy farming, and to call special attention to the importance of your co-operation in forming local organizations in each county for the benefit of an interested class that cannot attend your annual meetings.

Is there any reason why the State Dairymen's Association should not offer premiums for butter made in each county and exhibited at the State fair?

The State Board of Agriculture will esteem it a great privilege to aid you by the offer of liberal premiums and providing ample space and cold storage for the exhibits.

The limited display of butter compared with the splendid exhibits of fruits, vegetables, grains, and all the products of the farm at the Illinois State Fair is very humiliating to one making a specialty of dairy farming, and it seems to me that the people of the State can, very properly, look to this organization for the much needed enlargement and improvement in the dairy exhibits at the State Fair.

In conclusion it may not be out of place to state in this connection that the ladies composing the membership of the Sangamon County Buttermakers Association intend to continue discussing all matters pertaining to the rearing and selection of the dairy herd, and the making and marketing of the butter product. Other matters have been considered at our meetings, such as requiring all members of the association to adopt certain rules of practice in making butter, the use of a uniform kind of butter package, and the attainment of a high standard of excellence in the butter made.

In the not distant future, a label indicating the score of the butter may be used, and we hope soon to have a local agent to handle the entire product of our members and make purchase of needed dairy supplies.

There is seemingly no end to the opportunities to such an association to make itself useful and even powerful.

The matter of seeing that oleomargarine is sold for what it really is, instead of being palmed off as butter, is within the province of such an organization.

The great work that has been accomplished by the ladies of Sangamon county in the way of promoting the interests of the farm dairy buttermakers, can be repeated under your leadership in every county of Illinois.

I thank you for your kind attention to the matter presented, and for the honor of the invitation to appear before such an important and influential organization as the Illinois State Dairymens Association.

Music by the Mandolin Club. Encored.

Convention adjourned until 10 o'clock a. m. Wednesday morning, Jan. 10, 1900.

Wednesday Morning, January 10, 1900

Meeting called to order by President.

Announcement: I wish to announce there will be a meeting of the Boone County Farmers' Institute at Evans Hotel on Saturday at 1:30 o'clock. All who are interested in the work are cordially invited to be present. We desire a full attendance for our time is short. The meeting will be held the 6th, 7th, and 8th of February.

Silos and Ensilage

W. S. DAVIS, FAIRFIELD.

I thank you for this place on the program before such a body. I represent the southern part where we have had poor dairies and poor cows, and you have helped us a great deal in the work and we expect much of you, not so much the instruction, but to get some of our ideas before you so that you may help us to remedy them.

(Mr. Davis shows model of silo.)

Explains that 2x4 scantling is used. It is eight sided. You can make them twelve sided or sixteen sided as you please. But about five foot each side and girded with 2x4 scantling and lined inside with just common flooring, timber you can buy at any price. It keeps the ensilage all right and made very much cheaper. We cut doors in where needed. From this rough model you will understand better when I am reading.

Silo. The silo of today must be above ground, without square corners, of light, durable material, easily built, and cheap. Such a one I will try to describe.

A silo with eight sides of 5 foot each, girded by 2x4 scantling, lapped and spiked at the eight corners. These girders are 16 to 24 inches apart, making thirteen of them for a silo twenty feet high. They are lined up and down inside with common matched pine flooring.

The material will cost about twenty dollars and will hold sixty tons of ensilage. It is also a very cheap form of grainery or corn crib.

A larger, and therefore cheaper form, is a twelve sided one of 5 foot each, 20 feet high, girded the same as above by 2x4 rough timber lapped and spiked at the corners.

How to build this silo. Take seventy-eight 2x4, 12 feet long, rough oak scantling, cut them in the center at a 4 to 6 inch angle, cut ends at same angle, making short at outside 5 feet 3 inches, and inside 6 feet 3 inches long. When all are cut to this measure, level a circle twenty feet in diameter, lay twelve of these pieces around it, each alternate one on the ground, the others lapping at the ends on top. Have the laps all even. Then drive a 20 penny spike in each corner. Square this foundation by measuring from each corner to center. Then drive another spike in each corner. This is the foundation. Next, lay twelve more pieces on top of these, but see that the inside edges are plumb with the lower ones, drive two spikes in each corner. Then take a common fence plank, 1x6, nail it in the inside corner of the foundation; plumb it each way and brace it. Do the same at every corner. Cut some 2x4 blocks 14 inches long; raise one corner of the second girder of 2x4, and place one of these blocks perpendicular between this girder and the foundation. Raise each corner the same and nail the corner plank to them. Spike another girder together on top of this one, being careful to have the laps at corners plumb at corner edge of upright plank. Knock out the 14 inch blocks below and raise this girder with them. Nail as before. So continue until one-third the height of silo. Then use block 20 to 24 inches long. When the desired height is reached, the structure will be the skeleton frame, with temporary corner supports.. Line perpendicular with common one-inch matched pine flooring of 8, 10, or 12 foot, or longer lengths. When corner is reached, knock off the fence plank, as its

use is then ended. The flooring should just match at the corners; may need a little dressing with plane to make a tight joint. Continue around nailing as you go, except where doors are wanted. For these cut 2 feet out of a girder, fit two pieces of 2x4 perpendicular for side jambs. When lining, leave one inch space all around the face. Cut pieces of flooring 22 inches long and place horizontally as silo is filled.

Material required for this silo twenty feet high is 78 2x4 of oak 12 feet long, 624 feet, 1440 feet flooring.

78 2x4, 12 ft. long, 624, at $1.00	$ 6.24
1440 ft. flooring at $2.00 per 100	28.80
12 lbs. No. 20 spikes at 5c	.60
20 lbs. No. 6 nails at 5c	1.00
Total	$36.64

A stave silo of same capacity 18 ft., 8 in. in diameter (inside), 60 feet around, takes 144 2x6 staves 20 ft. long.

144 2x6 pine beaded 20 ft. long, 2880 ft., at $2.75	$77.20
4 4x4 hoop supports, 20 ft. long, 110 ft.	3.00
Sills of oak	5.00
8 hoops in 4 sections of 15 foot each, made of ⅝ round iron, tipped with 6 inch pieces for threads and nuts; cost of hoops at $3.50	18.44
For threading, welding, etc.	6.40
Total	$110.04

As against $36.64 for a twelve side silo with wood girths for widing, and practically without corners, made of material carried in stock at all lumber yards. It is put up without scaffolding by one man. Any farmer who can saw and drive nails can do the entire work. Foundation and roof are not figured here. They would cost the same for either form of silo. A clay floor is sufficient and cheap. We now have a modern silo at one-third the usual cost.

Ensilage.—Improved machinery for the field, new style cutter with greater feeding capacity and pneumatic elevators. All these have their place in lessening the cost of filling the silo.

But the new thing in ensilage that is coming to us now is a greater knowledge of the nutrative value of the plants with which to make ensilage. Corn has always been considered the crop par excellence for the

silo. The value of ensilage has been based almost entirely on succulence, and not on the food elements it contains. The plant having a high per cent of moisture, has a large proportion of its food elements in solution, which is practically digested food, as the digestive juices of the stomach and intestines must reduce all food to liquids before they can be taken up by the lacteals. The green plant is most readily assimulated and turned into milk. But the amount of milk produced from the plant depends entirely upon the elements contained in the plant and taken up by absorption, and used by the cow for milk production.

The quantity of the milk may be large or small, the quality poor or rich, but the solids come from the plant. Just what elements produce the fat in milk may still be in doubt, but the casine is indisputably the product of the nitrogen compounds of the plant. Because the plant is watery is not proof of its feeding value. But the plant containing the greatest amount of the essential milk elements in solution, and that is the least acted on or effected by ferments in curing and storing, is the best plant for the dairyman to raise. The method of curing, and the place to raise this plant to retain the most of these elements in the nearest soluble condition, at the least expense, is the method and building which the dairyman needs.

We do not have plant, animal or milk production without their proportionate nitrogen compounds. Physiologists agree that most of the protein is digested in the stomach and most of the fat after it enters the intestines. This being true, the dairy cow is well adapted for using bulky feed containing a large per cent of protein. This point of ensilage value had not been given its proper consideration in our opinion. Most of the dairy, farm and live stock journals have several columns or pages each week, giving in minute detail the relative value of the different grains, mill products, hay and fodder, but I have yet to see attention called to the comparative value of the elemants contained in plants stored in a silo; except to say that "the corn was heavily eared." That referred to the old superstition that "corn with ears was richer feed."

If corn, oats, peas, beans, bran, oil meal, cotton seed meal, brewers' grains, etc., have such a wide range of feeding value, based on the

chemists' analysis and feeding experiments, why should we not allow a similar basis of value on the various plants available for the silo. They have been as well analyzed and tested by feeding experiments. Their comparative food values are allowed everywhere except as ensilage.

In growing a crop for the silo, then a comparison of the feeding value should be considered first. As protein is the most essential and indispensable compound, the plant having the highest per cent of it, other conditions being equal, is the one to select.

A brief description of some plants will come in here. Corn is the staple farm crop, because its seed is cheap. Its cultivation and harvesting are well known. But it must be cut just at the right stage for the silo; then it is a good keeper. But it requires a large amount of high priced concentral grain to balance the ration. One acre yielding ten tons has 260 pounds of protein. (Government Cattle Book, Prof. Henry.)

Sorghum drilled like wheat, one bushel to the acre, will yield twenty tons to ten of corn. Requires no cultivation, so is a cheap crop to grow. Planted from May to July 15th; cut for ensilage from ten days before heading until beards are ripe. So it mixes well with other crops in filling the silo. The sacharine matter makes it an appetizer. It is a good keeper, but low in the percentage of protein; takes richer grain than corn to balance. One acre yielding twenty tons has 240 pounds protein.

Cow peas, seed one bushel to the acre. They can also be grown without cultivation, but better with it. Have a high percentage of protein. But their large percentage of water requires mixing with other plants to insure good silage. One acre yielding eight tons would have 268 pounds protein.

Soja beans, seed one-half bushel to an acre. Plant early as corn, cultivate the same. The thick epidermis and hairy covering of its leaves makes it one of the best drought resisters, and is free from insect pest in plant and seed. One acre yielding twelve tons would have 669 pounds protein. (Bulletin 22 U. S.) Thus one acre of the above silo crops gives us the comparative yield in digestible protein: Corn, 260 pounds; sorghum, 240 pounds; cow peas, 268 pounds; soja beans, 669 pounds.

The claim is not made here that protein is the only basis of value, but that a sufficient amount is essential to milk production, and that any deficiency of this compound in the roughage must be supplied in the grain.

As there is a limit to the grain a cow will consume, where roughage having a low per cent of protein is used, highly cultivated grain must be fed, which adds to the most of the ration, as is shown by the following tables of balanced rations, made of corn silage and soja beans.

SILAGE	Lbs. org'n'c matter	Lbs. dry matter	Lbs. Pro-tein	Lbs. carbo-hyd'es	Lbs. fat	Ratio	Cent cost	Color-ies of
Corn Silage.....	50	13.20	.66	7.	.36			
Corn and Cob Meal	4	3.57	.26	2.52	.14		.02	
Bran.....	4	3.52	.50	1.54	.12		.026	30.080
Cotton Seed Meal.	3	2.75	1.21	.51	.25		.035	
Total.....	61	23.04	2.54	11.57	.87	1.53	.081	
Soja Bean Silage.	50	12.9	1.53	4.46	.80			
Corn and Cob Meal	6	4.6	.39	3.78	.21		.03	
Bean....	5	4.4	.63	1.93	.15		.032	
Total.....	61	21.9	2.55	10.17	1.16	1.5	.062	28.699

Home grown ration without grain.

Soja Bean Silage.	50	12.9	1.53	4.46	.80			
Soja Bean Hay...	10	8.8	1.12	4.23	.17			
Total.....	60	21.6	2.65	8.69	.97	1.41		25.298

The above shows less colories of heat than is usually given in a ration, but is sufficient for summer, and in winter can be supplemented by warm brans and blankets at less cost than grain.

As an answer to the claim that there is a great loss in ensilage, attention is here called to the loss in curing hay and fodder. (Bulletin No. 22, U. S.)

	Green	Dry Matter	Pro-tein	Hay	Pro-tein	Per ct. less	Gain
Timothy.....	100	38.4	2.28	44.23	1.27	.44	
Corn.....	100	20.7	1.10	35.80	.88	.20	
Clover.....	100	29.2	3.07	34.47	2.26	.26	
Soja Beans.....	100	28.5	2.79	32.13	3.46		.19

Hay and fodder require five times the room for storing the same number of days' feed as ensilage does. June pasture grass cannot be cut and cured into hay and retain its June grass buttermaking qualities. Hay is made from July grass that has entered the woody structure stage, and loses all its June qualities in curing. But there are plants that can be cut in their "June grass" condition and make perfect silage.

To sum up this paper. It describes an easily built silo without corners for one-third the cost of the modern stave silo.

Ensilage is ensilage, because it is stored and cured in a silo. But its feeding value is the feeding value of the plant put in the silo.

DISCUSSION.

Mr. Long: I would like to ask if you have used that form of silo, and how long has it been in use?

A. Seven years in use.

Q. It would appear to me that a silo constructed on those plans of boards, would drop apart and allow the air to spoil the silage?

A. They have dried apart on the south side. We do not put boards around like you would in the north.

Q. Wouldn't that cause the silage to spoil?

A. When we put it in we cover it up tight. It has done us for seven years.

Q. You didn't say any thing about the cover?

A. We put a roof on it.

Q. Tell about the roof.

A. The matter would cost about $15.00 to cover 120 tons of silage. We don't use any foundation.

Mr. Kennedy. Do you think your foundation is substantial enough?

A. That depends.

Mr. Kennedy. We put in a cement floor and since we did that we have had no trouble, and others have had similar experience in that soil.

Q. Those stones pressed there?

A. Those stones were broken very fine, run through a stone crusher

and put down four inches thick, and lath on top of that. But we had trouble until cemented over.

Mr. Dorsey: You spoke of whole soja beans for your silo?

A. Fill with soja beans.

Q. You say your corn in yoour section is not healthy feed for your cow?

A. Yes sir.

Q. How far north in the states do you think soja beans could be grown?

A. They have been grown in Massachusetts and in some parts of Canada to make a silo crop. Have experimented with other beans and tried them and would not be satisfactory. Soja beans were not satisfactory first or second year.

Q. Would you think the soja bean could be grown?

A. I should just keep at it, but you will not be satisfied until you get the mammoth soja bean and cultivate it right.

Q. Some sixty miles from here several of us around Alton have experimented growing soja beans for the last three or four years, and we have almost given up in disgust. How do the southern cows make a success of it for dairying. Would it be practical to grow soja beans and corn together?

A. I think so. We have mixed maize with them and put them in the silo together.

Q. How many planted to the acre?

A. Half a bushel.

Mr. Kennedy: Explain to the people when is the proper time to cut? What season?

A. We have raised corn for six years. It was cut when the leaves showed it had no ears, when it showed in a glazed condition; would show a little ripening. I don't know just when to cut it.

Feeding and Developing the Kansas Dairy Cow

PROF. D. H. OTIS, MANHATTAN, KANSAS.

The young man starting out in life sometimes wishes he had the wisdom of a Solomon, the eloquence of a Webster, the bravery of a Dewey, and the longevity of a Mathusala all wrapped up in his own little self. He would then be able to accomplish something in this world. As a dairy State Kansas is still a youngster and at times some of her citizens long for a combination cow that gives milk with the richness of a Jersey, the sweet flavor of a Brown Swiss, and quantity of a Holstein, and at the same time have the beef producing qualities of a Hereford. Such a cow would be a howling success. But fortunately or unfortunately Kansas cows, like her young men, have not inherited all the traits and characters of every individual of its species from Adam to the present generation. In every walk of life we find ourselves hemmed in by certain limitations, and the question is not so much how to get rid of these limitations as it is how to make the most out of them.

We have in Kansas a large number of common or scrub cows that are being used for dairy purposes. These cows are not all we might wish them to be, but they are what we have and we want to know how to get the greatest profit from them. This thought in connection with the need of milk for our dairy school led the agricultural College to purchase a head of typical western Kansas cows, which at the time of purchase were admitted to be below the average of the state. A record of a part of this herd has already been published, but since then a larger number have completed a year's record, and we now have complete results from 28 heads. The following tables gives a summary of the results:

A YEAR'S RECORD COLLEGE SCRUB HERD.

MOST PROFITABLE FIVE COWS.

Number of Cows	PRODUCTS			Cost of Feed	VALUE			Receipts less cost of Feed.		Cost of producing Butter Fat per lb.
	Milk. lbs.	Average Test per cent.	Butter fat lbs.		Butter Fat	Skim milk 15c per 100 lbs.	Total	Gain	Loss	
20	9,116	4.21	383.7	$32.80	$60 88	$12 29	$73 17	$40 37		$.085
7	7,015	4.43	310.8	30.61	49 26	9 46	58 72	28 11		.098
14	8,054	4.13	332.8	35.59	51 92	10 85	62 77	27 18		.106
9	6,504	4.59	289.5	29.26	45 90	8 77	54 67	25 41		.101
15	6,509	4.27	277.9	29.20	43 89	8 70	52 59	23 39		.105
Average.....	7,439	4.28	318.9	31.49	50 37	10 01	60 38	28 89		.098

LEAST PROFITABLE FIVE COWS.

24	5,742	3.48	199.8	29.55	$31 02	$7 75	$38 77	$9 22		$.147
11	3,475	5.14	178.6	25.24	28 16	4 68	32 84	7 60		.141
33	4,772	3.92	187.0	27.25	29 08	6 44	35 52	8 27		.145
19	3,913	4.14	161.9	27.27	25 41	5 27	30 68	3 41		.168
27	4,200	3.96	166.3	27.69	25 38	5 59	30 97	3 28		.166
Average.....	4,420	4.04	178.7	27.40	27 81	5 94	33 75	6 35		.153

THE DEBT CONTRACTORS.

5	3,583	3.79	135.7	26.75	$21 39	$4 83	$26 22		$ 43	$.197
30	2,903	4.13	119.9	22.89	18 11	3 91	22 02		87	.190
29	3,730	4.23	157.8	31.22	24 34	5 02	29 36		1 86	.198
28	2,141	4.74	101.5	24.43	15 30	2 88	18 18		6 28	.240
Average	3,089	4.16	128.7	26.32	19 78	4 16	23 94		2 35	.204

AVERAGES OF HERD.

28 Cows	5,554	4.13	229.7	29.86	$36 10	$7 48	$43 58	$13 72		$.130
24 Cows	5,965	4.13	246.5	30.45	38 82	8 03	46 85	16 40		.123

It will be noticed that the above record is divided into four parts, the most profitable five cows, the least profitable five cows, the debt contractors, and the averages of the herd. Taking up the differences in individuals it will be noticed that the best cow gave 9,116 pounds of milk, which is 5,641 pounds, or 162 per cent more than cow 11 of the least profitable group, and 6,975 pounds or 325 per cent above lowest debt contractor. The average of the most profitable cow is 3,019 pounds, or 68 per cent above the average of the least profitable, and 4,350 or 140 per cent above the average of the debt contractors. The largest yield of butter fat was 383 pounds, the lowest profitable yield 161 pounds, a difference of 222 pounds or 137 per cent. Comparing the largest yield with the lowest yield we find a difference of 282 pounds, or 279 per cent. Comparing averages we find that the best cows yielded 318 pounds butter fat, an increase of 140 pounds, or 78 per cent over the least profitable, and 190 pounds or 148 per cent over the debt contractors. In the column headed "cost of feed" it will be noted that the best cows are the most, the average cost of the most profitable being $31.49, the least profitable $27.40, and the debt contractors $26.32. This shows that good cows are good eaters, and it pays to feed them well. Suppose that the most profitable cows had been given only half the feed they received. They would still require about the same amount to maintain the animal system, and as is customary among cows this requirement will have to be met first and the result would have been a very large shrinkage in the profits. A man that is stingy in feeding a good cow is simply extravagant and is working against his own best interests.

Under value we have three columns, one giving the income of butter fat produced at creamery prices, another giving the income from the skim milk at 15 cents per 100 pounds, and the last column giving the total income per cow. All these figures are interesting and instructive to the dairyman and will bear study, reflection, and comparison. Perhaps the most interesting column in the table is the receipts less the cost of feed. Here it will be noticed that our best cow gave us $40.37 profit, and our least profitable cow $3.28, and difference in animal income of $37.09, or

113 per cent. In other words these figures mean that our best, as far as dairy products are concerned, is worth 12 cows like No. 27. By adding the receipts less cost of feed of our poorest eleven cows, we have a total of $41.63, or just $1.26 more than the receipts from our best cow. Taking an average of the most profitable five cows and we have receipts of $28.89 per cow. Contrasting this with $6.35, the average receipts from the least profitable five cows and we see there is a difference of $22.54, or 355 per cent. In other words an average cow from the most profitable five cows is worth as much as 4½ cows from an average of the least profitable five cows. As will be seen from the table there were four cows that run the college in debt for their feed, the average deficiency being $2.35 per cow. Three of these cows are already sold for beef and their connection with the College will be severed as soon as the Dairy Association is over. The last column is also an interesting one, showing the cost of producing a pound of butter fat. Our best cow produced butter fat at 8 cents per pound, and our poorest at three times that, or 24 cents per pound. It should be noticed that the cows that cost us the most for feed are those that produced butter fat the cheapest. The cost of a pound of butter fat was 9 cents with our most profitable five cows, 15 cents for the least profitable, and 20 cents for the debt contractors.

In the portion of the table headed "Averages of Herd" the first line gives the average of the whole herd of 28 head under experiment. The second line gives the average of the herd as it would have been without the four unprofitable cows. In both cases the test happens to be the same but it will be noticed that these four unprofitable cows reduce the average of the herd of 411 pounds of milk and 17 pounds of butter fat from what it would have been with 24 cows. They caused a reduction in the average income per cow of $3.27, and in the receipts less cost of feed of $2.68 per cow. With the 28 head butter fat was produced at 13 cents per pound; take away the four unprofitable cows and it cost 12 cents per pound. In the above calculation the price of feed has been figured at what the farmer could realize for it if sold on the local market in Manhattan. In considering profits from the cows we must bear in mind that the farmer

has first realized a good profit in growing the feeds. So the dairy farmer who raises his own feeds obtains two profits instead of one.

With all the above facts and figures before us can anyone doubt the necessity of studying individuality of cows, and yet there are men who say that a cow is a cow wherever she is found, and will pay little attention to weeding out and grading up a herd. What stronger evidence does a man need to show him one of the greatest leaks in the profits of the dairy business. No mechanic would continue to use an engine that would consume more fuel than the value of the product it turned out. How much less should the dairy farmer continue to use an unprofitable cow machine. Both are not only useless, but they are eating up the profits made by the profitable machines.

Improvement. The history of this scrub herd is not all told in the first year record. Ten of these cows have commenced on their second year record and the following table gives the length of time milked in the second year, the yield of butter fat for this period, and the yield of butter fat for the corresponding period of last year:

PROGRESS REPORT ON SECOND YEAR'S RECORD.

Number of Cows	Period	Butter fat lbs 1898	Butter fat lbs 1899	Per cent. Increase
28	7 Months	83.0	164.5	98
5	6 "	85.1	140.8	65
11	7 "	114.7	186.7	62
33	6 "	129.4	180.9	39
9	2 "	48.7	60.5	24
20	4 "	131.6	163.4	24
7	7 "	194.7	216.8	11
24	6 "	155.0	162.6	5
6	6 "	142.0	139.6	1
30	5 "	35.3	80.9	5
Average				32

From this record we see that cow No. 28 became ashamed of her record as given in the first table and started out for the second year at the rate of 98 per cent increase. Nos. 5 and 11 follow with 65 per cent and 62 per cent increase respectfully. There are two cows, Nos. 6 and 30, that have fallen below their first year's record. On the average these cows have improved at the rate of 32 per cent. The greatest improvement seems to be

with the poorest cows, although the best ones increased from 11 per cent to 24 per cent. This table shows very clearly that it is possible, by proper feed and care, to materially increase the productive capacity of the cow, even after maturity has been reached. This improvement not only shows in the record, but in the appearance of the animals also. We have pictures of some of these cows shortly after arrival on the college grounds and again after one year of college education. A glance at these pictures will reveal some remarkable improvements.

But the improvement of the dairy cows does not stop here. This is only a beginning. A trip to the college barn will give you an opportunity to inspect a small herd of dairy calves, from which we expect great results in the future. These calves are grade Guernseys, their grand dam having produced as high as 600 pounds of butter in a year. They are being feed and handled with a view of developing dairy cows. This process of grading up, coupled with weeding out the poor cows, will result in a few years in securing a herd that will far exceed the original stock.

The results obtained in the above tables are largely due to feed and if improvements are to be made in the future the feed problem will have to continue to receive serious consideration. I take it that we are all familiar with the "balanced ration" and that we all agree that the cow cannot make milk without raw material to work with, and that in order to do her best she must have this raw material in certain relative proportions. But even after the ration is "balanced" there is still considerable latitude for choice. One ration may be much more expensive than another.

RATION NO. 1

FEED	Protein	Carbo-Hydrates	Fat
Corn Fodder, 25 lbs....	.50	8.30	.15
" " 10 "	.78	6.67	.43
Total	1.28	14.97	.58
Required	2.50	12.50	.40

RATION NO. 2.

Corn Fodder, 25 lbs.	.50	8.30	.15
" " 5 lbs.	.39	3.33	.21
Bran " "	.61	1.85	.13
Total	1.50	13.48	.49

RATION NO. 3.

Orchard grass, 10 lbs.	.48	4.20	.14
Clover, 10 lbs.	.68	3.54	.17
Corn, 4 lbs	.31	2.66	17
Bran, 1 lb.	.12	.37	.02
Chicago gluten meal, 3 lbs.	.93	1.31	.14
Total	2.52	12.08	.64

RATION NO. 4.

Alfalfa, 18 lbs.	1.90	6.71	.25
Corn, 8 lbs	.62	5.33	.34
Total	2.52	12.04	.59

As you look at these pictures I hope you will not get any wrong impressions. I was criticized the other day for publishing an account of our best cow and showing cuts of her at the time and one year after entering college, remarking that the difference was due to a college education. The criticism was to the effect that we should not speak of cows as going to college, for it gave the impression that the cows were associated with the students, walked arm in arm with them in the halls, sat beside them in class rooms. Such thoughts gave outsiders a chance to call this a "cow college." The fact of the matter is that this is no more of a "cow college" than it is a "plant college," a "chemical college," an "apple college," a "bug college," a "biscuit college," or a "hemstitching college." But the Agricultural College is a school that takes up the various subjects that the farmer, the stock raiser, the dairyman, the mechanic, and the housewife has to deal with and tries to give such instruction to the rising generation that will first make men and women of them by teaching them to think and at the same time let the instruction be such that will be

of practical benefit to them in the active duties of life. The cow is simply one of the many subjects dealt with, and you may rest assured that the students are not defiled by any associations with bovines. The young man who today trains his hands as well as his head and goes out into the industrial world to earn an honest living is no less of a man than the graduate in Greek and Latin who walks up and down the streets of Boston and New York hunting a job.

But I must not let the cow grow hungry while chasing after critics. We have tried a number of rations and find that on pasture or by feeding soiling crops to our cows we can produce butter fat at from 6 to 9 cents per pound. From January 29 to March 25, 1898, our cows were fed on alfalfa and Kafir corn meal, and produced butter fat at an average of 11.9 cents per pound. For a period of two weeks we fed Kafir corn meal one-third, bran one-third, ground oats one-third, and what Kafir corn stover they would eat. During this short period we produced butter fat at 10.8 cents per pound. A ration of one-half Kafir corn meal, one-half soja bean meal with what Kafir corn stover the cows would eat, produced butter fat at 12.3 cents per pound. When it became necessary to use high priced concentrates the cost of producing a pound of fat increased to 15, 16, and 17 cents per pound. This points to the fact that it will pay the dairy farmer to raise his own feeds. For this purpose alfalfa and corn or Kafir corn are undoubtedly the cheapest. If impossible to get alfalfa try red clover and soja beans. The clover is worth about two-thirds as much as alfalfa, and soja beans are richer in protein than oil meal. By knowing the value of the different feeds and exercising a little forethought it is possible for the dairy farmer to grow all the feed necessary for his cows on the farm and thus save all or nearly all the hight priced feed bills.

Notwithstanding the fact that there is money in milking cows, money in raising feed for them, and prospects for a much greater profit by proper feeding, selection, and breeding, the crying need of our creameries and dairies is more milk. Just at present there seems to be a tendency to quit milking cows in order to raise calves for beef, many farmers believing that a good steer cannot be raised on skim milk, but must have whole

milk and all that the cow gives. How to convince men that there is money in dairying even when beef is high is one of the problems of the day. With some men this is impossible, with others it will require a certain amount of education. The first thing to be considered is whether the farmer knows how to feed. Considering the way some men feed their cows it is no wonder they are disgusted with the dairy business. The best way to teach a man the principles of feeding is to send him to the Agricultural College. If he cannot take the regular course let him plan to take the short dairy, or farmers' course during the winter months. It is to the interest of every dairyman, creameryman, and creamery patron in the state to see that as many young men as possible from their neighborhood shall avail themselves of the opportunities offered at this college. Whenever a farmers' institute is held or ought to be held in your community it is to your interest to see that it is well worked up and advertised. Don't wait until the day of the meeting and then live in hopes that some way or other there will be a good turnout, but for weeks before the subject should be so agitated that everyone in the neighborhod will feel that he cannot afford to miss it. By getting the people together in this way it would then be possible to give them instruction in the principles of feeding, which so many need. Another valuable way in which the desired instruction could be given is for the creamerymen to see that the men at the weigh cans thoroughly understand the principles of feeding and can figure out balanced rations and vary the ingredients so as to cost the least. By a combination of these various methods it is possible to give great impetus to dairying from the feed standpoint alone.

But Kansas can never expect to reach the goal in dairying until she applies more business principles to the handling of cow machines. This shifting from milk to beef and back again from beef to milk is a practice that is eating the very bottom out of our profits. After a man spends several years in grading up a dairy herd, it is folly for him to change to raising beef animals from the same herd, just because beef is higher than butter fat. Such changes cannot be made in a day and by the time he has accomplished his end the tables will be changed and butter fat will

be higher and beef lower, and he will then wish he had the experience, the growth, the development he would have had by sticking to one thing and making the most of it. What would you think of a doctor who had spent years in preparing himself for his profession decided to become a lawyer just because lawyers were drawing larger fees at a given time. By the time he completes his law course, likely as not, the doctors will be reaping the largest profits. In the meantime he has lost all the experience and skill he would have attained by sticking to medicine. By shifting this way from one thing to another a man will go through life making a failure of everything. What men need to be impressed with today is that they should have a specialty and stick to it. As will be seen from the above figures the question is not so much how we can get more cows, but how we can get cows o a better brand. We want and ought to have cows that yield so much that the farmer cannot afford not to milk them no matter what the price of beef. To do this, records and the methods of men who are making a success of the dairy business need to be brought before the public. This in connection with experiments and instruction at the college, in connection with constant agitation along the lines of feeding and breeding will undoubtedly bear fruit sooner or later in raising the standard of the dairy industry throughout the state.

DISCUSSION.

Mr. Long: Can we raise alfalfa in this section?

A. I am not sure as to that.

Mr. Fraser: We have tried it several times at the University with very poor success. It does not do as well for us as red clover, and that is general throughout the State.

Mr. Long: The red clover in this part of the country was killed out last winter, and a great many are after ration No. 1. Can you tell them the cost of a pound of butter fat when fed that ration?

A. We don't feed that ration so have no results. We know what farmers are doing; they are getting from 72 to 85 pounds of butter from

their cows. If you know how much it cost per cow, you can find out the cost of producing a pound.

Mr. McCormack: What would be the effect of feed on the production of butter fat to increase the protein above two and a half.

A. Some cows would be all right, for undoubtedly if you have a cow with a tendency to lay on fat instead of giving milk, you will probably get better results by increasing the amount of protein. With a good many cows you will increase your profits by increasing protein; these are simple averages. You can take some cows and you might feed them and they would grow poor on this first ration. If you feed her too much protein and she gives too much milk, then lessen the protein and increase the carbonhydrates and get her back into condition.

Q. In table 3 instead of bran when it costs $14.50 would you substitute oats?

A. Oats make a very good feed; we get a very good feed sometimes. You could probably do that to a certain extent. Oats are so much higher in Kansas.

Q. Our oats are a little bit less than bran.

A. If you speak to me after the meeting I will tell you.

Mr. Kennedy: In re gard to the oats question. In feeding oats and bran when oats are worth 18 cents a bushel, bran is worth $15.00 a ton. You can obtain bran at $14.50 a ton and even when oats are 23 cents a bushel it is cheaper to feed bran.

Q. What kind of bran is that?

A. The Chicago bran supposed to be standard bran, 12 per cent protein to the 100 pounds. Not the cheapest feed, we get gluten meal. We bought it for less than $20 per ton. Bran at $15.00 per ton furnished protein necessary to feed the dairy cow. Oats at 18 cents per bushel will furnish protein, or, in other words, when bran is worth $15 per ton, gluten meal is worth $31.

Q. Have you not used experiments?

A. We are feeding gluten meal bran at $15 per ton at the university. We are feeding 6 pounds of bran in the ration. We change to gluten

meal. We substitute three pounds of gluten meal. The gluten meal contains 25 per cent protein bran, 12½ per cent according to chemical analysis. Two pounds of bran is equal to one of meal. We have tried it and our cows not only hold their own, but many of the cows increased to nearly three pounds a cow. They have all increased a little and from that day to this we have fed gluten meal.

Mr. Soverhill: I have a question to ask. Have those cows all been fed the same ration?

A. Yes, sir, our best cows cost an average of $31.49 for feed. The last two cost only $26.32. You see a good cow has got to be well fed. If you feed these cows only half the amount we would have got results very much below these. The dairy cow is a hard working animal and needs good ration.

Q. What is your basis for feeding. There are some heavier than others; which cow should have the most feed.

A. According to the amount of butter fat that would come. If we found a cow would eat more feed than she was getting, we increased, and if she paid for that extra feed she got it right along; if not, we took it away.

Q. Has any had any experience in feed roots?

A. Only to a very limited extent.

Prof. Henry: You have spoken of scrub cows. Did they come from the plains? Or the good cows which had been selected again and again as the family moved westward, were they scrubs or not?

A. That depends on what you call scrubs.

Mr. Dorsey: Could corn fodder be used in a cow's ration?

A. It should be supplemented by some feed like clover hay or soja beans.

Q. If I have a cow giving 8 per cent milk and getting 30 pounds in a day should I feed her more than that required ration 2½?

A. We should have to try and see; this is simply a standard. If we find a cow was producing butter fat at a profit and eating full feed then we increase it, and if the increase in the butter fat pays or more

than pays for the feed we give it to her; if not, we take it away. In place of those being scrub cows, look at those pictures and draw your own conclusions after looking. You can know about their breeding as we got it.

Mr. Kennedy: Were those cows on the left fed that ration No. 1?

A. No, sir.

Prof. Henry: Maybe they would have done as well if you had given them that; they were used to it.

A. We have plenty of cows being fed that.

Mr. Kennedy: What were those cows fed on?

A. They were fed on corn stalks. They were picked up in the western central portion of the state by a man who didn't know anything about the selection of dairy animals. They told us they could not get the best cows, so took what was left.

Q. The chemical analysis generally accords with the actual test by using those feeds.

A. Yes, sir; we have not used corn fodder and corn alone; it doesn't pay.

Q. What percentage of millet could be added to first food?

A. You would just increase the relative proportion. It has carbohydrates, but would not make up the protein.

Q. In the changing of feed did you notice any difference; the new ration did it increase their milk, gradually increase or not?

A. When the cows first came to the station they gave them a protein food and they increased rapidly. If I remember right it is something like this. They were getting about 80 pounds (from 60 to 80) a week per head at the time we got them, and at the end of the second week they were giving something like 120 pounds.

Q. How long did you continue to try that ration?

A. We first started them on a ration of one-third meal, one-third bran, and one-third oil meal—a very rich ration to stimulate the flow of milk. At the end of the term we changed to a ration of alfalfa and corn meal, and we fed that. Alfalfa and corn meal will produce butter fat as cheap as any other feed.

Mr. Crosier: Is the gluten meal too rich for the grain alone?

A. Yes, sir; all gluten meal. Your cows would give milk, but it would be a very expensive operation. Protein is the high price element in our feed. You don't want to supply any more protein than you need to when you are running a dairy business at your own expense. Just give what they need, no more.

Mr. Segar: Did you say that Hungarian with corn fodder was too heavy a feed?

A. Too much carbo-hydrates and fat and not enough protein.

Q. Corn fodder a better ration than the Hungarian?

A. Hungarian added to No. 1, the cow would not be able to do as well.

Q. A loss to her in that way?

A. Yes, sir.

Q. Corn fodder and corn and bran and Hungarian together?

A. No, sir; you would make a better ration, but not a balanced ration.

Q. It would improve the ration?

A. Yes, from one to two. You would improve but not do as well.

Q. What would you put in it to add to it?

A. Alfalfa, if not red clover, supplement it with soja beans; if not, use bran, oil meal, or gluten meal.

Dairy Evolution

D. W. WILLSON, ELGIN.

At the last meeting of the Illinois State Dairy Association held at Belvidere we had the pleasure of listening to a paper by a resident of your neighboring city, Marengo, the late Mr. S. K. Bartholomew, a vet-

eran dairyman of Boone county. It made a very considerable impression upon us as showing the difficulty under which the pioneer farmers and dairymen of this great western country labored. We can only call attention to a portion of his paper as pertaining to the dairy industry. He said the cows were brought up and milked in the shade of the trees in the summer time, and in the shelter of a hay or corn stalk stack in the winter time. He described the cheese-making process as carried on by the good wife, as in those days the women were considered the only butter and cheese makers. We had not yet evolved the scientific dairyman or butter-maker such as we find about us today and scattered thickly all over the country from east to west. After milking the milk was strained into a large open iron kettle swung on a pole supported by two sticks with a crotch in the top and a fire built underneath, the rennet added, and in this way the milk was brought to the normal temperature for separating the curd from the whey. The whey was carefully dipped off from the top of the kettle and curd taken out, drained on a cloth stretched over a frame, carefully packed in wooden hoops, pressed by means of a lever and heavy weights attached to one end and laid away to dry and cure in the loft of the one story dwelling.

How many of the dairymen today would be content to even undertake to accomplish the making of a decent article of cheese in that way? Few, I ween. Those methods would not be used in this day of scientific dairy education with any success, but there is no doubt that as good cheese was made at times in the old fashioned rule of thumb way as is made now with the whole extensive knowledge that we have of dairy bacteriology, improved methods, machinery, etc. Dairying has come to be almost an exact science, and the man, woman, or factoryman who hopes to succeed or who can succeed in this field must be up with times; must keep up with the times. It has been only a few years since centrifugal cream separating has been known and practiced in the dairy world. Last winter under the auspices of the Department of Agriculture I made a trip through Kentucky, and found very intelligent Kentucky ladies who were making butter from cream raised in stone crocks. That certainly is an old

enough and antiquated enough way to satisfy any of the believers in the good old fashioned days gone by. From the crock was developed the ordinary open shallow pan, and then came the deep setting system, developed, as we believe, first in Sweden. This was followed by the submerged system known as the Cooley can, which, at the time it was placed on the market, was considered the greatest invention that had been made in the cream raising system. From that was developed a large number of devices, all according to the same theory, that the sooner and quicker the milk was cooled the larger would be the amount of cream raised.

In 1883 I first saw the western country; first came in contact with the dairy industry of Elgin personally and directly. I had come out to place before the creamerymen and dairymen of the Elgin district the De-Laval Separator. The first one was placed in operation near Hinsdale, now a suburb of Chicago, some 12 or 14 miles south of that city on the C., B. & Q. Ry. The next separator of that sort installed was at Algonquin in the factory of C. W. Gould, one of the leading factorymen of the Elgin district at that time. This was followed by one at Udina in the factory owned by John Newman, now the head of the John Newman Company, one of the largest manufacturers and handlers of creamery butter in the Elgin district. These separators were capable of handling milk at the rate of from 600 to 700 pounds per hour; almost as nothing beside the giants of today that handle from 4,000 to 6,000 pounds per hour.

The Babcock test was again one of the evolutions in the dairy that has done many wonderful things. It has been the greatest educator, possibly, that has ever appeared in the way of dairy appliances or apparatus. Educating not only the creameryman, but the farmer as well, enabling him to weed out, if he so desires, the non-paying boarders in his dairy, and retaining those not only capable of paying their board, but a profit as well on the labor, care, and feed expended.

The Babcock test was not generally known at the time of the last meeting of the Illinois State Dairy Association in your city. Since then the invention of Dr. Babcock has become known all over the dairy world and has helped very much to eliminate some of the evils that pertained

formerly to the dairy industry. Paying by the test is almost universal in creameries and cheese factories, giving to each man his just due.

The latest development in the dairy industry, and one that has attracted the most attention, probably, is dairy bacteriology. It is only a few years since that the study of bacteriology has been sufficiently scientific to reach milk and its production. The investigators in our agricultural colleges and experiment stations have done most excellent work along this line, and today we find that the man who is up in his business is the dairyman who fully understands bacteria, where they come from, where they go, and how to determine the good from the bad. The man who has the best knowledge along that line is the man who is best fitted to carry on dairying scientifically and exactly and to guarantee that his product will be always uniform, providing his milk, or the raw product, has been delivered to him in the proper shape.

MARKETING DAIRY PRODUCTS.

This is a subject that has been revolutionized almost entirely within the last twenty-five years. The methods of transportation have improved, methods of packing, packages and handling in every way have been so radically changed that the handler of butter of 25 years ago would hardly be able to understand or appreciate what has been accomplished, unless he had grown up, as it were, with the improved and advanced methods.

Refrigeration in the creamery for holding butter in the same condition as when delivered from the worker; refrigerator cars for putting the butter from the factories or creameries or dairies into the great centers of population and consumption in the same condition as when it left its original place of manufacture. All these have been evolved within the last 25 or 30 years, and today we see butter carried thousands of miles from the place of manufacture to consumption and delivered practically in the same condition as when it left the refrigerator of the manufacturer. This has improved the quality of butter going into consump-

tion to such an extent that the increase in consumption and demand has more than kept pace with the increase in the supply, notwithstanding that today the dairy industry covers a wider field than was ever dreamed of 25 or 30 years ago.

On the north we have Canada with the Diminion government using both influence and money to increase both the quality and quantity of dairy products, arranging for transportation not only within their own borders, but across to the great consuming population of Great Britain. We see Russia coming to the front as a supplier of dairy products; little Portugal also doing something along that line; the Argentine Republic occupying the same position in the southern half of this continent as the United States of America does in the northern half, is rapidly developing in the dairy industry. Australia and New Zealand have come to the front largely because of the improved methods that have been evolved in handling and caring for milk and its products. The Danes and Swedes on the other side have become noted all over the world as manufacturers of high grade dairy products, uniform and excellent at all times. These things have become possible because of the evolution that has taken place from the cow to the finished product, with science, skill, and intelligence applied thereto.

We cannot finish an article of this kind without taking into account the evolution of the dairy cow. The old description of a cow: "An animal with four legs, with horns at one end and a tail at the other," does not fill the bill now as a dairy cow. We must have something beyond that; must have the dairy type, conformation of the cow to the business for which she is designed. We look upon the cow now as simply a machine through which the products of the farm are passed and from which we receive the milk in its perfect condition. The cow that would produce 100 or 200 pounds of butter per year fifty years ago was considered a fairly good one. They did not begin to average to exceed 100 pounds, but the cow that does not produce 300 pounds of butter per year now is hardly considered up to date. This has been brought about by organization, by breeding, by studying the problems and finding out how the milking ability of the machine could be developed.

Much honor is due to the various breeders' associations that have labored long and earnestly to induce the ordinary dairyman to become better acquainted with the cow machine, to find out what she is capable of doing, and instead of being contented with the ordinary common stock of the country, inducing them to improve the quality, so that in a 25 cow dairy now the cows may be made to average 300 pounds of butter per year instead of 100, with no greater expenditure of care and feed than formerly applied to the 25 cow dairy that only produced 100 pounds per year each.

With all this evolution in all the various channels we have touched upon, the dairymen themselves evoluted to the extent that they ought or that they might? That is the problem for you people to solve; that is one of the reasons why this dairy association was organized, because improvement of stock, methods and appliances are worth but little unless improved dairymen handle them and go with them. Are the dairymen of this district, of the whole country, as thorough, as capable of handling the dairy industry with the present improved methods and scieitific appliances as were the dairymen of 50 years back in doing the work with the knowledge and appliances then available? We believe they are. We believe that the dairymen today, on the average, are superior to the dairymen of 50 years ago, because progress and evolution must be and is a portion of all who come in contact with advancement in any particular line in which they may be engaged. But how many of the dairymen in this audience, the men who handle cows and furnish milk to the creamery, cheese factory, condensing factory, or for any other purpose, can say that their cows average them 500 pounds of milk per year. We fear that but few of them know whether they do or whether they do not. And if so, it is their fault and not the fault of the dairy industry that they are not averaging more than 500 pounds.

This information that is to be had along better lines of dairying by means of dairy literature through dairy papers, agricultural papers, bulletins of the agricultural colleges, and experiment stations, through the bulletins furnished by the agricultural department along those special

lines, are all available and accessible to every farmer or dairyman, not only in this audience, but all over the country. Have they availed themselves of it to the fullest extent? I fear the great majority are somewhat careless on this particular subject. They might know more about their business than they do. Might do better than they do. The object of this association is to encourage the betterment of the condition of the dairymen and creamerymen. Looking over your program I find that some of the topics touch upon many of these subjects, discussed by men who are thoroughly capable and able to place before you the very best information in regard to the improvements in the dairy. "The survival of the fittest" is what usually occurs in any industry. The man who is wide awake, pushing, progressive, and willing to learn, ready to accept what has been proven to be true in the way of improvement and advancement, is the man who will be successful in his chosen vocation, and there is no vocation in which it requires a larger amount of "sticktoitiveness" of push, or education, and information than does the dairy industry.

Wednesday Afternoon, January 10, 1900

Some New Year Problems for the Dairyman

H. R. DUEL, SANDWICH.

Upon the evening of the old year, or the dawn of the new, it has been a time-honored custom to make new resolutions, endeavor to solve old problems, and map out our course for the New Year.

Over there in that corner sits a man, or a wreck of a man; close beside him on the floor sits his little boy with bare feet, tattered garments, blue face and hands. Over by the window with a look of com-

plete despair written in her wrinkled face and gray locks, sits the wife and mother. No pleasant fire flashes and crackles in the fire place; no food for the sustenance of their bodies is seen through the open door of the cupboard; no hope for comfort is seen within the walls of their wretched home. What has done this? Time was when the father went to his work with a happy heart, and returned in the evening to his happy family. Time was when the boy did not want for the necessities of life, and had many luxuries. Time was when the fireplace sent out its warm rays for the comfort of those around.

Alas! all is changed. What has done this? The bleared and sunken eyes of the father will tell you; the empty whisky flasks which lie around the house will tell you; the clanking glasses found in the saloon around the corner will tell you; the money that lies in the till of the grog-shop will tell you. But on the eve of the old year, as he meditates upon his past career he resolves to right about face and solve the problem in favor of honesty and sobriety. So, as we are standing upon the brink of the new year as it were, there are problems for us as dairymen to solve.

First, we wish to speak of the skim milk problem; the distribution of milk in such a way that each patron may have his share, no more, no less. Some creameries have solved this problem, and solved it in a satisfactory way. Others are trying to solve it in a way that is a detriment to the creamery itself and to the patrons. You are standing in the weighing room; a patron drives up, places his cans on the platform; you empty the milk in the weigh can, weigh it, and find that the three cans he handed to you contained just seventy pounds of milk. The patron drives around to the skim milk room, and no doubt reasons to himself something like this: "Now I am almost the first one here. Of course, I know I am not entitled to three cans of skim milk, but if I do not take it some one else will, and I am just as much entitled to it as the next man, and besides, I may not come tomorrow and will need all I can get." So he fills his three cans to overflowing, thereby taking about 150 pounds more than belongs to him, and goes his way rejoicing.

Another patron comes around to the skim milk room; he left 100 pounds of milk in four cans at the weigh stand. He reasons like this. "I may run short next time I come, so I will fill all these full; I have a score of little pigs at home and this skim milk will be as a soothing syrup to them." He fills his four cans, thereby taking 180 pounds more than belongs to him, and he goes his way. This continues until the last patron arrives—a milk hauler. He is busily engaged in filling his cans, when suddenly the hum of the separator ceases, the flow of milk stops, and he is brought face to face with stern reality that the milk is exhausted, and yet he has seven cans to be filled. As he looks in bewilderment upon the seven cans containing a vacuum; as he meditates upon the fact he'll be called upon to explain the whys and wherefores of the vacuum; as his thoughts go out to the patrons who have preceded him and have been instrumental in bringing about this state of affairs, a poetical idea comes to him something like this:

Tell me ye winged wings that round my pathway soar
Do ye not know some spot where patrons steal no more?
Some lone and pleasant place, some valley free from care
Where theft is never known and never enters there?
The wild wind dwindles to a whisper low,
And sighs for pity as it answers, No.
Oh tell me sun, shining upon my face,
In all your rounds have ye not seen some place
To which patrons who steal can banished be,
And then I can sail on a pleasant sea?
The sun, blushing at what they had done,
Stands still for a while and answers, "Nary one."
Tell me, Justice, seated upon your throne,
Is there no place where they can find a home,
Where they from temptation will be free
And not take milk which belongs to me?
Justice smiling spreads aside the vail
And loudly and quickly answers, "Yes in jail."

And when the farmer, weary and dusty, returns to his home from the labors of the day, gathers together his milk cans only to find them empty, as he stands by the swill barrel and listens to the grunting and squealing of his pigs, he soliloquises thus:

"Who steals my purse, steals trash. 'Tis something, nothing. 'Twas mine. 'Tis his, and has been the slave of thousands." But he

who takes from me my skim milk, robs me of that which enriches him and makes my pigs poor indeed.

How shall this problem be solved? Some have been trying for years to solve it by one of the fundamental rules of arithmetic addition by adding water to the milk; but long ago the farmer found out that if he desires to raise good thrifty calves he must give them a better ration than skim milk and water; and what does he do? He either turns the calves with the cows, or retains enough milk from the day's supply to feed them and takes the remainder to the creamery, thereby entailing a loss to the creamery and himself as well, for it has been clearly demonstrated that good calves can be raised on unadulterated skim milk. What shall be done? To my mind there is but one way to solve this problem, and that is to procure a skim milk weigher; then the last man will be on an equal footing with the first; the creamery will make more butter, and it will be more satisfactory all around.

But there is another problem that demands the attention of the dairyman, and that is the test problem. I need not ask you if you have encountered any difficulty along this line. If there is a buttermaker here who has never been assailed on account of a patron's low test, he should put himself on record as the eighth wonder of the world. Yes, I take it we all have troubles of our own regarding this branch of creamery work. The question arises, is it possible to solve this question in such a way that no epithet such as robber, thief, swindler will issue from the throat of the patron, and settle upon the head of the buttermaker?

I have heard of some creameries trying this solution: The man who does the clerical work of some creameries looks at Mr. A's test and finds it is 6 per cent; down the list he comes to Mr. B's test of 4 per cent. He, no doubt, reasons like this: Mr. A is a quiet, easy-going sort of a fellow; never has a complaint to offer; always satisfied with his test no matter what it is. On the other hand, Mr. B. is a dyed-in-the-wool-grumbler; a chronic glowler; never satisfied. If I permit these two tests to stand as they are, these two men, who are neighbors, will compare their statements with the probable result that Mr. B. will be so enraged he will take

his milk to the neighboring factory; so, to ward off an uprising, I will just take 1 per cent off of Mr. A.'s and put it on Mr. B.'s test. Mr. Buttermaker, Secretary, or Manager, what have you done? You have taken 1 per cent from the man to whom it rightfully belonged, and given it to a man who was not entitled to it. You have just as much right to do this as you have to go to Mr. A.'s barn and take therefrom a horse belonging to him, and put it into Mr. B.'s barn. You have just as much right to do this as you have to go to Mr. A.'s corn-crib and take a load of corn and transfer it to Mr. B.'s crib.

No, this question can not be solved rightfully in this manner. I have it from a patron of a creamery in Iowa that their buttermaker adopted this plan to prevent some of his patrons from going on the war-path. If at any payday a patron questioned the correctness of his test, and made the threat that if it was not better the next time he would quit, in order to keep his pulse down and retain his milk, the next time he would make the test higher whether he deserved it or not. Buttermakers and creamery men, are you adopting either of the above methods to smooth the troubled waters arising from the test question? Dishonest means and dishonest methods may flourish for a time; they may bring ducats to the coffers of those who practice them, the creamery that adopts this plan may be in the race for a time, but like the biblical house, it is built upon a sandy foundation; the rains will descend, the floods come and it will beat upon that creamery and it will fall, and fall hard.

What shall be done? How shall this problem be solved? We are cognizant of the fact that it is an utter impossibility to please every one. There are a certain number of men in every creamery who are never pleased with their returns. If they have a 5 per cent test, they are positive there is something wrong; ought to have been 6 per cent. If their milk weighs 200 pounds there is something wrong with the scales of the weigher; ought to have been 205 pounds at least. If they are charged with three jars of butter, they will take their oath they never got but two. If they receive 25 cents for their butter they will declare robbery has been committed; 25¼ is what they should have had. So

his kicks are inexhaustible. And in giving a solution of this test problem, let me say this: Be sure no milk adheres to side of sample jars; be sure the pipette is full; be postive the acid is of the proper strength and the machine is up in motion; be sure the reading is done correctly; figure each man's milk on this basis though the heavens fall. You may lose patronage by doing so, but as you watch their forms disappear over the neighboring hill, you can go back to your work with the knowledge that you have done what is right and just.

Another problem is the poor butter problem, how to make it better. Complaint comes from every quarter that creamery butter becomes rancid too quickly. Let us have a pound of this athletic-frowy butter and let it stand up and speak for itself. A few days ago in my early existence, before I was transformed into butter, the cows, in order to get into the stable, were obliged to wade through barn yard filth up to their udders. The evening milking time had arrived and the farmers emptied the milk from the milk cans, milk he had received in the morning; the cans were then taken to the well and rinsed in cold water and taken to the barn for the evening's milk; soon the farmer and his men began the operation of milking. They did not deem it necessary to wash the cows' udders or even brush them, but allowed dirt, filth, milk, and all to hold one another company in the milk pail; while milking, either to produce a soothing effect upon themselves or the cows, or both, they puffed at pipes, the perfume of which was in harmony with the aroma from an ill-kept cow stable. The next morning Mr. Jones, the farmer, was obliged to haul corn for his neighbor, and did not have time to go to the factory. The next morning the corn shredders came and the milk was held until the following morning, when it was taken to the factory. Upon being turned into the receiving vat, there came to me a strong odor of tobacco smoke. I thought this rather strange for upon looking around I saw notices posted here and there, "Postively no smoking in this creamery." And, while in the receiving vat there was some foreign substance coming up from below. Upon investigation found it to be the stale water coming through the holes of a decomposed vat; but soon I was croweded through

a whirligig sort of a machine, where part of me was changed to cream and part to skim milk; the cream being the portion to be kept in the factory, was run into another room into a cream vat. Here also I detected the tobacco smoke odor and other odors which I thought came from the churn and a mouldy refrigerator. At noon the buttermaker left me and did not return again until the following morning, during which time I nearly perished for want of air.

Ladies and Gentlemen: This is not overdrawn. The foregoing has happened and is happening in some creameries today. Is it any wonder then that so much butter becomes rancid, Sampsonized, Herculean? He may be a Miller, a Haugdahl, a Sondergaard, or such a buttermaker as F. A. Leighton would have us to be; he can not take such cream and make extra butter; that delicate aroma that tickles the palate of the judge and strikes his olfactory nerve with a pleasant sensation is gone, and gone forever.

He may wash it with water the purest and best
That comes from the spring, kind nature's behest.
He may whirl the churn around and around
Those germs from the stable he never can drown.
He may use Sudy's color, that's known far and wide
To the user of which no ill can betide.
He may use just enough to get the right shade
But the flavor was gone 'ere the butter was made.
He may use Worcester salt, that's sparkling and bright
Which Bates has told us is just about right,
It has climbed far up the ladder of fame
But those troublesome microbes decay just the same.

How shall this butter problem be solved? The solution lies with the farmer who furnishes the milk; the buttermaker who received it, and the man who oversees the running of the creamery. They must work in harmony, overcome all obstacles, and good results will follow.

One more problem, and I am done. That is, the Oleo problem. Modern warfare has advanced materially in the last ten years. The death-giving agents of war have reached a high state of perfection. Whether or not this is as it should be, I am unable to answer. An advancing army starts out to invade the enemies hold; their step to the martial

music is firm and elastic; their bayonets glisten in the bright sunlight of the early morning. Far at the head of the column, bending with the morning zephyrs, is carried the flag of their choice. Suddenly, without warning, there is a noise like the roaring of many rivers, and hundreds of brave men are ushered into the halls of death. The enemy has surprised them.

In the State of Illinois, there are 250,000 dairymen marching to prosperity. Their farms for the most part are models of thrift and ingenuity. No mortgage holds its grasping hand upon them. And should you ask them to what they attribute their prosperity, no doubt they would make answer, "The Cow."

A Lesson in Feeding the Dairy Cow

W. A. HENRY, DEAN COLLEGE OF AGRICULTURE AND DIRECTOR AGRICULTURAL EXPERIMENT STATION, MADISON WISCONSIN.

Ladies and Gentlemen: I have a double purpose in visiting your city today, for I not only wish to talk with your people on dairy matters, but to visit once more the sights and scenes which in one way may be styled, the startling point of the Babcock milk test. Ten years ago I stood on this platform discussing dairy subjects with the members of the State Dairymen's Association. After the day's sessions were over, when we were gathered in the hotel a number of creamerymen came to me and pleaded for a milk test. They stated that the centrifugal separator had made the pooling of milk possible so far as skimming the cream was concerned, and that it had been demonstrated that from the milk gathered on many farms first quality of butter could be made. The trouble was, however, that so long as milk was paid for by the hundred

pounds or can, justice was not being done. Those who watered their milk, or who skimmed the cream off, or who had cows giving thin milk, took advantage of those who delivered milk rich in butter fat. The rogues were finding out daily how to practice fraud more and more successfully, and the honest people with good milk were growing more and more dissatisfied. Only by analyzing milk to determine its butter fat and paying each patron for the fat delivered, could co-operative dairying successfully continue. I said to these gentlemen, "You speak of the chemists working out for you a milk test as though you were asking a man to manufacture a pump—that all that was necessary was to get out some pattern and make one. Do you realize that for seventy-five years chemists have been endeavoring to discover or invent a quick, simple method of analyzing milk, and no one has yet succeeded?" I told them of the Patrick test, invented at the Iowa Experiment Station; also of Short's Test, invented at the Wisconsin Station. Objections were raised to both of these, and the conference ended as it had begun, with an urgent request from these creamery operators that our scientists in some way provide for them a quick way of measuring the fat in milk in order that each patron of the creamery and cheese factory might receive his just returns for fat delivered.

On my return to Madison, I had a conference with out doctor, S. M. Babcock, Chief Chemist of the Experiment Station, telling him of the gravity of the situation. After some reflection he stated that he thought it possible to modify the Soxhlet method of milk analysis so as to make it applicable to creameries and cheese factories. The Doctor at once took up the investigation and worked faithfully. After a time he thought he had modified the Soxhlet method so as to make it applicable to creameries. Then troubles arose and he was forced to abandon the original plan of procedure. Then a new line of study was undertaken, which ended in using sulphuric acid to break up the milk and set the fat free and a narrownecked bottle in which to measure the fat after it had been acted upon by the acid. And so there was given to the world the Babcock Milk Test, a quick and accurate method of measuring the fat in milk and

cream, and the discovery of this test may be said to be due to an impulse originating at a meeting of this Dairy Association many years ago.

Doctor Babcock gave his Test to the world without patent or restrictions of any kind, and nothing has come to him in the way of money reward, thought it has brought him a world of work and correspondence. Happily, the last Wisconsin Legislature voted a bronze medal to Doctor Babcock, and a committee of citizens are now having a medal prepared, which in due time and in proper manner will be delivered to the Doctor. He is the same modest, unassuming, scholarly chemist today that he was before his Test was given to the dairymen of the world. We have figured out that the Babcock Milk Test saves $800,000 annually to the dairymen of Wisconsin alone. Its use everywhere with dairying is extensively practiced. The Babcock Milk Test is as well known in Australia and New Zealand as it is in Illinois.

With this preface, let us now address ourselves to the subject of the rational feeding of the dairy cow:

LESSON.

I ask the dairymen before me in your annual convention to listen to the presentation of an elementary lesson in stock feeding. I shall present it in greatly condensed form for lack of time, as it seems to me it is possible for intelligent teachers in our rural schools to do when they shall have properly qualified themselves for such effort. I shall use a few comparatively new terms, but not many. Remember, that in these days we are constantly finding it necessary to add to our vocabulary, and the farmer is no exception. There are new words for him to learn as well as for other people. Please follow me closely, remembering that I shall condense many lectures by the country school teacher into one in this talk.

PROTEIN.

The nutritive portion of all substances which go to nourish man or beast may be grouped under five divisions, viz., protein, carbohydrates, fat or ether extract, mineral matter and water.

PROF. W. A. HENRY

Director of Agricultural Experiment Station, Madison, Wis.

We may consider the white of an egg, or the cheese part of milk the best examples of protein. The gluten of flour, the lean part of meat are also protein substances. Oil meal, gluten meal, peas, bran, and middlings are all rich in protein. Oats contain a fair quantity of protein, while Indian corn is relatively poor in that constituent. The stems of leguminous plants, such as clover, alfalfa, cow pease, the common field peas, etc., are quite rich in protein when cured into hay, while oat straw, corn stover (shock corn from which the ears have been husked) are comparatively poor in protein. Instead of saying "protein substances," we frequently use the term "nitrogenous substances," to characterize this group of materials for the reason that they all contain nitrogen, an element not found in the group o which I shall next speak.

The higest use of protein or the nitrogen substances is to build up the muscles of the body and to replace their waste. The protein substances also constitute the organic part of the bones, most of the hide, hair, horns, nerves, and blood of the body. The word "protein" means, first in importance, and we will readily agree that it was well named.

In its secondary use protein is broken down in the body and furnishes heat and energy, or it may be converted into fat for storing in the tissues against time of need.

CARBOHYDRATES.

Here is a long word, but let us learn to use it. Sugar is a pure, crystalized carbohydrate, and I am sure no one need ever forget the meaning of the word hereafter. Starch is another carbohydrate, as is also the woody portion of plants. The carbohydrates, as we shall soon see, constitute a large portion of all the food consumed by man or animal. In the body the carbohydrates furnish heat and energy. They also serve as the main source for furnishing fat to the tissues. The carbohydrates can not build up the muscles, but they may nourish them and prevent their waste. The sugars in plants and fruits, the starch in tubers, roots and stems, and the woody fiber of the leaves, stems, etc., constitute the car-

bohydrates used by man and beast as food. We can readily understand how abundant the carbohydrates are, and we will learn further on by the tables what quantities are required by some of our farm animals.

FAT OR ETHER EXTRACT.

The fatty substances of forage materials are called "ether extracts" by the chemist. We can readily understand what sort of substance the fat or feeding materials is. Corn contains a considerable quantity of oil or fat, and linseed meal or cotton-seed meal still more. There is considerable oil in oats, but not much in corn stalks or wheat straw.

A pound of oil from flax or Indian corn, for example, will give off more than two times as much heat when it is burned as will an equal weight of sugar and starch, and this being true, we may readily believe that for certain uses in the animal body fat or ether extract is worth more than twice as much as the same weight of carbohydrates in the form of sugar or starch. Oil and the carbohydrates contain the same elements and so serve the same purpose in the animal body, namely, furnishing heat and energy and building up the fatty tissues. The fat of feeding stuffs is a concentrated form of fuel just as coal is a more concentrated source of heat than is wood. Fat stored in the body is a supply of fuel for the body against a time of need. When an animal is starving, or when it is sick, it often lives for days upon the fat stored away in the body. The shrinkage which the body undergoes at such time is in part due to the loss of fat which is given up for the purpose of supporting life.

MINERAL MATTER AND WATER.

For building up the bony framework of the body there is required a certain amount of mineral matter, and some exists also in the tissues of the body. Generally where animals are properly nourished otherwise, they are getting in their food all of the mineral matters they require. Since we must be very brief at this time we will not talk further about mineral matter.

A large part of the animal body consists of water, but this is supplied so abundantly as a rule that we need not consider it further.

DIGESTIBILITY.

Having considered all of the group of substances required to nourish the animal, let us next consider their digestibility.

Food consumed by the animal passes into the digestive tract, which is a tube running through the body. Before any of the protein, carbohydrates, or fat supplied in the food can be taken into the body from the alimentary tract, it must first be dissolved by the digestive fluids secreted from the walls of the alimentary canal. These fluids of various kinds attack the food materials containing nutriment, and dissolve more or less of it. The dissolved portions then pass through the linings of the intestines and enter the blood, while the indigestible portion passes on as waste. For present purposes we shall consider only the digestible portion of feeding stuffs.

A SAMPLE TABLE OF COMMON FEEDING STUFFS.

In the table herewith presented are given a few of the common feeding stuffs together with the quantity of digestible material contained in 100 pounds. A school teacher would have to assist her a large chart which would not only give the substances I here present, but many others as well, so that the farmer boy and girl could learn something about all the materials which are used on our farms or might be used thereon for feeding animals. Please remember that this is a sample table containing only a few articles which are required for today's discussion.

Table showing the digestibility of several common feeding stuffs:

Feeding Stuffs	Total digestible Substance in 100 pounds		
Roughage	Protein Lbs.	Carbohydrates Lbs.	Ether Ext Lbs.
Corn stover	1.7	32.4	0.7
Red clover hay	6.8	35.8	1.7
Timothy hay	2.8	43.4	1.5
Oat straw	1.2	38.6	0.8

Concentrates—			
Corn or corn meal	7.8	66.7	4.3
Oats	9.2	47.3	4.2
Wheat bran	12.2	39.2	2.7
Oil meal, old process	29.3	32.7	7.0

Studying this table we learn that in a hundred pounds of corn stover (shock corn with the ears removed) there is 1.7 pounds of portein available for the animal, i. e., digestible, while the carbohydrates equal 32.4 pounds, and the ether extract or fatty matter 0.7 pounds.

Red clover hay is four times as rich in protein as corn stover. We find still more protein in the concentrates, especially in wheat bran, and oil meal. While corn stover contains a considerable amount of carbohyrates, corn is much richer in that nutrient; oats are less rich than corn in carbohydrates, and wheat bran still poorer. In fatty matter or ether extract corn is a great deal richer than corn stover, and oil meal is still richer than corn.

REQUIREMENTS OF FARM ANIMALS.

We readily understand that each farm animal requires a certain amount of food for the support of the body. This subject has been carefully studied by investigators, and here is what they report:

Table showing the digestible materials required daily by farm animals per 1000 pounds live weight.

	Digestible Nutrients		
	Protein	Carbohydrates	Ether Ext.
Ox at complete rest in stall	0.7	8.0	0.1
Fattening cattle (1st period)	2.5	15.0	0.5
Milch cow (yielding 22 lbs. daily)	2.5	13.0	0.5
Horse (medium work)	2.0	11.0	0.6

Remembering that in each case the figures are for 1000 pounds of animal, we learn that an ox of that weight standing quietly in his stall, neither gaining nor losing in weight, requires 0.7 pounds of protein, 8.0 pounds of carbohydrates, and 0.1 pound of fat or ether extract each 24 hours to support the body. In other words, this is the amount of food material necessary to run the animal machine without acomplishing any

results further than body support. If we propose to fatten this same steer, we are shown by the second line of the table that the protein must be increased until 2.5 pounds are given daily, and the carbohydrates run up to 15 pounds and the ether extract to 0.5 pounds. The milch cow needs the same protein and fat as the fattening ox, but not quite so much carbohydrates, and the horse at medium work requires less nutrients than the cow, excepting the ether extract.

Please remember that this table is only a sample, and does not give all that the school teacher would have when teaching her class. On her chart or in the text book used there would be a much larger table showing the feed required for pigs of different ages, for the dairy cow giving different quantities of milk, also for the sheep, etc.

PRACTICAL APPLICATION OF TABLES.

We have now had two tables before us for consideration. In the first we were told how much digestible material is contained as an average in several common feeding stuffs. We have been told in the second how much feed different animals require for their proper support. In order to apply this knowledge let us endeavor to calculate a ration for the dairy cow. Remember that by "ration" we mean the amount of food necessary for the support of an animal one day. Further, we mean by "standard ration," just the amount of nutriment the animal requires for one day—no more and no less—for here is where the usefulness of this line of instruction comes in. Every cow, for example, requires a certain amount of food for the support and nourishment of her body, and she must have this amount before she can return any profits to her owner. The amount that the cow requires for merely supporting the body is about that represented by the ox at rest in his stall, which is given in the second table. We see that when giving 22 pounds of milk daily the cow will require more than three times as much protein as the ox at rest, while she will need 13 pounds of carbohydrates instead of 8, as required by the ox at rest. The ether extract or fat required by the cow is five times as great as the ox at rest.

Let us next calculate a ration for the dairy cow using the feeding stuffs named in the first table, and meeting her requirements as given in the third line of the second table.

CALCULATING A RATION FOR THE DAIRY COW.

In determining a ration for a dairy cow yielding 22 pounds of milk daily, we choose from the list of feeds in the first table 8 pounds of red clover, 10 pounds of corn stover, 3 pounds of oat straw, for roughage, and 5 pounds each of corn meal and bran for concentrates. The digestible nutriments in these are ascertained as follows:

Calculation for dry matter and digestible nutriments in trial ration for dairy cow.

RED CLOVER HAY

In 100 Pounds	In 8 Pounds
6.8÷100×8	.544
35.8÷100×8	2.864
1.7÷100×8	.136

OAT STRAW

In 100 Pounds	In 3 Pounds
1.2÷100×3	.036
38.6÷100×3	1.158
.8÷100×3	.024

CORN MEAL

In 100 Pounds	In 5 Pounds
7.8÷100×5	.39
66.7÷100×5	3 335
4.3÷100×5	.215

CORN STOVER

In 100 Pounds	In 10 Pounds
1.7÷100×10	.17
32.4÷100×10	2.24
.7÷100×10	.07

BRAN

In 100 Pounds	In 5 Pounds
12.2÷100×5	.61
39.2÷100×5	1.96
2 7÷100×5	.1.35

Arranging these results in tabular form, with the standard of table for comparison, we have the following:

First trial ration for dairy cow weighing 1000 pounds and yielding 22 pounds of milk daily:

Feeding Stuffs	Digestible Nutriments		
	Protein Lbs.	Carbohydrates Lbs.	Ether Ext. Lbs.
Red clover hay, 8 pounds	.544	2.864	.136
Corn stover, 10 pounds	.17	3.24	.07
Oat straw, 3 pounds	.036	1.158	.024
Corn meal, 5 pounds	.39	3.335	.215
Bran	.61	1.96	.135
First trial ration	1.750	12.557	.580
Standard	2.5	13.0	.50

This trial falls considerably below the standard, especially in protein, and to correct this, 3 pounds of oil meal are added.

Second trial ration for dairy cow weighing 1000 pounds and yielding 22 pounds of milk daily.

Feeding Stuffs	Digestible Nutrients		
	Protein Lbs.	Carbohydrates Lbs.	Ether Ext. Lbs.
Ration as above	1.750	12.557	.580
Oil meal, 3 pounds	.879	.981	.21
Second trial ration	2.629	13.538	.79
Standard	2.5	13.0	.50

The first ration chosen with 3 pounds of oil meal added gives us a ration very close to the standard.

We learn from this that a satisfactory ration for a dairy cow weighing 1000 pounds and yielding 22 pounds of milk daily may be composed of the following: Red clover, 8 pounds; corn stover, 10 pounds; corn meal and bran, each 3 pounds.

TEACHING THESE THINGS IN OUR COUNTRY SCHOOLS.

What I have told you in this brief space of time represents a dozen talks or more, if need be, by the enthusiastic, intelligent teacher of the rural school. Lack of time and the necessities of the case have caused me to be brief before you today and to crowd a great many facts into a few brief sentences. I ask you as thoughtful farmers if I have not presented a

subject which is worthy of a place in the country school course of study? It is true, I have used a few unfamiliar terms, and these words will sound strange when first heard by our country school children. I beg of you, however, to think of the scores of words which you were compelled to learn and use when at school and which you have forgotten since your school days. Do you not recollect that you were taught to use such words and phrases as "minuend," "subtrahend," the "least common multiple," and the "greatest common divisor," and scores of others in arithmetic, grammar, and other books? Do you not agree with me that the words, "protein," "carbohydrates" and "ether extract" are just as important as many of those old school-day words, and that the farmer boy and girl should become familiar with them? Do you not agree with me further that the country school teacher might profitably lead the little people she is teaching slowly ahead until after a time they have a fair understanding of these feeding tables, and the older ones be taught to calculate rations not only for the dairy cow, as we have done today, but for the horse, the fattening steer, the sheep, and the pig. If this subject were taught in the country school, would not the boys and girls coming home at night have interesting topics for discussion at the supper table, and would not father and mother as well as John and Mary become interested? When doing his daily chores, would not John supply feed to the farm stock with more carefulness than if he had never thought of these subjects before?

IS IT NOT PRACTICAL?

If our teachers can acquire a knowledge of arithmetic, physiology, and other branches sufficient to pass examinations thereon and to teach these branches more or less successfully, could they not in time gain sufficient proficiency in some of the farm topics to teach them effectively and to the great advantage of all concerned? Remember that what I have here presented is only one of many subjects which might well come into our course of study for the rural schools. If such topics as these were added to the course of study, would not much good be accomplished thereby?

The facts that I have gone over concerning the feeding of farm animals are useful not only for the stable and feed-lot, but they apply indirectly in many ways to human nutrition, and so our boys and girls, while studying these topics in the country schools, would gain a great deal of helpful information. Can not and should not our teachers prepare themselves in the near future to give instruction in some lines of agriculture at least as well as in the branches now in the course of study?

See how one subject can be brought into school teaching. We need training. Go even to a circus and watch them ride horseback, but it takes training, as you would probably find out if you tried it. There is no line of business that needs such successful prosecution as agricultural pursuits, and we are trying to make them easier.

It is only coming to take up certain studies like these extra studies of agriculture, and solving the harder problems, this coming to college. When you want more education for your girls you send them to the normal school and where they have teachers trained from the ground up and down again. Having gone to this college even they can go out and use illustrations and arithmetic problems and all relating to the subjects they have studied. Why not lessons for the farm? Will it pay?

There is a little country over on the other side of the water, a quarter as big as this State; it is not all good farming land. They call it Denmark. Their population is about the same as Wisconsin. You would think they would eat up everything they raised. This little country of Denmark began many years ago to train her people along agricultural lines, and the Government took it up. They have their schools, their veterinary colleges, and professors of agriculture, and they are all respected and looked up to. It has trained its people in all these branches, and from a nation that was low down among agriculturists, whose butter had no marked distinction, they have become the greatest dairying people on earth. that little country a quarter as big as Wisconsin sends twenty and thirty millions of dollars' worth of butter to other countries. Denmark exports to other countries twenty-four dollars' worth of agricultural products for every man, woman, and child in the country, whether living in the city or the country.

We hear a great deal of agricultural, and from reports we find eight dollars for every man, woman, and child for America and twenty-four dollars for Denmark—Denmark, a quarter as big as Illinois, and shipping out twenty-four dollars worth of agricultural products for every man, woman, and child in the country. Talk about expansion, I think there is a chance for America to expand at home, right up here in the top story, and we just want to come down and get on our knees and begin with education in our schools and quit bragging and get to work. We are going to ship more and more agricultural productions right along, but other counteries are getting right along too.

I had a letter on my desk from the Argentine Republic, from some one who wanted to come and study dairying. Twenty years ago the Argentine Republic shipped all the butter they wanted to. Now they have creameries so big that it would make Illinois sick. They have the Babcock test. They are training their men and pushing and working in every possible direction and in this struggle for existence where commercial supremacy is the great factor, and you can only get that by education. They have schools in Denmark to train men who shall go out and represent machinery; they train them in diplomacy; they train them for traveling representatives of commercial houses. They are trained in machinery, fabrics, etc., and then sent out to sell their cottons, silks, machines, etc., and what are we doing to train our men? Germany is bothering England today because Germany pervades the whole country. Great Britain has been trafficing with her ships, while Germany was sending her children to school, and now the Germans are sending their exports all over the world and England is waking up. It is a question whether she hasn't lost her commercial supremacy by America and Germany being opposed to her.

The point I want to make is, train the boys and girls now to be the best farmers on earth—not a pessimist, but a broad-minded farmer that will get everything out of the soil. Let us go back to Denmark: After Denmark had stood by her professors so nobly and spent so much money and made her products world known, what has happened? Today it is

the standard of the world and it was made by her dairy schools and her professors training the people. Did Denmark say: "That was enough," and brag about it? Bless you no. She says: "What can we do next?" "We feed a good many pigs; couldn't we put pork products on the market of the world after butter?" That was a pretty serious matter. They thought of the United States and of Illinois, where the farmers grow pigs. They knew they had got to sell their pork in competition with the hogs from Illinois, and they heard you could produce pork in Illinois very cheap. "And here we are close together, four times as many people as in one of their States, and how on earth can we ever sell hogs in competition with Illinois." In this country we would just have laid down. Did Denmark quit? No. She sent out spies to find out about it; what kind of pork they made, and then came back and said, "There is no use trying to to compete with Illinois. But the Englishman goes to Ireland for Irish pigs and only people that want cheap pork buy American pork." We can feed whey and skim milk and make pork, but will it be good pork. After that he learned what Ireland did and then set their Experiment Station at work and spent $1,000 to find out; yes, they spent $5,000, $10,000 a year to find out what kind of feed would make the best quality of pork.

In this country you were trying to make filled cheese, thinking you were going to cheat some one. While you were doing that, what was Denmark doing? Spendng $10,000 trying how to feed to make a better pork than we were making in Illinois, and they succeeded, and when you sit down they will offer you on the bill of fare Danish bacon, not Illinois ham. The highest priced bacon in the market today with Irish is Danish.

Does education pay? Have you ever wondered about it, except to find fault; ever asked your legislature to give you a few thousand dollars to help it along? That is what Denmark did. They got down to business. I hope we are going to get down to business.

I referred to filled cheese. What happened 16 years ago. We were shipping 15 million cheese to England. How much now? About nine million. We have jumped from 15 to 9. People don't eat the same they did? I guess it was because there was no market for it.

Over in Canada they have been pushing their schools there. More than that; they have travelling dairy instructors. In Quebec there are 28 men who travel over different provinces teaching them to make better cheese. Now what happened? What were we doing while Canada was selling four million? We were selling five million. And what is being done today? She is selling sixteen million and we have jumped from fifteen million to less than ten million. Our exports decreased; her exports increased 400 per cent, and farmers winked at it because they could get five or ten cents more for their milk. We pretty nearly drove every cheese factory out of the country. We fought in Congress and got it stopped and American cheese is beginning to come up again. Now there are two million more going out of the country. We can make cheese and you can make butter. We first drove filled chees out of the State, but we had to take our bitter medicine. We purged our own State and then went with you citizens to the legislature and fought it.

Now it is butter, and we must fight it. You have got the hardest battle to fight that is going to be fought anywhere. If you hold together, if you down any politician that is against you, you will be helping in the battle, and it will be surprising how you will wake up here. There are enough men in this room today if they would hold together to do wonders in this work, no matter whether Populists, Democrats, or Republicans, if they will stand by honest dairy goods, and other things being equal, no matter what politics we are going to stand by the best man, never minding the party. Let the old questions go by and stand together. There are hundreds of million of dollars at issue; will you help us?

Just now there are two men in Washington that are both in jail, and the question is shall they go to the penitentiary. They have been condemned, but there are lots of men in Washington, Senators and Representatives, and the big influence from Chicago bearing down on McKinley to pardon these two men. Who are they? Wilkins and Butler. Wilkins has defied the United States Government times without number in regard to the revenue law of oleomargarine. He has been indicted and the

United States Treasury Department would let him off with a fine, but the rat got into the trap once too often. This time he is sentenced to the penitentiary for having broken the revenue law again and again. Have you written a letter to President McKinley concerning them? If not, sit down and write a letter to McKinley and say that you hope in the name of justice that these men who went against the laws of their country so many times shall go behind the bars and suffer the penalty. The politicians are after Wilkins to save him and begging for his release. The Courts have said he should go there and the President is wavering. If he should get fifty letters from Illinois it would have something to do with the next election. I have written four letters to city friends; I have written to McKinley to let Wilkins and that other rascal pay the penalty, and he has also received letters from scores of men to let them out. Write; do it. Take it up in earnest.

I cannot tell you about Wilkins; if you knew the corruption of these two men you would not hesitate to write, not one, but fifty letters, and it would aid us all to stand together. If you knew how powerful you are if you stand together. We have got along so easily we do not realize what we have got to fight for—a purer and better civilization.

I commenced by telling you of the Babcock test and will close by saying I come down here again with that problem solved. I ask you now, as I did when I went home before, to work together and with us for the solution of these great educational problems.

The Dairy Cow...How to Know Her and How to Breed Her

W. J. KENNEDY, INSTRUCTOR IN ANIMAL HUSBANDRY, UNIVERSITY OF ILLINOIS.

Mr. President, Ladies and Gentlemen:—I am sure that it is a pleasure for me to be here today to talk to you, the members and visitors of

this Illinois Dairy Association. As I sat here today and yesterday I admired you. I thought you were a most patient class of people. You have listended to talks and it reminded me of the story of the man who went into the restaurant and ordered a cup of tea. He drank the cup, or tea; ordered another, and drank it; ordered another, and drank it, and ordered a fourth one. By this time the waiter was amused and could not keep from laughing. He drank the fourth, and ordered the fifth. At this, the waiter could no longer control herself and she burst right out laughing. "My good man you must like tea." "You just bet I do, or I wouldn't have drank all this water to get a little bit of tea out of it." You sat here patiently the second day, and I hope that at least you have got a little out of it.

The subject I am asked to talk upon today is the dairy cow, how to know her, and how to breed her. This question of how to know the dairy cow is a much more difficult question than many people think it is. About sixty years ago we had a man who was able to tell all about a cow by looking at her, Guereau, but no man has been able to do so since. I know a man who went from a dairy section and bought up cows and bought them on the length of the tail. A cow with a long tail was certainly a good milker. If it did not come to the hock it was no good. He bought cows throughout the country. His name was Mr. Austin and was a wealthy man, but is today in the New York poorhouse. Whether the length of the cow's tail put him there, I don't know, but he lost money in buying cows.

You will find men that say they can tell good dairy cows by the dairy form. She has good thin shoulders and thin neck, a dairy cow and a milking cow.

Two weeks ago I visited a man's farm who advocated that theory. He knew the dairy type. He wanted the thin shoulders. I looked through his sheds; he had the dairy type, but he did not have dairy cows.

Now, gentlemen, the dairy cow is a cow for the dairy man and her use is to manufacture food into milk. That is what she is for. She is valuable just as she can produce or convert food into milk. If she can

convert a great deal of food into milk she is valuable. If she cannot produce much milk she is not valuable.

I start at the udder; that is where we get the milk from. Now a cow should have a good udder. Buy a good udder; an udder that is of good size; that extends well forward and well up behind. Should have four teats, if well placed so much the better. There are some good cows with the teats not so squarely placed as some would want them. There are a few points in regard to udder. A good udder should not have a heavy coat of hair on it. In most cases the udder heavily coated with hair indicates that the udder is fleshy. On the other hand I want to have a thin coating of hair.

I have some pictures here. This is a Jersey owned by the Hord farm of Massachusetts, and I saw the same one down here at Springfield at the State Fair this year. She had a very fine udder and I noticed in particular that she had many veins on the outside running over the udder. Plenty of veins on the outside of the udder indicates that the udder is not fleshy. Again, I like to see an udder having good veining on the outside. A fleshy udder is one that will milk down. After milking just feel the skin getting loose. Grasp it with your hand and a cordy feeling is a good indication. Leaving the udder, we will remember that is where we get the milk from.

The milk veins on the body. Some cows will have two veins; others will have four or five branching out. The more veins she has, the larger they are and the more crooked, the better. Remember that; want large veins, plenty of them, and crooked.

The veins do not carry milk to the udder, but return the blood from the udder to the lungs. If large and full they indicate a great deal of blood passing through, and milk is a producer for blood. These veins will run into the body. Sometimes up to the forelegs; sometimes way up into the body. Where they enter the body you will find udder holes, tender milk wells. The larger they are the better, five or six of them, especially in Holstein cows you will find five or six milk wells in a cow. I claim this is an essential point in the dairy cow. When you get the udder, get

the milk veins and the milk wells and you have got the dairy cow. These the the only safe and sure signs to go by. The only things you will find that holds true in all the parts—the udder, the milk wells, and veins. You have got to have the other things to get these.

Some men will advocate a cow must have a light thigh. It is a good milker, but the large udder has got to have the light thigh. They will also say, a cow must have good width at top of hind quarter. If she has a large udder she will have the width. Get the udder, the other things will come.

I used to be quite a crank on the body, but I don't believe so much in that now as I did. By close observation I find that many good cows have large bodies; many good cows have not. Must have capacity to condense and digest food. I noticed in many of our cows down here at the Experiment Station at Champaign have not got large bodies. Two cows in particular, both bred at Coolidge's farm, one cow has a very large body, the other cow not nearly so large, and the lightest bodied cow is the best milker. So you see this is sometimes true and sometimes not.

Then again you will say, "What are you going to do for the shoulders?" In many high class dairy cows and the best dairy cows have pointed shoulders. Then again I have seen good cows with broad shoulders. Many cows with pointed shoulders are not good milkers. To say that the good dairy cow must have pointed shoulders would exclude a great many good cows and take in a good many poor cows. On the dairy shoulder, a great many men are stumbling today. They are breeding these thin shoulders and losing constitution by it. If you have the pointed shoulder, you must get the width. The dairy cow must have constitution and she gets constitution by depth and width.

Two cows at the Experiment Station had both very narrow and pointed shoulders and contracted all the way through and we had to kill one of them. She was going down hill every day and had consolidated lungs and was very delicate; no constitution. In going into pointed shoulders, see that you get width below.

About the neck, have a thin long neck. But in short thick necks you

PROF. W. J. KENNEDY

Professor of Animal Husbandry, University of Illinois.

will find good dairy cows, and no man is justified in saying you must have long necks; some have it and some have not.

There is another point I want to speak about before going any further. If the skin is loose and soft so that you can grasp it, that is not an indication of milk, but it is an indication of health. A loose soft skin indicates healthy internal organs. It is necessary in every animal.

The head of the cow. She should have good eyes, good size, and if she has large eyes she will have a splendid forehead. The front bones are prominent.

Cows with clean head; not a heavy beefy head; in which the veins stand out; the nostrils large, an indication that she can breathe; a large mouth.

The cows on the chart are of five or six breeds. But the point I want you to follow is this: You will find one point common, or rather the point in superiority is the udder, veins and milk wells. You will find some of them this wedge-shape.

This cow is producing over 600 pounds of butter in a year. Jersey Tiggis. She has good veins, good milk wells, and good udder.

This is a Guernsey cow. "Pretty Milking Maid." She has a different shaped head and neck than the Jersey; different in the shoulders and different in the back. The point of similarity in the two cows is the udder and milk veins. Gives 62 pounds of milk a day.

This is an Ayrshire cow. "Pride of Maine." Has given 12,000 pounds of milk in a year. Highest record for a day was 66 pounds, and she has got a typical udder and milk veins, but in other ways is different from the Jersey or the Guernsey, but these three cows have not the same shape of neck and head. The point of similarity are the veins, milk wells, and udder.

This is a Holstein. "Aagie Grae." The highest official test on record. We cannot say she has great depth of body. She is long and deep. She has got the udder, milk veins, and milk wells. That cow is owned by Stevens in New York.

Short Horn cow. 511 pounds of butter a year. She is different from these other cows I have shown you. Her body is much different and she carries a great deal of flesh. No lean, thin appearance, but has got the udder, veins, and milk wells.

This is Pauline Paul. She is the champion cow of the world. Makes more butter in one year than any other cow. 1153 pounds of butter in one year, and strange to say never gave over 68 pounds of milk a day. Men might think other cows more valuable, but here is a cow that you can depend upon the year through. She has got good udder, good milk wells, and veins. She does not resemble other cows in body.

This is Mary Ann St. Lambert. She made 36 pounds of butter in a week. This is not an official test, but a test thaht was made unofficially because in the days of Mary Ann St. Lambert some say she did not make it. She is a long cow and has not got such wonderful depth of body, but has a good udder and milk veins.

This is a cow not pure bred. She is a half breed Holstein and Jersey owned at the Experiment Station at Champaign, and there is one of the best butter producing cows in the State. 56 pounds of milk that test 5.6 butter fat. Look at her. She has not got such a wonderful body. She has got a grand good udder and the best milk veins I have ever seen in a cow.

On this page I have another cow with which Prof. Fraser is carrying on an experiment; this cow and another one he is experimenting on. This cow is in the experiment station. Look at her. She is about the same depth, but lacking in udder. About those two cows it is very strange. Both have the same amount of food, and the same kind of feed. The first cow will get 1¾ of butter fat while this produced one pound. Six months of experiment. 175 butter fat this one; 75 for butter fat from other one. To look at them this cow has got a lean pointed shoulder and a raw looking cow, only this cow lacks in veins, milk wells, and udder.

In judging cows a man should bear this in mind, if he is going out to judge cows by tails or too much on type. I believe in dairy type to a

certain extent. But I think the universal type to go by is the udder, the milk veins and the milk wells.

Perhaps there are some good cows that will not have a large udder, but good milk wells and milk veins. No man today can tell by looking at a cow how much milk she is going to give. They cannot do it. There is only one way to find out and that is to use the weigh scale and Babcock test. Pay great attention to the udder, milk veins, and milk wells. If not milking, pay attention to the milk wells, light thigh, and not for the udder. See that there is plenty of loose skin if not milking.

The question is this: It is not a question of buying dairy cows in this State, but who is going to breed these cows? A great many people buy a herd of cows; they will milk and feed them, and when through, put them into beef and send them to the market. The dairy cow is a hard animal to judge, and if some of our herds were judged a great many of them would have been sent to the market long ago.

Who is breeding your cow? The men who are interested in milking these cows don't care about their breed. They just buy them and sell them; keep them six months or a year. It is no object to them to pay much attention to breed.

The average production of a cow in the United States is about 120 pounds of butter. Of course every man when he buys, selects nothing but good cows. He has scoured these neighborhoods and got all the good ones. The farmer and the dairymen must breed his own cows. He is interested in it and he is the man who is running this business, and it stands to reason that a man who is interested in the business should certainly do it better than a man disinterested.

If you have got some cows, do it. Select good sire, and save your calves. Remember in selecting the sire that he is one-half the herd. The farmer generally buys the cheapest one he can get his hands on. You say, how are we going to know? He is just as hard to select as the dairy cow, or even harder.

When buying a sire, buy one that is from dairy stock. Buy one whose mother was a good milker, and whose grandmother was a good

milker, and you will find you are not running nearly so much risk. Do not buy a cheap one. It never pays.

Another point in selecting the sire. A mature sire is the best and safest at all times. Suppose he is six years or seven years old; he is as good at ten as he was at five. See the stock from that animal; if they are good you want them; if not, you don't want him. You say the old sires are cross, and you are afraid of the old sire. But, gentlemen, you must get over this scare of crossness. The best sires are cross. For my own sake, if I was to buy a sire that was a little cross, I would prefer him to a kind one. A cross animals never kills. It is the quiet animal you need to be more afraid of. You do not keep the quiet animals tied up. Bulls are not always quiet and you are not prepared for it, while the cross animal you keep at a distance and you get no harm.

A man was breeding Jerseys because he says, "I want to get better milk." Then the next year he wants Holsteins for more milk. Then the next year he takes Short Horns. Keeps running around from one breed to the other. If you desire Jerseys, why this is the stock you should start with. But whatever line you start in, follow in that line. Don't go mixing breeds. Keep to one line. There are just as many poor ones in all breeds. Always bear this in mind, that it is the best animal you want. Don't buy either just because it is a Jersey or Holstein, but because it is a good Jersey or a good Holstein.

A few years ago in Minnesota the Jersey craze came over the farmers. And the Wisconsin people were pretty sharp for them and shipped them their little light colored Jerseys, and they have got a cattle no good for beef and no good at all for milking. If you mention Jerseys out there now you would be nearly mobbed They bought Jerseys, not good animals. They ought to have paid more attention to the animal and not bought them just because they were Jerseys, but because they were good animals of that breed.

Get your own stock. Get your heifers and weed them out. Always bear in mind and save your good ones. Don't say you don't know because if you do you will surely save the poor ones. Don't be afraid of

it. Save the animals which will be profitable. Keep at it and you will get some good ones.

DISCUSSION.

Q. How many years will you keep Jersey heifers before discarding them?

A. Have her drop her first calf at 2 years old.

Mr. Sawyer: Were those two cows weighed during the test?

A. They were and strange to say we cannot find where it went. The two cows, and each had as much food as the other, and yet there was ¾ pound more butter fat from one than the other.

Q. How were they bred?

A. One half breed Jersey and Holstein and the other Short Horn.

Mr. Dorsey: What is the milk well?

A. You all noticed there are veins and you follow them along on to the body and you will find it stops there. Put your finger where that vein stops and you will find that maybe you can put your finger in. That is where the veins enter the body and are the milk wells.

Q. What is the point to judge?

A. The size of it. If a cow has only one milk well, that should be large; if four or five they may be small.

Mr. Davis: Wouldn't the effect of feeding develop the udder so she might be able to give milk up to 60 pounds?

A. These milk wells will always be there. In the young cow the veins may not be large, but these wells should always be there. Nature put them there.

A Member: In case of this cross breed cow, that cow half Jersey and half Holstein you speak of, which breed would you say was best to start in on?

A. If you are a Jersey fancier breed Jerseys; if you are a Holstein fancier breed Holsteins; just follow whichever line you start to follow, but stay with it. Don't breed Holsteins this year and Jerseys next.

Q. Won't the milk veins always extend when the cow becomes excited? Put a cow in the stable you will find that milk vein larger won't you?

A. It must be more blood passing through. The milk vein carries the blood to the lungs; there may be more circulation.

A Member: Will you please give the convention those figures that Mr. Curtis gave at a meeting some time ago on those two amateur cows that had never been milked before; do you recall them?

A. No, I cannot.

A. Wasn't it eleven years old and never milked and then gave 246 pounds of butter fat. And one seven years old and in nine months 356 pounds butter fat. It is as good an illustration of individuality without the breed as I ever saw or heard of.

Prof. Kennedy: The point of the individual cow is you must study the breed, not the type because they are all shapes and all forms, but I say the only points in common are the udder, the milk veins, and the milk wells. They generally hold true; other things vary.

Mr. Sawyer: If in starting a dairy herd a man was looking for individuals, and he found an individual Holstein, and individual Jersey, Guernsey, and Short Horn, would he start with those, or would you prefer getting the individuals of one line of breed and working for that point?

A. No, I take this ground. In starting a herd I would go out and buy the individual cow, whether black, brindled, or speckled. Then go on whatever line you want to. Buy the individual animal regardless of the color. By changing breed I mean changing sire. Get the cow first.

ADDRESS BY J. H. MONRAD.

ASSISTANT FOOD COMMISSIONER OF ILLINOIS.

I did not expect to be with you. Your Secretary put me on the program before he had talked with me, and I am not at all prepared to speak to you. As I did not get here in time for my turn on the program I thought you would let me off. However, I have never yet refused when asked to talk at a dairyman's meeting, and I hope I shall not as long as I live. I wish to express regrets for Mr. Jones, Food Commissioner. Business called him to Springfield, and he could not meet with the dairymen of Illinois today.

This commission work has just been established; we haven't got to work yet. I hope I will be able to assist the dairymen not only in the line of protecting you by reducing the fradulent sale of butter imitation, but also by helping you in this Association in the education work. I dare say that the Elgin creamerymen present here may think that the reputation of Elgin butter will permit them to need no more education. I wish to say frankly that I differ with them. I think we need as much education in the Elgin district as in any other district.

We have some very fine, well-built, clean creameries in Illinois, but I am sorry to say we also have some dirty creameries. Now just to hint at my idea; I don't know whether we will be able to carry it out or not. My idea is that every creamery should be clean enough and neat enough to be an example to the patrons of that creamery, before they can expect the Commissioners to send out inspectors to preach cleanliness from the platform. I want to say to the creamery men of Illinois if they want to preach cleanliness to the farmers, they must keep a cleaner factory and cleaner platform from which to preach. I want to say to the milk producers, I don't care whether their creamery is run by individuals or

whether by the farmers themselves; they have got to co-operate better than they have done before.

You have got to get rid of the spirit of the man I heard spoken of at this meeting, who didn't care about the quality of the milk; that it made no difference so long as he got it to the factory. There is a law against it and I hope yet to get after some of those people who deliver city milk to the creameries. The men who are selling clean milk to the shippers are the ones that are applauded.

I want to say that while I am very proud of being an American, I cannot but confess that I felt a great deal of the old Dane rising in me when I heard Prof. Henry speak so flatteringly of my native country. I want to say, however, that distance often lends a charm, and we are often inclined to praise what is far off a little too much, and I want to let you into a secret, that in Denmark they have the very same troubles we have, that the farmers did not deliver clean enough milk for the buttermakers to make good butter from. I also want to say that when Prof. Henry spoke of the education, and the want of better education in our country schools, I felt like jumping up and saying "Amen" every five minutes. It is a hobby I have been riding the last few years. I want them to teach it in the grammar schools, and the school teacher might just as well teach mathematics that would bring it home to the children on the farm. But I think that the sentiment is good, and if we had champions like Prof. Henry we would soon have it. The only trouble is to get the teachers; there is our difficulty. I hope Prof. Henry will take up that white man's burden and prepare a primary book for that purpose. Education will not only make it easier to do our work, but it will give us an added interest in manual work as I have again and again stated and ridden this hobby, and shall now go right on, and at the same time I want to give the officers of this Association a gentle hint.

I understand this State has given the Association $500 a year more than before. I want now from this platform, as a fifteen-year-old member to urge on this Association not to spend that $500 on this convention and the publishing of one report. I want to urge you fellow-members

and officers of this Association to spend that $500 in another manner. I will shortly explain.

I want $200 of that money to be spent in paying the expenses of good dairy speakers to give dairy instruction, and the other $300 to be offered as prizes to the first test association that is had in Illinois. Your last speaker spoke of the importance of knowing the individuality of each cow. We can only find it out by testing. In this country we have had testing a good many years. We have had the Babcock test going all right on many farms before ever the Danes heard of the Babcock test. In 1895 the first Danish test association started up. It was simply 13 farmers that felt it was too much trouble to test their own cows. They joined, and hired a young man just graduated from the agricultural school—and he was only too glad to get the experience and to work for reasonable salary. They hired him and he would visit the farms, go from farm to farm, and would return to the same farm once in two weeks and test and weigh each cow's milk and make a memorandum of it. At the end of the year they made a report. On these thirteen farms the cost of producing a pound of butter varied from 15.01 up to 78.05 cents per pound. That's a stunner. We have had a line of that work here, but not a single farmer's test association. I claim that the association in this State in which the first association starts will go into our dairy history with a reputation as being one of the first promoters of a principle that will raise you higher.

Now I want this Association to encourage such a test by agreeing to pay $300, provided that the farmers will agree to keep up the test for five years; direct a young man how to keep account; help them in any manner possible. Let them select a young man to do the testing. The report of the test should be published in the annual report of this Association. Something like that. I will not bother you with details. Anyone interested in it will find something in our 1898 report. I feel very strongly on that subject. I hope you will take up this line of education while we wait for the teachers that Prof. Henry has described to us.

I think Mr. President I have talked long enough. I have nothing more to say, and you know "we don't want too much water."

DISCUSSION.

Mr. Sawyer: I would like to know your object in giving us that secret, that the Danes had the same trouble we did; that they furnished dirty milk to the factory? My reason for asking is this: We have the impression here that we didn't furnish milk clean enough and that the Danes had mighty nice clean milk. Your secret lets out the fact that they have dirty milk. Are we to consider our milk is all right, or did you simply say that to jolly us up a little?

A. While in Denmark I know that the creameries got milk in a good enough condition to pasteurize. As an illustration. If today we were to order pasturization to be introduced in our creameries, I honestly believe only 30 per cent of them could do it properly. On account of the talk of the standard of cleanliness in the creamery, a standard in the milk so that I think they are a good deal ahead of us in Denmark. Prof. Henry seemed to give us to understand that the Danes were perfection.

Prof. Henry: If that statement is too broad I will say that they make more of a business of it. Do they not export between twenty and thirty millions of butter annually?

A. Yes, I think so.

Q. Don't they as a whole market their best butter, and isn't it a fact, taking it as a whole, that all the best butter from any country goes into market. I am leaving out a few creameries from France?

A. Yes, sir.

Q. If they have dirty milk and sloppy ways could they market so much butter of a high grade as their?

A. Not if the dirty milk is delivered in as dirty condition as I am sorry to say it is at a good many of our creameries where the patrons ought to know better, because when they have shipped milk to Chicago they took better care of it than when taking it to the factory. If the

milk is as dirty as in some creameries here it cannot be pasturized. Prof. Henry wants to know why Denmark has got the reputation on the quality of butter; it is because they pasturize and make that a business which is introduced generally. They have done all they can in that line, but in a leading paper by one of the Government Instructors, he said: "We have done all we can in the creameries. It remains now for the farmers to improve the butter by improving the milk."

Q. The farmers here are going away with the idea that the Danish farmer had dirty milk.

Mr. Johnson: There is a reason for this great export of butter from Denmark. The Americans are noted as being great butter eaters. Is it not true that every American eats two pounds of butter to a Danes one? Isn't it true that the Danes make that a business and make their money in that way and eat something else. It is a side issue with us and we all eat butter without thought of making so much money out of it.

Mr. Monrad: What are you driving at?

Q. I am driving at this, the selling of so much butter there. It is a means of their support?

A. It is the main support.

Q. We don't export so much butter; we eat it instead of selling it, and they sell it instead of eating it.

Prof. Henry: If you take away all the butter that Denmark sells and put her other products on the market, she sells more other products than America does altogether.

Mr. Newman: I claim that that upholds his statement that an American lives better. That we eat our productions instead of shipping them out of the country.

Mr. Monrad: Does the American farmer kill his best steers?

A. I don't know about that, but we eat the best. We send to Chicago for what they have sent there and bring it back.

Mr. Monrad: It is perfectly true that a good deal has to be deducted from exports of butter. By this explanation, the Danes buy a great deal

of cheap butter and that takes the place of the finer Danish butter. That is quite true. That is what Mr. Johnson is driving at. You must remember the Danish farmers are working a high priced land; they pay freight on your corn from Illinois, and have got to compete with you. They have got to be economical; they have got to eat cheap butter. They eat lard flavored a little; they eat butterine, but they eat it under its own name. They have to sell oleomargarine in open packages no matter whether 60 pounds, or 10 pounds, or 1 pound. It has got to be open and oval; it cannot be round or square. They are allowed to have a very light color; pretty near the color of a telegram blank. It is too true that the Danish farmers have got to be economical, and it is true that we eat more butter.

Prof. Henry: Those farmers are buying feed from Illinois and turning it into butter and shipping it to Liverpool and London markets for sale. I don't want to give things one-sided. I present facts as they are. I don't say you can compare Denmark and America. 3.00 agricultural product to America, 1.00 per capita after deducting the whole butter export of Denmark, she still sells more agricultural products than America altogether. Then she has four persons on every acre of land to the State of Wisconsin one. I don't say you can compare everything, but these facts I say will stand.

Mr. Johnson: About that cow whose butter cost .78; one cost .15 and the other .78; what kind of a cow was the .78 cow?

Mr. Monrad: A mighty poor cow. She went to the butcher pretty quick, I tell you that. I think seriously the cows of our western farmers they have too much land.

Reading of Scores

MR. GEORGE CAVEN, SECRETARY.

The Judge who scored the butter made one general criticism. He said that most of the butter was too fresh. It was brought directly from the creamery and it still retains, or a good deal of it retains, the buttermilk flavor. A considerable part of the butter is wavy or mottled; probably haste in getting it here, or failure to give the salt the proper time to dissolve. Anyway there is a good deal of mottled or wavy butter, and a great many of the entries are scored off a little on color.

BUTTER SCORES

W. R. Harvey	Clare	94½
H. S. Mack	Rockford	94
A. D. Caincross	Amboy	92
Andrew Fredericks	Manhattan	92
Albert Faulkner	Cherry Valley	97
Matt Ludwig	Goodings GGrove	95½
Martin Gullickson	Frankfort Station	93½
D. S. Chamberlain	Belvidere	95
Geo. Reed	Belvidere	95½
J. S. Waspi	Spring Grove	95
Fred Richard	Somonauk	95
L. E. Camp	Elmoville	95½
Harvey S. Crosland	Capron	95
Chas. W. Davis	Woodstock	97½
W. W. Fleming	Alden	92
D. C. Benton	Kaneville	96½
O. A. Seyfried	Dakota	94½
Frank B. Thompson	Greenwood	94
Geo. Hoppensteadt	Eagle Lake	93½
H. R. Duell	Sandwich	95
Albert Winter	Waterman	96½
W. L. Lewis	Belvidere	96
Geo. F. Burton	Mt. Carroll	94½
K. B. Carpenter	Thomson	92½

Grant Mallory	Freeport	93½
Walter Kerns	Warren	95½
Frank J. Muller	Milledgeville	93½
Geo. Bloyer	Harper	91½
Otto Bloyer	Elkhorn Grove	92
A. B. Parker	Sherland	96½
C. A. Prosse	Union	91½
F. E. Barrett	Union	97¾
F. E. Wolcott	Leroy	94
A. Kremer	Stockton	96
M. L. Musselman	Kent	97
A. C. Bender	Durand	93
Loren E. Root	Lena	96½
A. McCall	Roscoe	97½
A. J. Salley	Bonus	97½
Geo. E. Waterman	Garden Prairie	98
Geo. Havens	Belvidere	90½
R. R. Murphy	Garden Plain	90½
David VanPatten	East Wheatland	94
H. Nolan	Hinckley	96½
H. F. Rotermund	Bemes	95½
J. H. Werner	Naperville	97
Peter Nelson	Creston	94½
W. R. Tindall	Malta	96½
O. Meyers	Hinckley	96½
J. W. Carr	Aurora	95
Mrs. J. E. Woodard	Kaneville	94½
Kingston Co-op. Creamery Co.	Kingston	93½
S. W. Peck	Winchester	84
Eli J. Crosier	Utica	93
Davis Bros.	Fairfield	92
Thomas Slouborg	Savanna	93
Mrs. E. H. Springer	Springfield	91
S. S. Merritt	Henry	95
W. R. Hostetter	Mt. Carroll	92½
Irvin Nowlan	Toulon	89
H. B. Rice	Lewiston	94
John Christ	Washington	89
G. D. Cassens	Hawel	88½
A. B. Steidley	Carlinville	91
Miss Ella Kinkaid	Monmouth	91½
Joe Plock	Kickapoo	85
J. W. Wheeler	Enos	82
J W. Wililams	Putnam	90

CHEESE SCORES.

S. G. Soverhill	Tiskilwa	92

J. R. Biddulph ..... Providence 95
J. R. Biddulph ..... Providence 94½

PREMIUM MONEY.

Butter purse of $210 was divided as follows:
First in Creamery—Geo. E. Waterman, Garden Prairie $20 00
First in Dairy—S. S. Merritt, Henry 15 00

PRO RATA.

W. R. Harvey $2 95
H. S. Mack 2 36
Albert Faulkner 5 90
Matt Ludwig 4 13
Martin Gullickson 1 77
D. S. Chamberlain 3 54
Geo. Reed 4 13
J. S. Waspi 3 54
Fred Richard 3 54
L. E. Camp 4 13
Harvey S. Crosland 3 54
Chas. W. Davis 6 49
D. C. Benton 5 31
O. A. Seyfried 2 95
Frank B. Thompson 2 36
Geo. Hoppensteadt 1 77
H. R. Duell 3 54
Albert Winter 5 31
W. L. Lewis 4 72
Geo. F. Burton 2 95
Grant Mallory 1 77
Walter Kerns 4 13
Frank J. Muller 1 77
A. B. Parker 5 31
F. E. Barrett 6 75
F. E. Wolcott 2 36
A. Kremer 4 72
M. L. Musselman 5 90
A. C. Bender 1 18
Loren E. Root 5 31
A. McCall 6 49
A. J. Salley 6 49
David VanPatten 2 36
H. Nolan 5 31
H. F. Rotermund 4 13
J. H. Werner 5 90
_____ 2 95
Peter Nelson 2 95

W. R. Tindall	5 31
O. Meyers	5 31
J. W. Carr	3 54
Mrs. J. E. Woodard	2 95
Kingston Co-operative Creamery Company	1 77
Eli J. Crosier	1 18
Thomas Slouborg	1 18
H. B. Rice	2 36
Miss Ella Kinkaid	1 18
Total	$210 49

CHEESE PREMIUMS.

J. R. Biddulph	$12 50
S. G. Soverhill	8 00

The meeting adjourned until 7:30 Wednesday evening.

Wednesday Evening, January 10, 1900

Convention called to order by the President.

Music by Hon. Jules Lombard, "I Fear No Foe." Responded to an encore. Duet, "Larboard Watch," sung by Mr. Lombard and comrade, sole survivors of the Lincoln campaign quartet.

The committee on resolutions made a partial report by offering the following resulution:

That the Secretary be instructed to telegraph the following:

"Belvidere, Ill., January 10th, 1900.

"To Hon. Wm. McKinley, Washington, D. C.:

"The dairymen of Illinois, in convention assembled, after discussing the pardoning of Wilkins and Butler, unanimously resolve that to pardon them would defeat the ends of justice and show a cruel indifference to one of the greatest industries of the country.

"G. H. Gurler, President.

"Joseph Newman, Chairman Committee on Resolutions."

Some Educational Forces that are Helping the Farmer and Dairyman

A. B. HOSTETTER, SUPT. AND SEC'Y ILLINOIS FARMERS' INSTITUTE, SPRINGFIELD.

Ladies and Gentlemen: Through some mistake, likely the printer's, for printers do sometimes make mistakes, I am recorded on the program of this association as secretary of the Farmers' Alliance, an organization that is dead, killed several years ago by politics. The program should read, "Illinois Farmers' Institute," an organization which was never so much alive as it is today.

Since our attention has been called to the Farmers' Alliance, it might be well in passing, to give it a moment's thought. The older members of this audience will remember much about the Farmers' Alliance. Its fundamental principles, object and purposes were good, the membership was large, larger than that of any other farmers' organization ever attempted, and the possibilities of its usefulness great and promising, but unscrupulous and ambitious men were permitted to get control of its offices and to use its membership to further their own selfish political aspirations. The result was the disruption and death of the Farmers' Alliance.

This ought to teach us to keep our Dairymen's Association, Farmers' Institute, Agricultural College, and, in fact, all our educational institutions free from every phaze of partizan politics.

Every man and every society or class of men is operated upon by two opposing forces. There are influences which tend to build up, strengthen, enlarge, and beautify humanity and the social relations of life, and influences which have the opposite effect, which tear down, weaken, narrow the life and darken human existence. Every man and every woman, whether he or she wills it or not, exerts an influence, be

it much or little, in one direction or the other. We are either helping to build up or helping to tear down; we are either pushing forward the wheels of progress or retarding those who are.

The Farmers' Institute, as a social institution, is an organized effort to help to up-build; its influence is on the right side and its tendencies in the right direction. To become eminently successful in any calling, there must be first, respect for the work and those engaged in it; second, a thorough knowledge of its relations to other callings, and third, enthusiasm in its prosecution. These three things the Farmers' Institute is helping the farmer to attain.

The Farmers' Institute teaches the farmer a higher respect for himself and for his fellow farmers. It teaches him that he is, in many cases he can be and ought to be as well educated, as thoroughly informed on social and political matters, as cultured and refined as the members of any other profession or calling. It is teaching the farmer that he is essentially a business man, and as a business man he has greater opportunities of conducting his own business in his own way, and for his own purpose than any other man. He is not subject to the limitations and dictations of any syndicate or combination of trade or capital, or of any monopoly or trust. Neither is he bound by any union which can decide how many or how few hours he can work, and how much he can earn in a day, or for whom he can work or whom employ. And yet, while the farmer is more independent in many ways than any other business man, the Farmers' Institute is teaching him that he is still only a factor in the great business transactions of the world and that his greatest success is to be attained not by independent, purely selfish action, but by becoming a part of the business world, and by co-operative effort with his fellow man.

The savage, only, is independent. As people advance in civilization they are brought together through the channels of commerce and trade; they become more and more dependent one upon another. The greater the number of industries and trades, the more complete the divisions of labor, the more extensive and the cheaper the means of transportation,

the more we become dependent upon one another. The farmer, therefore, instead of trying to live apart and independent of the rest of the world, should use every means within his reach to put himself in touch with every other trade, calling, and industry. He should utilize the mails, the telephone, the railroad, the electric motor, and the press more than he does. The farmer should not confine his efforts merely to the production of food products, but he should study the markets of the world and their requirements and develope co-operative methods of supplying those markets to the very best advantage of producer and consumer.

The farmer has other duties besides those of providing for himself and family. He has responsibilities resting upon him as a citizen of this great commonwealth. The farmers, more than any other class, represent the home abiding, home loving, home protecting, law abiding, peace principles of society. In the rapid and marvelous development of the resources of this wonderful and beautiful land of ours, great wealth has been produced, phenomenal wealth. There is wealth enough and food enough produced annually in the United States to cloth and shelter and feed every human being in the land, and to provide him with the comforts and luxuries of life if the products of labor and earnings of capital were unselfishly distributed. But we know that selfishness prevails; that the tendency is for the rich to grow richer and the poor to grow poorer, and that when either riches or poverty becomes conjested, then either capital or labor becomes violator of law and order, so that the whole social fabric is shaken, life and property endangered, and the very principles of republican government imperiled. To meet and solve this intricate problem of capital and labor, of riches and poverty, will require the intelligent exercise of the elective franchise on the part of the people and the highest order of statesmanship on the part of our legislators.

In the solution of these vital questions, the farmer must ever play an important part. Capital alone can not solve these social problems. Labor is even more powerless than capital. The farmer represents the balance of power and upon him and him alone rests the safety and per-

petuity of the nation. He is the only truly independent voter. He represents his own business, habits of thought and life, both capital and labor, and is therefore the only impartial and available arbitrator.

When imperial Rome was shaken to her foundations she called Cincinnatus from the plough and he saved the country. So it has ever been in the past; so it will be again in the future. Looking at things from this standpoint, the first and most important work of the institute is to develop the farmer himself. How important that he be a man of intelligence, of high moral integrity, and that the spirit of patriotism, love of home and native land be kept alive in his breast. Verily I believe that the Institute has helped and is helping the farmer to respect himself and the position he occupies in the world, and that it will continue to help him to look up and not down, forward and not backward; that it will inspire him to press forward and lend a helping hand.

The Farmers' Institute is bringing the scientists and experiment stations into closer relations with the farmer and dairymen and all are helped and benefitted by a more intimate fellowship. One of the hopeful signs of the development of agriculture is, that the best scientists are every day becoming more practical, and our most practical and successful farmers and dairymen are more scientific. There are many farmers yet who are disposed to ridicule so called book-farming, and who do not appreciate what the chemist, the entimologist, the bacteriologist, and botanist are doing for them. But the Farmers' Institute is spreading the gospel of scientific truth and the burdens of the husbandman are lightened thereby. For example, the "Babcock milk test" is a purely scientific invention, without which co-operative dairying is scarcely practicable. It could never have been developed on the farm nor outside the labratory and university.

A knowledge of smuts and fungi, the amount of damage done by them to farm crops, and the ability to prevent such damage could only be worked out by men trained along lines of scientific investigation and properly equipped for their work. The composition of foods and their feeding value, the chemical and mechanical conditions of the soil and

their effect upon the production of crops, all these and many other problems that every day confront and concern the welfare of the farmer need to be solved and the solution applied to farm operations. Therefore there is a place and a demand for scientific men, and a college where the farmer's boys and girls can be trained to fill these places.

Hence it is that the Illinois Farmers' Institute has concerned itself about the College of Agriculture and has helped to secure the appropriation for the grandest building ever devoted exclusively to agricultural education. Nor is that all. It was largely through the Farmers' Institute that one-half of the United States' appropriation for industrial education in Illinois is being applied to instruction along strictly agricultural lines.

The funds for the agricultural building and the funds for instruction having been obtained the Institute next turned its attention to securing bright, enthusiastic farmer boys and girls to attend the College of Agriculture to avail themselves of these grand opportunities. Eighty-five or more applicants have been honored by the Institute in the award of free scholarships, good for two years of instruction in the College of Agriculture of the University of Illinois. There are still a few of these scholarships to be awarded. The awards should all be made before the next term opens. Beginning with the opening of each College year in September, a scholarship will be awarded by the Illinais Farmers' Institute for each county in the State and one for each of the congressional districts of Chicago. With one captain of industry returned to the farms of each county every year, together with the recruits which he will gather around him, we will soon have in Illinois a standing army of scientific workers that will do more for the prosperity, peace and business of our State than all the National Guards put together and without the demoralization of young men and the expense upon the State of the latter. While the number of farmers' boys and girls who are enabled to attend the agricultural college will increase rapidly from year to year, yet the great majority of them will not be able to secure other educational advantages than those of the country school, and what they may learn from books and

their own experience. There are many now living on farms who have passed their school days and who need educational helps; to meet this need, the Illinois Farmers' Institute has inaugurated a system of free libraries which will be sent into the rural districts for the use of those who wish to continue their education through the medium of books.

Everyone is said to have two educations. One which he receives from others, and one which he acquires for himself. The latter is the most important and with an ambitious person is never completed. Each day should leave us wiser in some respects than the preceding day. In the process of self education no medium is so valuable as good books. The book which you can open with pleasure and close with profit is the one to read. The Institute libraries will contain books suited to all the members of the farmer's family. There will be books on the various lines of farming, live stock and dairying. Books on household subjects and of various kinds for boys and girls of all ages. The best habit boys and girls can acquire is that of reading good books; books that will tell them about the world outside and away from the farm, and books that will help them to see and appreciate some of the beautiful and wonderful things that come into their own every day life.

Thomas Carlyle said: "All that mankind has done, thought, or been is lying as in magic preservation in the pages of books. They are the chosen possessions of men." Another writer has said: "The supreme privilege of our generation is not rapid transit, nor increase of comforts and luxuries. Modern civilization hath its flower and fruitage in books and culture for all, through reading."

The city resident of necessity can not choose his company nor control his environments; he must admit to his ear and eye, every day of his life, many things that grind and wear upon his finer sensibilities and try his soul. There are advantages in the quiet and isolation of the country if we but use them rightly. If we select books as our companions, we need to have only those companions who are pleasant, agreeable, entertaining, instructive, and helpful. There is no better place in the world in which to read and enjoy the company of books than in the farm home.

Books save a man's time and strength, also increase his manhood and multiply his brain forces. Through books we can have around us the wisest counselors, the best teachers, and the most learned scientists, the most entertaining talkers, and the truest friends. It has been said: "For a thousand men who can speak there is only one who can think; for a thousand men who can think, there is only one who can see." Since then, it is such a great thing in life to have an open vision we need to be taught how to see.

Professor Burrill told us at an institute once, in Carrol county, that he had made a trip across the Atlantic; that he had gazed upon the wonders of the great ocean; that he had visited many of the cities of the Old World, both ancient and modern; he had been in lofty and magnificent cathedrals; he had been in the great factories and workshops where are made the most intricate mechanisms of human invention; that he had climbed to the top of lofty mountain peaks and had gazed down upon the clouds at his feet; he had traveled thousands of miles and met many races of people, but when he returned he found in his own door yard, in the grass beneath his feet, in the insects floating in the air, in the growth and development of life, things that to him were more wonderful and more interesting than any one thing he had seen in all his travels.

Would that our country schools could do more to open the eyes of the little ones to see the things around them and the relation of these things to themselves and to their future happiness and prosperity. The blind can not lead the blind. Neither can the teacher instruct along lines he has not learned. It should be part of the work of the Institute and the Dairymen's Association to create a sentiment in favor of instruction in our Normal schools along those sciences which pertain to and have a bearing on agriculture and that have a tendency to direct thought toward rather than away from the farm. It is true that the fundimental principle of schooling is to teach the pupil to think, to develop the faculties of observation and imagination and acquisition. But can not this be done as well by the study of the roots and plants and trees and the delop-

ment of life, as well as by the study of the roots of Greek verbs and Latin derivations.

One year ago, between Christmas and New Year's day, a gentleman representing the State Horticultural Society, appeared before a convention of the County Superintendents of schools of Illinois, and proposed that an effort be made to introduce into the rural school studies pertaining to agriculture and horticulture. The proposition was received with a coolness and indifference which indicated that this body of school superintendents had no faith that anything of the kind could be done. This year the same gentleman, representing the same Horticultural Society, again appeared before the same convention of County Superintendents with a like proposition, and it was received with applause and expressions of approval and the belief that it was not only possible, but desirable that studies pertaining to nature and the farm and the products of the farm should be introduced into the rural schools. This is encouraging. It shows that there is an awakening in educational circles along practical lines and that the school superintendents are inhaling the spirit of progress that is in the air.

Last week, President Hadley of Yale, in addressing the convocation of the University of Chicago, is reported to have deplored the low standard of commercial morality in the United States, and appealed to those interested in the higher education for the development of a higher standard of commercial and political morality. This too, is encouraging. When our educators in the primary and rural schools begin the work of character building by putting the little children in touch with the great warm heart of nature, inculcating at the same time the idea of service; service to family, to fellow men and country as the noblest ambition of life and the sole aim of education, and emphasize this idea by training in the schools, the hands and minds to some employment, and when universities and colleges turn out as graduates only men and women who are imbued with the idea of service and who are close in thought and inspiration to the God of nature, and who are so established in the ethics taught in the sermon of the mount, that their influence will be felt in

every avenue of life, then, and not until then, can we hope for the solution of some of the problems that now embarass our social institutions. Ignorance, it is true, is a menace to society, but the ignorant are more to be pitied than feared. The dangerous element of society today, the element which is threatening our republican institutions, is the element lacking in moral force, who yet have the intellectual training of our schools and universities, the men who have the ability to make chemical, commercial, and political combinations and who use them for personal ends regardless of the rights and happiness of others. These are the fellows who are creating the inequalities of opportunity and who are bearing down upon the laboring classes. These are the men who are prostituting the discoveries of science by the manufacture and sale of adulterations and imitations of all kinds of products. Ignorance and poverty, when driven to the verge of dispair by genuine or fancied wrongs, may resort to mob violence and the destruction of property, but greed and avarice, trained and skilled in the subleties of logic and rhetoric, and loaded with dollars, strike at the foundation of our institutions. I believe, as a whole, the world is growing better, that the good yet predominates and is on the increase.

I would like to believe that the students of science, the men who are able to learn the compositions, relation, and causes of things, would never use that knowledge except for the development of truth and the upbuilding of humanity. I would like to believe that the dairyman who makes butter which has a flavor suggestive of green fields, clover blossoms, and new mown hay, will get his reward in this world. I would like to believe that the milkman whose milk produces not a film but a visible layer of cream on its surface, and the taste of which takes us back to the farm, and the days when a bowl of milk and bread was a feast, and a dish of mush and milk, a banquet, will prosper and his tribe increase. I would like to believe that the cheesemaker who is generous enough to allow the curd to absorb all the butter-fat that it will take from the whole milk, and whose cheese will cut smooth as butter and dissolve in the mouth with the flavor of the country air, may be made a professor in a

dairy school and all the cheesemakers be obliged to take lessons from him.

It has been my misfortune of late to live at hotels and restaurants and boarding houses and to change from place to place. I have had to eat, of necessity, not from choice, things I knew not of. I have had set before me things that were fearfully and wonderfully made, among them something that had the semblance of butter—in fact had been bought and sold as butter, and I had to eat it for butter or go without. I have had to contend with other things, too numerous to mention, that would not bear the investigations of an inquiring mind. As a result of a continued diet of this kind I have been seeing things at night. Instead of sleeping the sleep of the just and dreaming of green fields and cherry blossoms and garden things, and the dairy house with the "Cooley" cans full of rich milk submerged in crystal clear ice water, or hearing the hum of the separator, I have been awakened by the sobs of the dairy maid, who in the natural orders of things, should be happy and cheerful as forth to milk she goes. The air in my room becomes oppressive, the green fields disappear in the distance, the cows throw up their heads and tails and take to the woods as if pursued by a swarm of gad flies, a huge monster tears out the side of my room and stands at the foot of my bed. It is an octopus. It has the face of a hog and the breath of its nostrils is greasy and hot like the fumes of a slaughter-house. It has great snake-like arms or tentacles that squirm and twist and reach out in all directions: intwined in one of these it has a dairyman and in another a cheesemaker, and he is squeezing the life out of both of them. The horrid thing has his ugly ears filled with cotton, saturated with oil, so he can not hear his victims, but they are yelling and praying for help and although other dairymen hear them they do not come to their relief, and now the horrid monster is reaching for me. I feel that my time has come, cold chills run down my back; I cover my head with the bed clothes and faint.

Ladies and gentlemen, I hope that none of you will get to seeing things at night, but if you should, you will then be ready to rejoice with me that our schools and colleges are beginning to educate the young to be

useful and honest citizens and that the Dairymen's Association and the Farmers' Institute are creating a public sentiment in favor of commercial morality. The fight against the adulteration of food products is on and will be continued until victory is gained on the side of justice and truth.

We have outlined in a general way that the Farmers' Institute is helping to develop the farmer as a man and a citizen. That it is helping him in a business way by making him acquainted with the discoveries and results of scientific investigations. It is also giving him the opportunity to compare methods and experiences with his fellow farmers, the most direct benefit of all the institute work. It is also supporting and encouraging the agricultural college and distributing books in the rural districts. There is yet one feature of the work I have not mentioned; that is the department of domestic science, or the domestic science associations which are affiliated with the Farmers' Institutes, the work of which is being carried on by the ladies. It is said that "men can not live without cooks." So you see this last department is the most important of all. The character of a man and the character of a nation depends largely upon what the man eats, what a man drinks, also affects his character and his eating affects his drinking. That the housekeper and homemaker should have a thorough knowledge of the composition and value of foods and be skilled in their preparation for the highest development of the body and brain, becomes a question of vital importance, not only to the individual, but to the nation as well. When we consider that the home is the very foundation of our social institutions, the fountain of all happiness, peace, and prosperity, then to organize for the purpose of developing all those branches of domestic economy which sustain and perfect the home, is a most important step. The ladies' clubs and domestic science associations are doing a great amount of good; their efforts to have instruction on the lines of home-making and housekeeping in the public schools is a most laudable one. However, before there can be instruction on these lines, there must be teachers. Hence, the need for a department of domestic science in the University of Illinois, where teachers can be trained. I should like to have the Illinois Dairymen's

Association help this movement along by the adoption of a resolution asking the next legislature of Illinois for an appropriation for a department of domestic science in the University of Illinois. Of all the foods that are used to sustain and develop the human race, there are none so valuable and none that require so much skill in their use, to keep them pure and wholesome and unadulterated, as the products of the dairy. It is eminently proper therefore, that the dairymen should foster and sustain this infant in the educational world, domestic science, which will as it grows, become more and more allied with the dairy interests.

Music, duet by Mr. and Mrs. Ritchie, "Greetings." Responded to an encore.

Address

PROF. N. W. MC LAIN, CHICAGO.

Mr. President, Ladies and Gentlemen: I did not know that I was to be on the program until after it was printed, and I have not had the opportunity to make such preparation as I would like to have made for the benefit of this Association. Your Secretary told me he thought he could call on me at the last moment and I would be ready to respond, and I am always ready to contribute what I can to the advancement of the interests represented by this Association.

Many of the thoughts which I shall read to you here have been gathered in this convention, while I have been engaged in drinking the five cups of tea that were told about this afternoon.

The subject I have in this address I have called "Essentials to Future Development."

A distinguished American statesman and patriot once said: "The only lamp by which my feet are guided is the lamp of experience."

In any convention like this, at the end of a decade, it is fitting to inquire what real improvement, if any, has been made in the dairy and creamery industry in this state, and in the United States, during the past ten years.

In the light of practical experience and intelligent observation it is important that we should inquire into the present condition, in order that we may compare the present with the condition existing ten years ago. If we find that improvement has been made we should note well the nature and extent of that improvement and find out whether that influence which has brought progress and development may not be extended and made more fruitful.

But not only does the lamp of experience reveal our present condition and enable us to make a comparison with that of ten years ago, but it points out the mistakes of the past and signals the way along the path which leads to real and permanent development.

Before instituting a comparison between the existing condition of the dairy and creamery industry, and that of ten years ago, we assume first, that the term improvement is a comprehensive term which includes not merely an increase in the gross production of dairy products in the state and country at large, attended with a corresponding increase in the labor and capital employed in the introduction and establishment of the industry over large areas where it was before unbroken, but in a truer and no less important sense it contemplates a higher average quality in the gross output of dairy products together with a corresponding reduction in the cost of production. What chiefly concerns us in this inquiry is not whether there are or are not tens of thousands more men, using hundreds of thousands more cows, producing millions of pounds of dairy products in excess of the production a decade ago; but what does concern us is whether or not the gross output of our factories is of a higher average quality, and whether it has been produced at a lower average cost per pound.

The wideness of the margin between the cost of production and the selling price of our products is a matter full of interest to all of us.

Whether we have widened that margin by elevating the average quality and lowering the average cost of the products and by-products of the dairy and creamery will determine the question as to whether there has or has not been any real progress, any very marked and permanent improvement during the past decade. The supreme test upon which this question may be determined is very simple. But two factors enter for consideration. First, there has been a real and noteworthy improvement in the average quality of the gross output of the dairies and factories in this state and in the United States during the past decade; and second, has the average cost of production been substantially reduced?

The belief is everywhere current that there has been a very marked improvement in the quality of the butter made in the United States during the past decade. The improvement in the quality of the butter (or oleo) served upon the tables in hotels and restaurants is the subject of frequent remarks by travelers and among commercial men who live "on the road" and patronize hundreds of hotels and restaurants every year. These innocent, childlike, unsophisticated commercial tourists sometimes know more or less about the ways of the world, but they are blissfully ignorant of the fact that from three-fourths to nine-tenths of the substance called butter within the exclusive circle of their acquaintance is an imitation.

To the pure all things are pure and honest and good report, and these credulous knights of the road have been deceived. The harmless analine dye that has no mud; the skillful salting and working that left no mottles; and the just about right buttermilk flavor has transformed packinghouse refuse and cotton seed oil into butter like mother made in a rare day in June in the long bright days of childhood. The discriminating sense of color and aesthetic taste of the simple-minded commercial tourist has been appealed to and gratified and now he unhestitatingly declares that the dairy and creamery industry has made wonderful improvement in the past few years.

It is true that with the rapid growth of the industry creamery-made butter has displaced the farm dairy products almost entirely through

out the more populous regions in the United States, and the place and estimation held by creamery butter in domestic consumption has been honestly gained by an article superior to dairy made product, but that is not saying that the average quality of creamery butter has improved, or that the average of farm dairy butter has deteriorated during the time when the one was being substituted for the other.

The reason why factory made butter has displaced farm dairy butter is not because the milk delivered to the factory is better than that from which dairy butter is made. On the contrary, the conditions are all favorable to the farm dairy supply. But the reason plainly is because a higher degree of skill and superior mechanical means are employed in handling the milk and cream and making and marketing a much more uniformly high grade of butter than ever has or probably ever will be supplied from the farm dairy.

Let me remark incidentally that herein lies the reason why oleomargarine has been able, as a simon-pure fraud, to find ready acceptance and increasing demand everywhere from all classes of consumers alike, because it is uniformly made in imitation of high grade creamery butter, and sold to the consumer as creamery butter.

The only improvement then worthy of special mention which affects the condition of the average dairyman or creameryman, which has come during the past decade, is not from improvement in the average quality of the milk supply or in raising the average per capita milk yield, or in economy of production, but rather in raising the average quality of the aggregate output of butter, by the use of greater skill and better machinery, from that of farm dairy to the average of creamery butter. And still this does not show that there has been any noteworthy improvement in the average quality or any reduction in the average cost of the milk, butter and cheese produced today, over the average of ten years ago. Increase in the quantity is no indication of an improvement of the quality of the product, for upon the testimony of some of the leading dairy and creamerymen in the best dairy regions in the United States, men speaking in the light of fifteen or twenty years

years of practical experience, and from personal experience and observation as well, we feel fully warranted in saying that there has been no substantial improvement in the quality of milk delivered at the factories or the milk supply of cities or use in farm dairying, or the quality of the butter and cheese produced in the farm dairy or factory in the past five and probably ten years, and apart from the advantage gained by the very general adoption of the factory method, where one skilled man using modern machinery can do the work of many, little has been gained in economy of production. The scores upon which prizes have been and are being won and the average scores in the exhibits of butter and cheese at state fairs, state dairymen's associations and the annual meeting of the National Association of Buttermakers, prove that the quality of dairy products has not improved, and the reason is not far to seek.

The quality of the butter and cheese which comes from the churn and the press is determined absolutely in the case of extras by the quality of the milk which goes into the weighcan. The quality of the milk has not improved, neither has the average cost of production been lowered, and it is claimed by some of the most practical creamerymen in the Elgin district and in the best regions of Wisconsin and Iowa that the average quality of the milk now delivered is not equal to the average quality ten years ago.

Doubtless this statement of facts is in agreement with the experience and observation of every practical dairyman and creameryman when applied to the average quality of dairy products and the average cost of production, and it reveals a condition of the dairy and creamery industry which is not hopeful and assuring. It shows us there is much that is radically at fault in the methods practiced, much that is fundamentally wrong in the present condition. Worst of all the condition has become chronic and the prospects for an early improvement which is conditioned upon a general removal of the causes which have brought about this condition, and which have long stood and now stand in the way of the normal development and prosperity of the industry,

are not very encouraging. In a general way it may fairly be said that in actual improvement of the average quality of dairy products and in reducing the cost of production we long have been and still are at a standstill. The exceptions to this statement are sufficiently rare to prove its truthfulness.

And now as to the essentials of future improvement, it is important before all else that we give our thought and efforts to the average man behind the average cow. These are the two determining factors in the future development of this important branch of husbandry.

Primarily then, before there can be any improvement in the average quality of dairy products, together with a noteworthy reduction in the average cost of production, there must first come about radical and permanent improvement in the average dairyman and the average dairy cow. The practical methods and means used by the progressive and successful man in improving the average quality of his products and in reducing the cost of production must be adopted and used by the average man.

The adoption and intelligent and skillful use of the methods and means by which the progressive and successful dairyman improved the average quality and reduced the cost of his products, constitute the essentials to improvement in the average man and the average cow. The methods and means used by the progressive and successful man in raising the average quality and reducing the cost of production are easily within the reach of the average dairyman.

The first step in improvement consists in intelligently feeding the average cow a skillfully compounded milk producing ration, composed of varieties of food available to the average man, providing food and water, comfortable and sanitary shelter, milking with regularity clean to the last drop, weighing and testing the milk; in applying skill and judgment in selecting and breeding the best individuals in an average herd, in feeding and training the dairy bred calf for a high class cow, and in applying common sense methods and skill in raising the quality and reducing the cost of production, using average cows under improved conditions.

Real skill and improvement consists in making the most of what we have. If the dairyman does not own a herd of high grade profitable dairy cows, his paramount duty is to secure the service of dairy bred sire of the highest obtainable individual excellence and from the best half of his herd raise a high grade profitable herd. If he does not know what crops to grow best suited to the production of milk and for keeping up the milk flow during the cold of winter and the drouth of summer alike; if he does not know how to compound a proper ration for his cows from the crops grown on his farm or from available substitutes, which will enable the cow to produce the maximan quantity of the best milk of which she is capable. or the best ration for the proper and special development of a calf for a dairy cow, it is essential that he should learn how, because there is no more prolific source of waste and failure than in improper feeding, whether the feeding be done for making milk or for developing a dairy cow. Next in importance after the education and training of the dairyman is the proper feeding and training of the dairy calf, for the calf is mother to the cow.

Permit the suggestion that in the great corn belt of the United States, almost from necessity, some form of Indian corn or corn meal must form the basis of any economical milk making ration and very properly so, both on account of its cheapness and abundance, and on account of its suitableness in combination with other foods in forming the basis for a balanced milk making ration.

Another matter of vital importance, especially this year when feed is scarce and costly, is the tendency which is quite universal, to feed too sparingly. There is general complaint that there has been little if any increase in the milk flow this fall, notwithstanding the weather has been very favorable. The failure may be charged mainly to the fact that the cows were allowed to shrink to a minimum milk flow during the past summer and are permanently injured until they freshen, and also because they are being fed simply a maintenance ration instead of a full balanced ration for milk making. Intelligent feeding, economical feeding, is feeding to the normal capacity of the cow. The normal capacity

of the cow is fixed by her capacity to digest and assimilate food.

Finally, an essential to future development must be found in a campaign of education, and the strategic vantage ground from which this campaign must be begun and carried on in the future is in the public schools, established by the people for the benefit of the people and for all the people. Our public schools must be made the recruiting ground from which those who are to fight the battle of rural industrial development are to be drawn, a class of industrial workers superior in discipline and efficiency to the present generation, superior to any the world has ever known.

It devolves upon us as an industrial organization to see to it that our public school shall be made the recruiting ground for filling the ranks of skilled and intelligent workers in rural industrial lines, as they now are and always have been agencies for educating away from industrial lines and into commercial and professional lines.

There is nothing novel or unreasonable in this demand. Anything short of this means that the present lame and unsatisfactory methods are to continue.

Already our enterprising neighbor, the province of Canada, has a law upon her statute books fixing the limit of time when all applicants for certificates to teach in her rural public schools shall pass an examination determining the qualification of such applications as to their ability to successfully and acceptably teach the elementary principles of practical agriculture. The sooner we place such laws on the statute books of every state in the Union the better for all the interests concerned. Not until we have such laws in force in every state will our rural public schools reasonably fulfill the purpose for which they were established and for which they are sustained.

Music by Mr. and Mrs. Ritchie entitled "In Meadows Green." Kindly responded to an encore.

Address by Senator Aspinwall

Senator Aspinwall of Freeport being present was asked to speak and responded as follows:

Mr. President, Members of the Dairy Association of Illinois: It is a pleasure for me on this occasion to look in your faces. I believe that I can lay claim to having had some thing to do with the industry, and with the present prosperous condition of the dairy interest of Illinois as far as the legislature is concerned. Your President very kindly asked me this afternoon if I would help out the program of the dairymen here. I thought that from the excellent character of the papers that I have listened to, that it was not necessary for me to appear before you and help fill up the program.

But I desire for a few minutes, inasmuch as there is a question in common with all of you in which I have been interested ever since a member of the senate, and that is the dairy legislation, or anti-color legislation.

That is a subject of controversy, and which I find on entering this hall, has been a subject of controversy to quite a large extent. I desire to give you some of the inside history of the difficulty we had in the legislature. When first I went to Springfield and put on my fighting clothes I had the pleasure of meeting and joining hands with Brother Reed. He was there fighting for the dairy interests early and late, morning, noon, and night. For four years that issue was unsuccessful. Fought at our night sesion, our mid-night session, canvassing and recanvassing. During all that time we failed to secure enough votes in the senate to get it through.

Our desire was to put oleomargarine upon the market and let it be sold as such and not as pure butter. In response to that sentiment; in response to the demand of the dairymen all over Illinois; reinforced by help from outside, we went at the question again to get enough votes to enact that law. Session after sesion went by and we were forced to be

outvoted. Finally, during the session of 1897—Mr. Reed was not there as a member, but was succeeded by Mr. Fuller of Boone county, who took up the material laid aside by Mr. Reed and started on the main line that Mr. Reed had followed when a representative.

Mr. Lyon introduced a bill in the house, which was passed without any difficulty. There never is any difficulty in passing the house, the trouble is in the senate. That bill came to the senate and was referred to the committee on live-stock and dairying. I met then for the first time Mr. Willson of Elgin in this connection, who has worked hard for the enactment of this law.

This was during the session of 1897 and C. Y. Knight was representative of the Illinois Dairy Union, and when this bill came over from the house and was referred to the committee on live-stock and dairying in the senate, a very strange scene took place in this committee. They had an all night session, almost, and at the close of that session they refused to report the bill out of the committee or make any report whatever. Mr. Knight then said to Senaator Willoughby, "Mr. Chairman I hope you will keep that bill in the committee." I never could understand from that time to the present what Mr. Knight proposed, or why he ever took that position. Why he requested the chairman of that committee to hold the bill in the committee. We were blocked then. A counsel was had with Lyon, with the house members, and all of the men interested in the passage of this legislation. The result was that we felt that the only thing to do, as the session was drawing to a close, was to pass a compromise measure and a compromise bill.

It was soon introduced in the senate and the privilege was asked to have it passed to the second reading without being referred to a committee. That was not granted. It required a two-thirds vote in the senate to pass it to second reading without reference. It failed by one or two votes. It then went on the calendar and went to the committee on agriculture, of which I was a member. We went over it next day; took the bill, examined it thoroughly, and were ready to report the bill out on the floor of the senate. Lyon called me out and asked what to

do. I told him I didn't really know myself. It seemed that all the time we had been endeavoring to pass this bill that we had been stopped at every stage of the game, and it seemed now, at this present moment, as though this was the only legislation we would be likely to get, and thought we had better perhaps take this than not have any at all. He concurred in my judgment, and though it was not satisfactory, we took it. We took that bill and passed it through the senate from stage to stage until reported to the house. It went over to the house, and after it reached there, it was put upon the calendar or order on second reading, wherein subject to amendment is in order.

Fuller of your district desired to amend the bill by striking out after the enactment clause and substituting his bill, which was a copy of the Ohio law. Mr. Knight had a bill he had prepared and opposed this course. He said instead of doing that, we will take this, a shorter bill, and can get it through surely better than the other, and in all probability with lesser difficulty in getting it through the senate. So the bill prepared by Mr. Knight was substituted for the senate bill, by striking out all after the enactment clause. It passed the house, and after the hardest fight we ever had in that body during the time I was there, we passed it. The governor affixed his signature and it became the law of the State of Illinois.

My point is, that I do not know whether the law, which has been held unconstitutionel by two of three judges, if it had been enacted as it was first had in the house, I mean the very same bill, the identical bill, that we tried first to pass, I believe as I stand here and not being a lawyer, it never would have been declared unconstitutional by the courts of Cook county. I believe if they had enacted the law of the State of Ohio, or rather I think it was the State of Massachusetts, it would not have been declared unconstitutional by the courts, but we enacted this substitute law.

I am as strong a friend as ever of the dairymen of Illinois, and have always stood for the dairymen, and no man who knows me and my career, or who knews my course or work will challenge my statement upon

that point. What I do not like to see is this disrespect for the courts. I have the greatest respect for the courts of my country and I have the greatest respect for the jurisdiction of my country, and I do not like, as I came into this hall, to find a circular in the seats of the convention arraigning a judge on his decision—that is little less than anarchy. As a practical dairyman I am willing to submit the case in which I am interested to the very highest court in the land, then if it is decided by that body as unconstitutional, I am willing to commence over again, and place upon the statute books a law that will be found constitutional. This dea of arraigning a judge's dicision, or a governor's, or a representative's, or a senator's simply because you differ from him, perhaps, on some of the law, there is altogether too much of that talk. We are here as loyal citizens, and all love our country, love our institutions, and the strong bulwark is the faith we have in them and in the men who by a majority of the votes of the people of this commonwealth and this nation, are called upon to administer in office. When we presume to ridicule the same we are taking a position which we can ill afford to take. The one reason why we were successful in enacting this legislation, which so far has proved bad for us, was from the fact that the dairymen had maintained an upright, honorable, and manly course in every single instance. They could look every representative and every senator square in the eye and ask him to support that legislation, they could look the chief executor of the State of Illinois squarely in the eye and say to him: "Sir, the dairymen of this Northern Illinois, and the dairymen all over Illinois ask to have you sign this bill that it may be placed upon the statutes of our State, and you remember that was signed and so become a law. But these decisions, as I said, have made it unconstitutional at the present time. You are practical men; you business men, and the remedy is, that if what we have is not right, go at it like men. Let us not go after it crying down individuals and impugning his methods. Let us carry it to a successful issue; because the farmers of this country can illy afford to stand upon a position that is not strictly in accordance with a law that will be sustained by the highest courts of the land.

As I look into your faces and think of these questions I have stated, and the remarks I have made concerning them, I simply desire to stand in the interest of right and justice and wish to have credit given to the people who have given us the right to stand as we do.

Chicago, Illinois, that great city of ours by the lake—we all recognize that Illinois is the fighting ground upon this position, and as I understand, more oleomargarine and butterine is manufactured in that city than in any other place in the world. Let us go together in a body and in such a way that we will achieve the object we are after.

If the law is wrong, let us pass one that is right; one that will stand the tests of the courts. I do not believe the mistakes have been made maliciously; they were made from the very reason that we enacted a law that we thought was right. When this law is carried to the United States court it may be declared constitutional. I know nothing of the decisions of the court whatever. I do know that if you enact and pass legislation that will require the manufacturer of a product to stamp it in such a manner that the innocent consumer will know what he is getting. I know that you will have cured the defect and remedied the error. If every single package of oleomargarine or butterine that is put on the market for sale, is put in just the very same manner and stamped by the revenue department or government, it will be impossible for the manufacturer to sell it to the public for pure butter, and until such legislation is enacted the evil will not be cured.

These are just the initiatory steps, and we are not going to stop here, because two or three judges, sitting in chamber, have declared them unconstitutional. We are going to carry it to the highest courts in the land, and in such a way so that we will have a decision for what it represents.

If it is wrong for a man to put a product on the market and sell it for something for what it is not, we will put a stop to it and we can do it if we take the proper steps.

These ideas may be some what crude, but I believe the ideas I have given you along this line are practical ideas, and believe they can be enacted in the legislature.

I saw an article in the paper at Rockford along this line, and being on this subject, is very conciliatory and worthy the attention of the dairymen. I do not believe in accusing a man and blaming a man and impugning his motives when he occupies as high a position as some of the men who have been impugned in this meeting. It is well to meet these men who have borne the burdens during the heat of this battle. It is something marvelous the amount of labor, the amount of work they do. Remember they are at Springfield and far from you in northern Illinois.

I believe I had a batch of letters this high (indicating by his hands) bearing on this subject, and this is the right thing to do, to simply keep after your members of the house and your members of the senate, not only one year, but two, three, four, five, six, seven, eight, and nine years, until you accomplish the object you are after. I have kept all these letters and postal cards and stored them away in a box, and it is the right thing to do to send them. Those of us at Springfield enacting legislation for your benefit, we are there as your servants, and when you desire certain legislation you are likely to get what you want. But be very careful that it is carefully prepared so it will stand the court. The work that was done by the dairymen of northern Illinois was marvelous.

I am almost a veteran in carrying our your ideas and placing them upon the books of the State. If we have made a mistake, then let us do the very next best thing we can—remedy the error by making a law that will be right.

I thank you for listening to me, and remember it is only a short while since a representative gathering from all over northern Illinois would not represent the intelligence and the brightness that I see in this auditorium here. The time has passed when our dairymen are not fully alive to the situations that surround them as citizens. He must go along the lines in which he is interested in that way and in that manner which will bring ultimate success for whatever he is seeking.

We make an appropriation of $1500 for the dairymen's convention of the State of Illinois; appropriation for the Farmers' Institute, and an

appropriation for the Beekeepers' Association, and this man who lives in the city, who does not represent agricultural districts, objects on every occasion. They tell us "this idea of appropriating the people's money for Farmers' Institutes and appropriating the people's money for Dairymen's Institutions and for this institution and that institution is wrong."

The University of Illinois was started as an agricultural college. The first thing we look up is the condition, and then they tell us it is not an agricultural college, it is such and such a matter. The trustees of that institution asked for an appropriation of $12,000.00 to build a president's house. We thought the amount too large and made no appropriation on that line. During the interim between that session of the legislature and the convening of the next legislature, the trustees of the University of Illinois sold 160 acres of land of the State of Illinois and built the house, so the president has his house all the same.

The farmers ought to know of it. Two years ago this Farmers' Institute wanted an appropriation made for the erection of a building upon those grounds for the teaching of agriculture, and the bill passed and it became a law. One hundred and fifty thousand dollars was appropriated for that purpose. We went further than that. We simply said to the trustees who were diverting a portion of the income of that institution, we said to them, "One-half of the income of this institution ($25,000 or thereabouts) shall be used for the teaching of agriculture, and that's one of the things that such meetings as this has brought about.

Support this Farmers' Institute; support this Dairymen's Convention, and go before the legislature whenever it convenes and whenever anything along that line is wanted. We will be in a position to help it through and to receive it at the hands of the workers. It don't make any difference whether the State is democratic or republican. I am a little partial to the republicans. The fact is that the appropriation that we have made for the University of Illinois has been sufficient. It is a great institution and is being built up, and when we can send our boys and girls to a college like that we shall be glad.

I was very much interested as I listened to Prof. Henry in his lecture before you and the stress he put on the education of the farmers, and the

education of the dairyman. I was also very much interested in my friend who claimed himself a Dane, and he is just as good an American citizen as though he had first opened his eyes here, I mean the deputy food commissioner of Illinois. What we want is to give our boys and girls the privileges and opportunities that are within their grasp, and if we go about this intelligently; go about it vigorously, and go about it earnestly, we will reap success. The day has passed when the farmer from Illinois or dairyman or any of these interests are to take a back seat.

People who live in the cities point to the dairyman as the aristocrat. I am glad to know it. The man in the dairy interest who works from early morning until night, I am glad to know that he has been successful along the lines of business, and it will not be long before you will need to look in your villages for our millionaries, not in your cities of Illinois. It is upon your men of the country that the future depends, the future prosperity of our great State depends. I know there is no class of men any more proud or have a higher regard for the welfare and the honor and integrity of our country than you people have, and I know that upon this occasion and upon all other occasions you will acquit yourselves as to reflect credit upon this great country and its welfare that we love so well.

Creamery Buttermaking

GRANT MALLORY, FREEPORT.

Creamery buttermaking is the subject assigned me for this occasion, and it is a subject on which buttermakers widely differ.

I will give you my ideas of making creamery butter. In the first place the buttermaker should be the manager of the creamery, then he has full control of the milk, cream, and butter. He should be an engi-

neer, a machinist, so as to keep his machinery in shape and know when things are running all right, for guesswork won't do in the creamery. It has ruined many a separator, engine, and boiler, and spoiled lots of fine cream and butter.

The buttermaker should be a man of good judgment, quick to think and quick to act in times of emergency. He should have a place for everything, and have everything in its place. The buttermaker should be a good judge of human nature, for he has all kinds of people to deal with.

He should know his patrons and go out among them and tell them how to care for their milk and cans; help them to select good cows; give them good advice in regard to feed and care; show to them that it is to their interest to bring nothing but the best of milk to the factory, for it is impossible to make good butter out of poor milk.

The buttermaker should read good books and papers pertaining to his business. He should study the different machinery used about the factory; the different butter colors and salt, and what effect they have on the butter, and all things that go toward making fine creamery butter. I have tried to tell you what a buttermaker should be.

I will now tell you how I make butter. We always try and have a good head of steam, and everything ready early in the morning. When the patron drives up to the weigh-room its "Good morning Mr. King, Smith or Jones, or Mrs. Jones," as the case may be, for we have a large number of ladies that bring milk to the factory, and they must be looked after.

The milk is weighed in and a test taken. We do not take sour or spoiled milk. The milk in the tempering vat is heated up to 80 or 90 degrees, before it is run through the machines. This milk is heated by a Curtis heater. Never use live steam to heat whole milk, for it often injures the flavor of the butter.

We then skim a thick, heavy cream. The cream is cooled down to 54 or 56 degrees as soon as separated and stirred often during the day. It is held and ripened in the vat. We hold our cream twenty-four

hours. We heat it up to about 62 degrees, and use a starter. Of course in the summer we do not heat the cream at all, but cool it down as low as possible. When ready to churn cool to 52 degrees, then strain into the churn, color put in and churned. We churn our butter into granules, not lumps, the size of your fist or head. The buttermilk is then drawn off. The churn is filled up with clean, cold water, the water being about the same temperature as the buttermilk. The lid replaced, the churn is revolved a few times, the water is drawn off, then the butter is salted, worked, and put up in packages ready to ship.

Then the churn is washed and steamed out, and the vats, pipes, cans, and everything about the factory is washed and scalded, floors scrubbed, and everything got in shape for the next day's work.

In conclusion, let me thank you for the time and space you have given me in this convention.

DISCUSSION.

Mr. Crossland: What kind of starter do you use?

A. Mostly skim milk starter.

Mr. Sawyer: For fear of possibly misleading, I would like to ask Mr. Mallory if he intended to advise buttermakers to experiment by trying all the different butter colors and salts that come on the market for the sake of knowing himself what they are. Did he intend to convey the idea that he ought to carry on that class of work?

A. No sir, but if you have started in new with a butter color, it is a good idea to experiment a little to know what you are doing.

Q. Your idea is what, taking anything new that you have to work in to experiment with it, rather than to experiment with 14 or 15 that might present themselves. Is it your idea every time a butter color comes along to get that color and try it?

A. Not always. I am placed in a position where I do that a great deal. The firm asks me to try it.

Q. What firm?

A. The firm I am working for.

Q. That is a different light?

A. Yes sir.

Q. Not experimenting on his own hook at the expense of his company, he should be judicious, but in a position that Mr. Mallory is in, the firm he is working for desires that he should do that, why then if there should be any loss, the firm themselves are responsible for it?

A. I am very careful not to try anything that would injure the interest of the firm.

Mr. Crossland: How do you prepare the starter?

A. I handle the starter almost as I do my cream. Save one can of good milk, cool it down to about 54 degrees, and then heat it up again to 60 or 65. Set it away and by the next morning that starter is ready for use.

Q. What is the effect in the cooling down skim milk?

A. It does not hurt the flavor, adds a little.

Mr. Henderson: I would like to ask how long the butter lays in the salt before working it the second time?

A. I never work butter over the second time.

Q. You don't?

A. No sir.

Mr. Crosier: I would like to ask in preparing that starter whether you stir the skim milk the same as the cream?

A. Yes sir.

Mr. Sawyer: How much time usually allowed when you put your salt in to when you put your butter in the tub?

A. Just while it takes to work it.

Q. Well, how long is that. One hour, two hours or how long?

A. Half an hour. Sometimes not that long.

Mr. Johnson: Have you a way of handling mottled butter. You didn't have any of that here?

A. No sir I hope not here.

Location and Building of Creameries

OSCAR ERF, ILLINOIS COLLEGE OF AGRICULTURE AND EXPERIMENT STATION, URBANA.

The demands of butter making have become so varied and the needs of the dairy man are so many, that the time has arrived for those who are in this business to look for improved methods, and more convenient arrangements in order to produce a more economical produce. It is necessary to take advantage of all natural means possible, to locate judiciously and properly manage their affairs on business principles. With this view, I will aim to point out what are to my mind the requisites to erect and profitably put in operation a creamery.

The question arises, how and where should we build such a modern separator plant? The best place for the successful operation of the creamery is a farming district, where dairying has been long practiced and where butter is the leading product, but yet not of the highest reputation as to quality. Such conditions insure the number and generally kind of cows needed, with the proper care of the animal, and the proper knowledge of the details involved. There are many creamery buildings through the country which are standing idle simply because the conditions necessary for success were not recognized in advance. The plants have been located in communities where farmers had no knowledge whatever of dairying; were unfamiliar with cows and their care, and if accustomed to cattle at all, they generally had the kind not suited for the production of milk. The first requirement then is a sufficient number of cows. The more milk, the more profit. The thousand cow creamery is more profitable than the five hundred cow creamery because it can be more economically conducted.

The total cost for running a creamery and marketing the product, including interest on investment, and provision for a sinking fund, should

never exceed 3½ cents for every pound of butter made. Under favorable conditions this cost can be reduced to 3 cents, and even as low as one and one-half cents. This is only practicable where patrons deliver their own milk at the factory.

As a small creamery can not be operated for less then $4.00 to $5.00 perday, it becomes evident that the daily product should be over 150 pounds of butter as a safe minimum. Consequently no creamery should be put in operation unless having the control of the milk from 300 cows. The greater the number of contributing cows and the better the quality of these animals as butter producers, other things equal, the more certain the success of a creamery. On the other hand 1500 cows is considered a maximum number, as the factor of transportation of milk comes in here as an expense to offset the increasing profit.

Next, a creamery must be located as near as possible in the center of the milk producing district, and have the milk routes not extending over seven miles from the creamery. This, however, depends more or less on the condition of the roads in that vicinity.

Select a location where provision can be made for good drainage. This is of utmost importance, yet in many cases evidently the last thing thought of. It should be near some live stream where the outlet of the drain can be placed under water, or the drain should be conducted not less than fifty rods from the building.

The longer the drain the better. That drain may consist of glazed tile for the first fifteen rods from factory, not less than five inches in diameter, and for the remainder of common tile of the size, may be used, if satisfactory to the community through which it runs.

A reliable supply of good water is again of great importance. The water must be pure and guarded against future contamination. Cold water will be a great saving of ice.

Surrounding should provide pure air and freedom from dust and exposure to direct sunlight. A lawn with some low shrubs will greatly aid by purifying the air, beside making the surrounding more attractive.

Also a location with reference to shipment for products, and mar-

ket to which the product goes, deserves some attention.

The dimensions of the creamery building depend on the amount of butter to be manufactured and somewhat on the arrangement. A creamery handling the milk from 400 to 500 or 600 cows should contain about 1200 to 1500 square feet of floor space including store and coal room.

It is more desirable to have the plant in a compact form rather than to have it spread over a large area for two reasons. First, it saves labor in keeping a creamery clean; and second, it teaches the operator to put utensils back in a place after using them, as it is necessary for him to have the required room.

In planning and building a creamery, one should try to so separate, and yet combine the different sections as to secure both convenience and cleanliness, and to reduce as far as possible the expenses necessary to perform in the best manner the labor of the factory. All who have had experience with creameries know the loss of time and waste of labor resulting from one seemingly small mistake in construction, such as putting a door in the wrong place or other little faults in the arrangement of utensil rooms. One should endeavor to see such faults in advance so as to save the operator as much work as possible, and enable him to reach given points easily and readily without taking unnecessary steps by a roundabout course.

There are two general principles which govern the arrangement of a creamery building: The gravity and the pumping system. The first is, where milk starts on such an elevation that is flows by gravity from the receiving vat into the tempering vat, separator, cream, and skim milk vats. This again has two principles involved in it: One where the milk is taken in on an elevation such as sidehill or two-story; the other where the Jepson elevating weigh can is used. The main advantage of the former is that no pumps are necessary during the whole course of manufacture. But this advantage is offset by a considerable amount of extra labor in climbing the stairs at the time when work is most urgent, and nearly all the machines are in operation.

It is here, in a small creamery, when the man at the weigh can should reach the boiler, engine, separator and sample bottles in least possible time.

Convenience is an essential point to be taken into account in creameries. The advantages of the latter system, the Jepson elevating can, is that it does away with the plat forms and stairways; puts all machines on the same level and takes up less room than the former system.

On the other hand, the greatest objection is the liability of mistakes in weighing the milk on account of the friction produced by the guide rollers on the weigh can. It is also quite complicated and needs considerable care in handling it.

The second of the two principles, the pumping system, is more economical in labor and space required, but introduces pumps through which the milk must be passed and which are always more or less difficult to keep clean and exceedingly lable to be neglected. Therefore if a pump is used, it should always be of the simplest kind; one that can readily be taken apart.

Construction of Building. The building should be placed on solid foundation, walls rather than upon piers. This, besides keeping the building warm in winter and cool in summer, adds decidedly to the appearance. The foundation should not be less than one foot in depth and 18 inches in width. This must be grouted well with crushed stone and cement. Upon this foundation a wall can be built not less than 24 inches high, and the width depends on the material used. If common wall stone are used, about 15 to 18 inches would be the proper width; if range stone eight inches, and if made of glazed hollow brick 12 inches would be ample in width. Sills may be of hemlock 6x6 or it may be a box sill made of 2x8 Norway pine. In case wooden floor is wanted cross sills are necessary to support the joist. These cross sills should in turn be supported by 18 inch square buttments, not more than 6 feet apart. Studding may be of yellow pine and need never be more than 2x4 inches in size, and 12 or 14 feet long according to the desired height of the building. Studding 14 feet high makes a more attractive building and at the

same time gives more room for building the ice box or the refrigerator, increasing its capacity.

It is essential for every creamery to have a first class floor, be it cement or wood. If a cement floor is preferred, it should be put down in the very best shape. A cheap cement floor is next to no floor in a creamery. A cement floor should be made as follows: First fill in with small cobble or broken stone; then put on dry sand mixed with a little common cement, and pour on water and wash the mixture down among the stone so as to firmly imbed them. Then puddle on a mixture of common cement and sand, half and half, and apply it 2 inches thick; on top of this spread a thick coat from 2 to 2½ inches of Portland cement and fine sand mixed half and half. Let this harden thoroughly, and a good floor can be insured, if the Portland cement is of the best kind. This makes a rather expensive floor, but one cannot afford to put in a cheap floor in a creamery in the line of cement. A wood floor in general gives better satisfaction than a cement floor for the simple reason that the latter is seldom put down right. In putting down a wood floor, one should first see that the joists are of Norway pine or good white oak not less than 2x8 in size, laid full strength on sills 16 inches from centers. The length of the joist should not exceed 12 feet without having a support. The flooring may be of good white oak or Georgia pine. If the very best white oak can not be obtained, I would prefer Georgia pine. The flooring should be well dressed and matched 1½ to 2 inches in thickness and securely spiked to each joist. The tongue and groove should be painted with white lead, and when completed should be covered with a coat of boiled linseed oil applied hot and thoroughly brushed in.

The refrigerator floor should be made the same except that the space underneath should be filled with cinders to the joist, leaving a dead air space between the cinders and flooring. The boiler room floor may be made of cement or of hard brick laid in cement.

The studding may be set 16 inches apart from centers. Toe nailed to sill below and also firmly nailed to roof plate which is of the same material.

Rafters can also be of same material as studding, but not less than 2x5 in size for a shingle, steel, or galvanized roof, and 2x6 ifslate are used for roofing, depending somewhat on the width of building. A shingle roof seems to give the best service for a creamery, it keeps the building cool in summer and warm in winter. As far as durability or being fireproof is concerned, a slate roof is far superior.

Siding may be 5 inch popular lap or pine drop siding, the latter being the cheapest.

The building should be ceiled entirely on the inside with yellow pine ceiling, except the boiler room which should be lined with corrugated iron or made of brick. Two dead air spaces can be cheaply constructed on the entire building, by putting building paper up and down on the studding, nailing over this 1 inch by 2 inch strips and ceil on strips. Paper must be secured at top and bottom so that a perfect dead air space is the result. Lath and plaster may be used as a substitute for paper but at a greater expense.

The Drain. If a cement floor is used, the floor should slant ¼ inch to every foot from all directions toward one point, the inlet to the underground drain, at which point a bell trap should be connected, to prevent the odors from the sewer from coming up into the factory.

If a creamery is to be built with wood floors it is always best to use a gutter set into the floor for the drain. This can be constructed by placing two joists about 4 inches apart, and letting them extend the full length or width of the building. Cut the floor flush with the edge of each joist. Rabbit these ends ½ inch on each side and paint with white lead, then lay in a coating of putty and form the gutter of galvanized iron or preferable copper, so that it will set down in between joist, and turn over where the floor is rabbited, nail into the floor, driving the nails close together, then give it another coat of white lead and putty again. The slant of a wood floor should be the same as that of a cement floor, and the gutter itself should also have the same slant toward the trap. A cast iron gutter may be used in place of galvanized iron or probably best of all for a wood floor is a gutter worked out of a solid piece of wood, well oiled before it is put in place.

The sides and ceiling of the interior building should have at least one coat of shellac; two coats are better. This makes a sort of enamel finish and can easily be washed. It goes without saying, that the outside ought to be painted to make the building neat and attractive.

The refrigerator for a creamery handling 3000 to 6000 pounds of milk per day needs to be about 8x10 feet including a cold room. The refrigerator proper should at least be 6½ feet high, and the ice box above as high as it can be made under the rafters, never less than 6 feet. Three dead air spaces are necessary for a refrigerator, if the partitions are made of double boards with paper between. If made of paper alone, five dead air spaces are necessary. The latter is the cheaper where simply the paper serves as the partitions, and fastened with ⅞x2 inch strips every 16 inches. Care must be taken in securing the best building paper, and see that it is not less than 32 inches in width, so as to fit the studding, when placed 16 inches apart.

The inside should be ceiled and shellaced. The doors must be made same as walls; beveled and packed with canvas at the edges. The ice box must be connected with the room below by flues construced in the walls. These flues may be the spaces between the studs and joists.

One flue must receive the warm air at the ceiling on one side of the room and conduct it to the top of the ice box, while the cold air flue on the opposite side extends down from the bottom of the ice box in all the spaces betwen the studs to within six inches of the floor, where it should enter the refrigerator room. These flues carry the air after it is cooled in the ice box to the room below. Thus a circulation is kept up by the air coming in contact with the ice where it is cooled, becomes heavy and returns by its own weight to the room below. At the same time it drives the warm air at the top of the refrigerator into the ice box ready to start circulating when cooled. A double circulation can be provided in this way: By converting all four sides into flues, making the refrigerator more effectual. The air flues leaving the ice box near the bottom must be arranged so that no ice or water can enter them. The bottom of this box should be lined with heavy galvanized iron turned up 3 inches

on all sides and have a drip pipe to carry off the ice water. The cold room should be tightly ceiled and not connected with the ice box. In passing in and out of the refrigerator through the cold room, one of the two doors should always be closed in order to prevent the cold air from rushing out.

It is generally necessary to have an ice house connected to a creamery, where ice can be secured from ice companies. An ice house may be built of single or double walls, depending more or less on the ease and cheapness with which ice can be secured in winter. The dimensions of the ice house can easily be determined from a standard. A cubic foot of ice weighs 55 pounds, and an average creamery should have an ice house of 150 tons capacity. It is generally advisable to have the ice house connected with the creamery building.

All doors in a creamery should be not less than 3 feet 8 inches wide and 6 feet 8 inches high, except to the receiving rooms, one churn room and a boiler room door which should not be less than 5 feet in width.

The windows should be large, having not less than four 14x28 inch lights, and should be arranged so as to drop from above as well as below in order to secure a means of good ventilation. Creameries should be provided with ventilators on the roof and passages connecting with the rooms below so as to carry off the heat and steam.

Machinery. Not less than a 15-horse-power boiler should be put in a creamery. A large boiler saves fuel and labor. It should always be one-half greater capacity than engine. The horizontal bricked exterior or the new tubular boilers are preferable to the upright style. If the boiler is to be bricked, care must be taken in setting it up. See that the foundation is at least 2½ feet deep and grouted well.

The furnace walls should not be less than 16 inches in thickness, fire box lined with fire brick and stayed with three setts wall stayers. The smoke stack should never be less than 30 feet in height to insure good draft.

Engine should be set on a good solid foundation fastened with four anchor bolts. The horizontal style is always preferable to the vertical.

The size depends on the kind and amount of machinery to be used. It should be as simple as possible.

It is desirable to have a good separate foundation for a cream separator, but for many machines a solid floor foundation will be sufficient. Never purchase a horizontal steam or other surface cylinder pumps, without measuring or knowing the height of the column of water to which it has to be lifted. The limit of suction for an ordinary pump is 27 feet. If the surface of the water falls below 27 feet a deep well pump must be used.

In purchasing the remaining parts of the outfit, it is best to buy on 30 or 60 days' trial. If there are any flaws in the separators bought, they will by this time be discovered.

Water and steam should be piped to all vats, sink churn, and skim milk tank. The skim milk tank should be lined or made of galvanized iron, and be placed high enough for a wagon to drive under and draw off the milk by simply opening a valve. The ground around this place should be paved in such a way that the drop will run off into the sewer. It is necessary to flush this place every day for sanitary purposes.

This milk can be elevated by means of a pump or steam jet. If a checked pump is used this is not necessary. The exhaust steam of the engine should be utilized for scalding the skim milk in order to keep it sweet until fed. The arrangement must be convenient so that the person in charge can easily clean and steam it every day.

The cost of a creamery depends mostly on the local cost of materials and building expense in general. As an estimate it requires $2,500 to $3,300 to complete a creamery having a capacity to handle the milk from 300 to 500 cows at the present time.

Thursday Morning, January 11th, 1900

Announcement made by Mrs. Springer:

Ladies and Gentlemen and Dairymen: I wish on behalf of the Sangamon county farmers and the Ladies' Butter Association to extend to you an invitation to hold your next meeting in Springfield. And I don't think there will be any trouble whatever in our meeting with any demands that your association wishes, and I think Mr. Hostetter will bear me out in that.

Mr. Sawyer: I move that we extend our thanks to this organization and to Mrs. Springer, and that the matter be referred to the executive committee. Carried.

Committee on Nominations: J. H. Coolidge, Galesburg; J. R. Biddulph, Providence; H. H. Hopkins, Hinckley; L. S. Dorsey, Moro; Geo. Reed, Belvidere.

Proposed 10 Cent Tax on Colored Oleomargarine

W. S. MOORE, CHICAGO.

The oleomargarine question has been so thoroughly discussed, directly and indirectly on this platform, that I hardly think it necessary to go very far into it, and owing to the change in the conditions, I have not prepared any regular paper on this subject.

About a year ago the National Dairy Union in casting about for means to control the increase of oleomargarine, struck upon the idea of having a tax of ten cents per pound imposed on oleomargarine colored like butter. With this in view, they started a fund, knowing it could only

be started by the farmers in this country, and they have raised for the purpose about $10,000.00 in sums of fifty cents and $1.00 each, thereby enlisting the sympathy and aid and co-operation of the farmers of the great northwest country.

The agitation has been sufficiently developed that there has been three separate and distinct bills introduced into congress this year to accomplish this purpose. The Tawney bill of Minnesota, the Davidson bill from Wisconsin, and one by Grout of Vermont, and I am given to understand that at a recent conference of those interested in leading this fight, it has been decided to push the passage of the Grout bill.

The Grout bill may be divided into three parts. The first imposes a tax of ten cents per pound upon all oleomargarine colored in semblance of butter. The second imposes a tax of ¼ cent per pound upon all oleomargarine made in any other manner. The third provides that oleomargarine when it lands in a State shall come under the laws of that State, notwithstanding the fact that it is in the original package. We feel that this law will not only accomplish the purpose of imposing a ten-cent tax on the colored oleomargarine, that made in the semblance of butter, but it affords legislation against oleomargarine not made in semblance of butter.

Thirty-three States have already laws prohibiting the manufacture and sale of oleomargarine when colored in the semblance of butter. The third part of the Grout bill puts oleomargarine under these laws, so that in thirty-three States it will be impossible to sell colored oleomargarine even if the ten-cent tax is paid.

We think this law, if we can succeed in obtaining its passage, they will effectually check the sale of oleomargarine for pure butter.

Day before yesterday Mr. Tawney of Minnesota introduced a resolution in the house, setting forth the fact that there was good grounds to believe that there were large quantities of oleomargarine being sold in this country for pure butter; setting forth the fact that notwithstanding the laws in the thirty-three states absolutely prohibiting the sale of colored oleomargarine, the production of colored oleomargarine had in-

creased over twenty-five million pounds within the past year, and further facts to the secretary of the treasury to give to the house of representatives as to what places oleomargarine was being sold in and in what quantities. In other words, giving to the house of representatives the informations as to the violation of the State laws, where there are laws about the sale of colored oleomargarine.

The purpose of raising this $10,000 00 or more by the National Dairy Union is to use this money in educating the people as to help they should have, and as to their ability to oppose this oleomargarine traffic, and the greater per cent of the money is spent for that purpose. It is not being used for lobbying in Washington, or paying the expenses of men to watch out for the dairymen's interest.

The campaign will be directed from Chicago. The leaders in the fight will stay in the west and get information to the farmers and dairymen in this great country, not only in the northwest, but whatever part they may reside, and let them bring the press to bear on their representative in congress.

This is a campaign in which the oleomargarine men are on one side and they have millions of money, while the buttermen and the dairymen have millons of cows. It is a campaign of cows against money. We can hope to succeed only by thoroughly impressing on our representatives in congress, not only that it is right, but that we demand it, and that each and every one will be held accountable for the stand taken on this question.

At this time, when bringing this press to bear on our congressmen, it seems to me that it is important that we set a good example as to the fate of any man who opposes our interests, and let it not be said that a man can do everything that is hostile to the dairyman, and at the same time receive his vote. It is upon this fact that our whole fight depends. If our legislators in congress can say, "They will elect me just the same when I return even if I am against them." In this fight the leaders themselves have no power or influence. The whole fight depends upon the farmers and the dairymen of this country; not in simply thinking they

would like to have the law; not in simply thinking that it is a good law; but in thoroughly impressing on their representatives that it is a good law; that it is to their interest, and that they must have it, and every man who doesn't help them get it will be held strictly accountable.

DISCUSSION.

Mr. Conklin: Is not the farmer the last man that ought to complain, object to, persecute or prosecute the manufacture of oleomargarine or butterine or any other substitute used for butter, when he is the only man that can guard against all imitations and substitutes and manufacture his own pure butter to his own taste, and at his own sweet will? Is not the farmer the last man? There are 1500 men in this factory here that wants to buy oleomargarine and they don't care about the stopping of the sale of that manufacture.

A. If every man in the United States was the manufacturer of his own butter. But the trouble is that oleomargarine is not sold to your 1500 laboring men or operatives in this factory as oleomargarine. It is not put at ten or twelve cents a pound so that he gets the benefit of the cheapness. But Mr. Workman walks into the store and asks for a pound of your best butter, and they hand him out a pound of oleomargarine, and he pays the price of butter for it.

Q. What's the matter with eating oleomargarine?

A. I will ask if you knowingly and willingly eat butterine?

Q. I make it every day most. I put my pork gravy and butter and my tallow together and make it every day.

A. If the gentleman wants it that way of course he is welcome to it. For my part, I will take the pure dairy creamery butter in mine.

A Member: I would like to ask what he thinks the price of butter would be today if there was no oleomargarine?

A. What the price of butter would be today if oleomargarine had suddenly been stopped in its production yesterday? I would answer him that it would probably be very high.

Q. How much higher do you think if no oleomargarine was in existence?

A. If oleomargarine had suddenly been stopped and no more butter in the market than there is today, butter would probably be worth fifty cents a pound. If oleomargarine had never been made, butter would be worth 25 cents and not a cent more. For years oleomargarine has made the production of butter unprofitable to the dairyman, and they have quit it to such a large extent that there is not enough butter being produced at the present time for those who demand it, and that is the reason it would be high today if oleomargarine was suddenly stopped. But it will be only a question of a short time before there will be plenty of creamery butter for every man who wants it and at a reasonable price.

Q. I am a farmer and a dairyman and I own lands that the productions are all milk, but I say today that I don't see how you are going to reach this question, for the reason that the butterine and butter can't be told apart by some of the best men. There are not fifty who can tell the difference between butter and butterine here. You can go in the store and buy the best kind of butter and buy the best oleomargarine for fifteen cents, and there ain't half the men here can tell the difference. How are you going to beat them out of it? I am telling the truth, but this is the case. They come out here and go to the condensing factory and then come back to the store and buy oleomargarine and take it home and eat it. That is the condition and in my opinion today if oleomargarine was out of existence that our butter would fetch 75 cents a pound, because I have sold it in years past. I don't see how you are going to meet it if you can't tell the difference, and you ain't going to pay 75 cents or even 35 cents if you can get oleomargarine for fifteen cents. Can you give some test that people can test it right on the counter there and tell one from the other. Then you can meet it?

A. We have a test, sir.

Q. I can go in town here and I can pick out butterine better than one-half of the dairymen in this town. I don't see how they are going to meet it if they can't tell the difference?

Mr. Coolidge: This will help clear up the other question. Provided this law is passed and goes into effect that oleomargarine is taxed if colored ten cents a pound, at what price can it be sold to the consumer and make a reasonable profit for the manufacturer and the middleman?

A. The lowest price at which the best grade of oleomargarine at the present time can be made is 16 cents per pound, while adding 8 cents it would make it 24 cents, which would be the lowest price at which the retailer could purchase it, and he must add his profit to that.

Q. After the tax goes on?

A. Yes sir. That is oleomargarine made in the guise of butter. If they want to make oleomargarine and leave out that little speck of color and sell oleomargarine on its own merit—why make such a fuss about half an ounce of color. If they leave out that little speck of color they can sell it for ten cents a pound less.

Mr. Conklin: Why not leave the color out of the butter?

A. That is a question often brought up by people who have not investigated the question and thought of it as thoroughly as they might. Oleomargarine has color put into it, not to make it any better, not to make it uniform, not for any of these purposes, but simply to make it look like butter. Butter has color put into it, not to make it better or look like anything else, but color is put in butter simply to keep it the same color all the time. Just the same as a piece of dress goods. The color is put into it to make it uniform through and through. Take cotton. You do not color it to look like wool, but just to have it a uniform color. It is the same with butter. You do no one an injustice when you take butter, that varies in color in the different seasons of the year, and put in a little innocent color to keep it the same color all the year round, it is simply a matter of taste, which is not true of oleomargarine.

Q. If the color was left out of butter, how much less would it be on the Elgin market?

A. None. The color used would not lessen or make any difference in the price. The taste of the people is for uniformity, not only in butter, but in everything. They get used to having things that way, and

they want it that way, and so the effort is made to keep the natural shade of butter in June all the year round by putting a little coloring in it in winter.

Mr. Henderson: I will try and answer this question of this 75 cent butter. Before butterine came into existence we could make enough butter and sell it so it paid for farmers to keep their cows for milk, but when oleomargarine came out butter went down to a low price and many farmers went out of dairying, of course. I once run twenty-seven cows on the farm and now have ten and twelve, because it will not pay farmers running a large farming business. Anything else will pay better than cows.

A. As a matter of fact there is really no alarm on account of the extreme high prices, even if the oleomargarine law should go into effect. There are in this country at the present time thousands of cows whose milk does not go into the production of butter, but which will immediately be turned to the production of butter, notwithstanding the fact that the oleomargarine law has not been passed, owing to the very high prices which now exist. In the western states there are a large number of cows which have not been milked at all this year. They anticipated low prices and feed was high, and they allowed the calves to run to the cows and never milked them. Another year there will be milk enough to make butter. There is a large herd of young stock in the west which will be producing butter in the next one or two years. But we want to watch out for this. We have a good price for butter now, and aside from the oleomargarine discussion, people are going to go back to dairying. and in the course of two or three years butter will be down to twelve or fourteen cents if we don't have some restrictive legislation on the fraudulent oleo traffic to save us from that fate.

Mr. Conklin: Why is it not the business of the men down at this factory here and every other factory in the State of Illinois to push this question before congress, instead of the farmers; why didn't they go at work at it. They are not caring about oleomargarine looking like butter?

A. One reason for that is that the working men of this country are only just beginning to realize how they have been imposed upon. They have been buying oleomargarine thinking it was butter, and the consumption of butter has been enormously decreased from the fact that people have been eating what they thought was pure butter, when really it was oleomargarine. The working man spends 10 to 15 cents a day for butter. It is a comparatively small matter to him. He cannot afford to spend the money necessary to bring about this agitation, but when we go before congress you will find we will have enormous petitions presented to congress from the working man demanding this very same thing. The men vitally interested are the ones to first take up this question.

Mr. Crossland: I would like to know how much more the laboring man would have to pay for oleomargarine if that tax is passed than they do now?

A. They would have to pay about eight cents a pound more for oleomargarine colored like butter; but if they want to use oleomargarine that is not colored they could get it for eight cents less than they are paying now.

Q. Can't a laboring man just as soon save that?

A. If he wants to eat oleomargarine and is content to eat it. He would be glad to buy it for 12, 14 or 16 cents in preference to paying 28 cents for it, thinking it butter.

President Gurler made the following announcement:

Mr. Soverhill and Mr. Biddulph desire me to say that every member or man or lady in the room that has a badge can come to the butter room and get a piece of cheese, and those that haven't badges to come and get some afterwards. Those having badges are to be first served.

Adjourned until 1:30 p. m.

Thursday Afternoon, January 11th, 1900

Silage vs. Non-Silage Milk

PROF. W. J. FRASER, UNIVERSITY OF ILLINOIS.

Mr. President, Ladies and Gentlemen: I think the value of ensilage as food for the dairy cow is not appreciated by the average Illinois dairyman. It is a well-known fact that you want to get as near summer conditions as possible for the dairy cow; they do better in summer time than any time of the year. We can get the weather or as nearly as needed by warm barns. The great trouble then comes in the feed.

In order to get the best results we must have green feed of some sort, and this can only be produced by either feed roots or silage, and roots are expensive to raise in Illinois because of the high price of labor. Silage is very much cheaper.

Corn is one of our principal crops. We get a great deal more from the land on corn considering the labor and it also makes the best thing to put in silage. It is the best way of preserving corn.

There have been a great many objections to silage in regard to flavoring milk, and for that reason I took up a test at the University to determine what people liked, whether they perferred silage milk or non-silage milk, and have some charts which show the test.

Three cows were selected for silage and three for non-silage, and they were selected from the herd for the best milk they give. By mixing the milk of the three that were fed silage and the three that were fed non-silage it had the same amount of butter fat in it. The three fed with

non-silage were moved into another barn and the milk kept in a different place. No odors observable that did not come through the cow. No notice of food giving taint to the milk. It is a well-known fact food will taint when milking is done soon after feeding, than a long time after. The first test fed one hour before milking, and in this case we fed after milking to see if there was any difference. The milk was mixed from three cows on silage, and the other three not fed silage, and the milk put in pint bottles and corked, and then taken to these different people, and they were given a sample of each. They were asked these three questions: "Any difference in the milk between the two samples given?" "Have any objection to either?" "Which they preferred, the silage or the non-silage?" This was a test with the professors at the university. The first ten tests were made with one professor. In every case he could see a difference in them, but no objection to any. These were taken to him at different times. The first five times he preferred silage milk. The next time he could see a difference between them and preferred non-silage.

No. 2 professor preferred silage. No. 3 just the same. No. 4 could see a difference; no objection to either, but preferred non-silage. No. 5 preferred non-silage. No. 7 could see no difference between them; was the only one that could not see the difference.

There were twenty-nine that could see a difference and one that could not in this test. There were thirty in the test. No. 9 could see a difference and objected to taste of the silage milk and he preferred non-silage. There were two who had no choice, twenty-one that preferred silage and seven non-silage. Three-fourths actually preferred silage milk in the first test.

Tried feeding after milking to see if there was any difference and it came out the same as first. It was not quite as easy to distinguish a difference.

There are more nos in the second column. Five could see no difference in it, and nineteen who could see a difference. No objection to any of it. Those that preferred silage were fifteen, non-silage four, and

those that had no choice do not cut any figure. The ratio is a little larger, 4 to 15 in this, a little more that preferred silage milk.

CHART NO. 1

Silage vs. Non-Silage Milk

TEST WITH PROFESSORS

	FED ONE HOUR BEFORE			FED ONE HOUR AFTER		
Number	Any Dif.	Any Obj.	Pref.	Any Dif.	Any Obj.	Pref.
1	Yes	No	Silage	Yes	No	Silage
	"	"	"	"	"	"
	"	"	"	"	"	Non-Silage
	"	"	"	"	"	"
	"	"	"			
	"	"	Non-Silage			
	"	"	Silage			
	"	"	"			
	"	"	"			
	"	"	"			
2	"	"	"	No	No	
3	"	"	"			
4	"	"	Non-Silage	Yes	No	Non-Silage
5	"	"	"	"	"	Silage
6	"	"		No	"	
7	No	"		"	"	
8	Yes	"	Silage	"	"	
	"	"	"	Yes	"	Silage
	"	"	"	No	"	
	"	"	Non-Silage	Yes	"	Silage
	"	"	Silage	"	"	"
	"	"	"	"	"	"
	"	"	"	"	"	"
	"	"	"	"	"	"
	"	"	"	"	"	"
	"	"	"	"	"	"
9	"	Yes	Non-Silage	"	"	"
10	"	No	"	"	"	Non-Silage
	"	"	"	"	"	Silage
11	"			"	"	"
	29 Y 1 N	1 Yes 29 No	21 Silage 7 Non-Sil. 2 No choice	19 Y 5 N	0 Y 24 No	15 Silage 4 Non-Silage 5 No choice

Chart No. 2 is just the same as chart No. 1, except it is with students instead of the professors. The same questions asked and with these results:

CHART NO. 2

	FED ONE HOUR BEFORE.			FED AFTER		
Number	Any Dif.	Any Obj.	Pref.	Any Dif.	Any Obj.	Pref.
1	Yes	No	Silage	Yes	No	Silage
2	"	"	"	"	"	"
3	"	"	Non-Silage	"	"	Non-Silage
	"	"	"	"	"	Silage
	"	"	"			
	"	"	"			
	"	"	"			
	"	"	"			
	"	"	"			
	"	"	"			
4	"	"	Silage	Yes	No	Silage
5	"	"	"	,,	"	"
	"	"	Non-Silage			
	"	"	Silage			
	"	"	"			
6	"	"	"	Yes	No	"
	"	"	"	"	"	Silage
	"	"	"	"	"	Non-Silage
	"	"	"	"	"	"
7	"	"	"	"	"	"
8	"	"	Non-Silage	"	"	"
9	"	"	Silage	"	"	Silage
10				"	"	"
11				"	"	"
12				"	"	"
13				"	"	Non-Silage
14				"	"	"
15				"	"	Silage
	21 Yes	21 No	12 Silage 9 Non-Sil.	19 Y	19 N	12 Silage 7 Non-Silage

Running down the first column they all see a difference between the two milks. No objection to any of them. Taking those that preferred silage we have 21, and the non-silage 9. More preferred silage milk than non-silage milk. Somewhat different than in the case of the professors in the second column. All see a difference again. No objection to milk. As to the silage there were 12 preferred silage milk and 7 preferred the non-silage milk.

CHART NO. 3

TEST WITH LADIES

	FED ONE HOUR BEFORE			FED AFTER		
Number	Any Dif.	Any Obj.	Pref.	Any Dif.	Any Obj.	Pref.
1	No	No		No	No	
	Yes	"	Silage	"	"	
	No	"		Yes	"	Silage
	Yes	"	Silage	"	"	"
2	"	"	Non-Silage	"	"	Non-Silage
	"	"	"	"	"	"
	"	"	"			
	"	"	"			
3	"	"	"	No	No	
	"	"	"			
4				No	No	
5	Yes	No	Silage	Yes	"	Silage
	"	"	"			
	"	"	Non-Silage			
6	"	"	"			
	"	"	Silage			
7	"	"	Non-Silage	Yes	No	Non-Silage
	"	"	"	"	"	Silage
	"	"	"	"	"	"
8	"	"	Silage	"	"	"
	"	"	"			
	"	"	"			
9				Yes	No	Non-Silage
				"	"	"
10				"	"	"
				"	"	Silage
11	No	No		No	"	
	Yes	"	Silage	"	"	
12	"	"	Non-Silage	Yes	"	Non-Silage
13	"	"	"			
14	"	"	"			
15	"	"	Silage	Yes	No	Silage
	24 Yes 3 No	27 No	10 Silage 14 Non-Sil. 3 No Choice	15 Yes 6 No	21 No	8 Silage 7 Non-Silage 6 No Choice

This test was with different ladies in town. You will notice they seemed to discriminate a little more. Three of them could see no difference. None of they had any objection. Taking them across No. 1 no difference, next time could see a difference and preferred silage milk. There was one person who preferred the non-silage milk every time. She seemed to have a more acute taste. She was not fond of milk and did not like the silage taste and preferred the non-silage in every test. We will simply take the footings, they are the most important part.

In this case 27 tests were made and three of them had no choice, ten preferred silage and fourteen the non-silage. In the second test there

were fifteen who could see a difference and six didn't care which. Six had no choice, eight preferred silage and seven non-silage. They were equally divided in both cases. The preference was for the silage rather than non-silage.

CHART NO. 4.

TEST WITH MILK EXPERTS

		FED AFTER	
	Any Dif.	Any Obj.	Pref.
Mr. Cheeseman	Yes	No	Silage
Mr. Kedzie	"	"	"
Dr. E. J. Stewart	"	"	"
Palmer House	No	"	
Leland Hotel	"	"	Non-Silage

You see that Mr. Cheeseman preferred silage milk. Mr. Kedzie saw a difference, no objection to them, preferred silage. Dr. Stewart had no objection, preferred the silage milk. We sent some to the Palmer House. They had no objection and could see no difference. Also sent some to the Leland Hotel. They could see no difference, had no objection, but preferred non-silage.

These are the footings of all:

	FED ONE HOUR BEFORE			FED AFTER		
	Silage	Non-Sil.	No Choice	Silage	Non-Sil.	No Choice
Professors	21	7	2	15	4	5
Ladies	10	14	3	8	7	8
Students	12	9		12	7	
Total	60	38	5	48	27	22

Sum of all tests made which was 220: Silage, 118; Non-Silage, 65; No choice 37
12 Samples at Hotel for 30 days. 370 samples. No objections.

There were twenty-one professors preferred silage milk and seven non-silage; two had no choice.

There were in the students tests fifteen silage, four non-silage, and five no choice. Three-fourths preferred silage milk to non-silage.

With the ladies ten preferred silage, fourteen non-silage, and three had no choice. You see they preferred the non-silage. The students preferred silage milk. There were twelve for silage and nine for non-silage. The students seemed to be more decided than the professors or

than the ladies. This represents the sum of these: Sixty for silage, thirty-eight for non-silage, and fifteen no choice. In the second test forty-eight for silage, twenty-seven for non-silage.

There were 220 tests in all made on 75 different people. We had enough for these comparisons. These 220 tests, 118 preferred silage, 65 non-silage, and 37 had no choice. You see silage milk was preferred to the non-silage.

There were twelve samples left at the hotels every day for a month in half-pint bottles and served on the tables, with no objections to any of them, so that it seems to me the criticism in regard to silage milk is unjust. Of course I don't want to be understood to say you always get good milk from silage. If you feed poor silage you will get poor milk. Feed good silage and throw out the poor and you will have good results. I see no reason for condemning it the way people do. Mr. Gurler of DeKalb feeds silage right along and sells milk at 12 cents a quart, and of course if there is anything the matter with silage he would not do that.

DISCUSSION.

Mr. Lloyd: Did the people know which milk they were testing?

A. None of the people knew what that experiment was. I told them we were trying to experiment on different feeds and wanted to see the effect on milk, and asked them which they preferred, and did not tell them until after the experiment was over. The same was true of the milk experts. We just numbered the bottles and the amount of butter fat and asked which they preferred. They did not know in any case what the experiment was.

Mr. Monrad: Did you test as to the acidity of the milk?

A. No, I did not.

Q. Did you make a test as to the keeping quality of the milk?

A. Not to a great extent; kept the milk quite cool and kept it six days. Tried it again at that time and before commencing to sour. No difference yet.

Q. No difference between the two samples?

A. No sir. We did not make a thorough test of that. I would put as much confidence in that.

Q. What was the temperature?

A. Packed in ice. No different temperatures. They were left in the refrigerator about four days. It was kept six days at 40 degrees most of the time.

Q. Pretty clean milk in both cases?

A. We always have clean milk at the University.

Q. Did you wash your hands before milking in the morning?

A. Yes sir, and put on a white suit.

Q. Was there any difference in feeding before milking and afterwards.

A. Just a slight difference, but not very much.

Q. Which way in favor of after or before.

A. That just depends. You can detect the flavor in milk where silage is fed just before. Some people prefer that flavor. Twice as many people preferred that flavor to the other in milk. That is, the flavor of good silage. You have got to be careful in this. The milk that is taken to the condensing factory, if they would teach the farmers how to feed silage I think it would be a good thing. In that case they have got to be careful and see that they do not feed rotten silage.

Mr. Coolidge: Do you attribute the extra amount of flavor to that feeding before to the odor of t he silage in the barn or go through the cow?

A. Goes through the cow, because with our barn there is very little odor there. The barn is quite large for the number of cows and for the amount of silage eaten. There is not a strong odor in the barn.

Mr. Monrad: How do you explain the silage flavor was more pronounced when feeding just before than when feeding after?

A. If fed before it is in the cow's system.

Q. More pronounced when you feed before?

A. Yes sir. Feed a cow an onion an hour before and you get more flavor in the milk than if you fed the onion after. I speak of

onions because they have a strong flavor. I have experimented in that line. Fed two cows and fed a little to see how long before you noticed the flavor in the milk. It will hold longer than twelve hours from onions.

Q. I will ask if there is generally more food that is put in than comes out whole in a silo?

A. That all depends upon the construction of the silo and how it is filled. If constructed poorly so that it cannot all get in and filled poorly you will have trouble. If too ripe will not shut easily. If you don't keep the silo level it will spread easily. A little higher on the outside and tamped on the edges the corn and leaves will keep together. You should not get over 5 per cent that is put in poor shape.

Mr. Davis: In feeding silage entirely with five pounds of grain a day to cows, would taste more, show more flavor than if fifteen pounds a day of grain, the same amount of silage?

I would not think any difference if feeding the same amount of silage.

Q. Feeding forty pounds of silage with fifteen pounds of grain or sixty pounds of silage with five pounds of grain?

A. I should judge it would give more taste to the milk were you to feed sixty or forty pounds. Naturally suppose so. In this case the cows were fed forty pounds of silage.

Q. How would you mix up the silage so the chaff portion and the heavy part should be distributed. It is a trouble to me to do so, and if you know a better way than I do I would like to know how to do it?

A. One way recommended is to take gunney sacks so you get a long string of them clear from the carrier to the bottom of the silo and distribute it all in one place. If you have a carrier and can run it rather slowly you will not get it separated.

Q. The trouble seems to be it gets to the carrier and don't drop off as soon as the stalks from the top. It is a nuisance. You have one part falling over here and another part there.

A. Keep these mixed together.

Prof. Kennedy: We have had twelve years' experience with silage and for many years we had trouble. When corn is thrown up the heavy

corn goes to the side, the leaves fall down right immediately behind the carrier. In order to prevent that we hang a blanket behind the carrier. The heavier corn hits the blanket and the leaves hit the branket and they mix better. All the man in the silo has to do is to spread the silage. Hang the blanket two or three feet behind the carrier at the top and the heavy corn will hit that and fall back in the same pile with the leaves. It will all fall in one pile and by following that method you will have no trouble in getting it mixed.

Q. You mean the man inside has got to be the best man on the job. I have fed silage for nine years and when a boy I took the top myself, and when I do that myself I wan't beholden to any one, but when depending on hired help then I was not satisfied.

A. I have done it myself for six years and that is why I hung up the blanket.

Q. This damaged silage. Could it be fed to young cattle to pay the expense of putting it up?

A. Yes, I think it could. It is an excellent thing for young cattle. Even feed it to the beef cattle. It is a good thing for any stock to have a little green feed in the winter.

Q. I mean damaged silage?

A. You might let them pick it up. Don't starve them to it. There is, however, considerable good corn in silage that is not fit to eat. If you could put it where the hogs can get at it, it would be all right.

QUESTION BOX OPENED AND QUESTIONS ANSWERED.

Mr. Caven, Secretary: We havn't very many questions handed in so far. The first question is:

Q. Will the overrun be practically the same in cream testing 20 per cent and cream testing 30 per cent by the Babcock test?

Mr. Monrad: That is a pretty good one. Of course the overrun should be larger if the test has been made properly because there being less cream for one thing, consequently the same percentage of loss in the

butter milk would be less. We can churn at a low temperature. I think Mr. Gurler was the first to show us we can churn at a low temperature and leave a small percentage of fat in the buttermilk. This should leave us a little bigger overrun, but I do not think the question is practical.

Mr. Johnson: The temperature as Mr. Monrad has stated affects the overrun. I might add that the acidity affects it somewhat and would cause the overrun to increase slightly.

Question No. 2: In improving the dairy cow, which side of the parentage do you look to for the most benefit?

Prof. Kennedy: In view of a pure breed herd, there would not be much difference; in case of ordinary cattle where we have graded cows or half-breed cows, or cows with very little breed, the question with us is to have a pure-breed sire. We expect more from the sire than from the dam. Here we have the cow, perhaps four or five kinds of breed in the herd. For instance, you take and mix black ink, red ink, and blue ink, and purple ink altogether, and then you take another bottle that is all black or all red ink; it stands to reason if you use the one colored ink instead of the mixed colors it will give better satisfaction, so with breeding cows. If you get a pure breed sire and breed in one direction you will do better than having a mixed breed and breeding in all directions. In the use of the sire, we get more from the sire than from the dam. In breeding two different breeds is like mixing red ink with black ink; we would get half and half. In breeding we expect much more from the sire and we breed for a greater number of years for high class dairy stock. If the dam, on the other hand, had been bred from high class stock and the sire had not, we would expect more from the dam. It depends upon the breeding from way back, but we expect more usually from the sire.

Question No. 3: How to feed a calf to make a dairy cow? (This question was referred to Prof. W. J. Kennedy.)

A. Well now, in order to make a dairy calf I would both breed it and feed it. I might say the great trouble has been in the past, a great deal more attenaion is paid to feeding than breeding and it ought not to be done. Too little attention is paid to breeding. You feed a calf on

highly concentrated food and allow it to run with the cow and it will have a tendency to lay on flesh, and when it matures into a cow it will have the same tendency to put on flesh rather than go to milk. When the calf is dropped allow it to stay with the cow three days, then take it from the cow and feed new milk until it is about two weeks old; then gradually change the calf from new milk to skim milk; take about ten days to do that. Don't give skim milk alone, add a little flax seed. Flaxseed if fed whole must be boiled one part seed and six water. And then add one cupful of the jelly to the milk, adding more jelly until six or seven weeks old; then put some nice hay before it and a little green feed along that way. Feed it rather to produce growth than flesh. We don't want the dairy cow fat but just in a thrifty condition; not to produce fat but just keep the calf growing along nicely. In that case if the calf is well bred it should develop into a high class dairy cow. If you overfeed when young you may spoil the best bred calf, although sometimes I have seen calves fed highly and you would think they were apparently ruined by flesh, but grew out of it, but sometimes you spoil them.

Mr. Dorsey: You advocate the use of skim milk. Suppose you had no skim milk, what would you do?

A. In that case new milk until four weeks old and afterwards make it a gruel Use water and some corn meal or add meal and add some flaxseed and feed it. We have fed some calves in that way. In the summer time when milk is taken to the factory we could not afford to keep milk at home and have raised them on corn meal or corn meal and water and bring them up in that way. They will not grow as rapidly as with skim milk.

Question No. 4: Why are dilution water separators condemned?

A. Any man studying dairying properly will know they were used thirty years ago and we do not want to waste our time on it.

Mr. Dorsey: I would like to have a thorough answer on that question. It is giving good satisfaction. People of good sound sense as a good many of us here are using it and satisfied with it. I ask honestly why it is condemned?

Prof. Kennedy: I might say, while I am a live stock man, in the past I had some experience in regard to separators. This dilution separator has been tried at the Experiment Station, at the Massachusetts Experiment Station, and at the Iowa Experiment Station. The agent came along and he said this will take all the butter fat out of the milk and do all this and do all that, so we gave him a fair trial and he left as much in, 6-10 was the lowest he got out of it there. We got as good results from the shallow pan as this. The centrifugal machine will skim milk down to 1-10 of 1 per cent. The man with the dilution separator has never done that. I had occasion to try one in Canada where they were advertising this separator. They said it would do such wonders, and I wanted him to demonstrate publicly how he took it out, but they never said a word and never heard from them since. The notice was taken out of the paper and that was the last of it.

Mr. Monrad: As the gentleman is from southern Illinois I made no answer on northern Illinois work. Why the farmers used it is this. When adding the water it threw up quickly a large column of what looked like cream. We have compared that cream with balance of cream not used with dilution separator and would find that it was very much thinner. That was tried thirty years ago in Germany and it was explained in that way.

Mr. Dorsey: The point Mr. Monrad made is good. It covers the answer to the question. The cream raises very quickly. Our people who are using this machine are not people who have fifteen or twenty cows, but perhaps two or three gallons of cream a day, and this machine made less work for the busy housewife, and the grade of butter is improved over our country grade of butter. I think Mr. Monrad answered the question.

REPORT OF COMMITTEES.

Committee on Resolutions report. Resolutions read by Mr. Joseph Newman of Elgin.

Whereas, While this Association has always been, and is now, strictly non-partisan,

Resolved, We recommend and urge our members and farmers of this State generally, both north and south, to scrutinize the record of, and to strenuously oppose the nomination of all candidates for office, who are hostile or unfriendly to the dairy interests of the State.

By the above resolution, it is not the intention of this Association to impugn the motives or rulings of our judiciary, believing the integrity of the courts and their decisions must be upheld as they are the foundation and bulwark of our system of government.

Whereas, The anti-color law and pure food law passed by our friends in the Legislature, and approved by our Governor are the results of many years of earnest work.

Resolved, Our thanks are hereby extended to them for befriending our interests.

Resolved, We continue the fight against all substitutes for butter sold for butter, until we have secured the necessary legislation and judgment on same in our favor from the highest court in the land.

In this connection, we urge all members and friends in every congressional district to write their Congressman and Senator urging them to do all in their power to secure the passage of the Grout bill now before Congress, placing a tax of 10 cents per pound on oleo and butterine, when colored to resemble butter, and reducing the present tax on same to ¼ cent per pound when not colored as butter.

Whereas, The Act providing for an inspection commission to regulate Produce Commission Merchants in Chicago, passed by the last legislature, whereby the appointment of five commissioners were authorized to be made as follows, one each by the following organizations:

Horticultural Society, The Retail Grocers' Association of the State, Illinois Dairymen's Association, National Commission Merchants Association, and Chicago Butter and Egg Board, has been declared unconstitutional on account of the manner of appointment of said Board, and

Whereas, Said law was obtained by the Horticultural Society of the State assisted by the dairymen and other agriculturalists.

Resolved, That we believe such an Act is beneficial both to the commission trade of Chicago, as well as to the shippers of produce, especially of fruit.

Resolved. That the officers of this Association be instructed to act with the Horticultural Society in endeavoring to secure the passage at the next Legislature, of an Act correcting the mistakes as pointed out by the Supreme Court, believing the agricultural interests should work together in forwarding the interests of each other, keeping in mind the just interest of all citizens of the State.

Resolved, That we heartily endorse the action of the last General Assembly in setting aside a permanent fund for instruction in technical agriculture at the University of Illinois, and in providing the sum of $150,000 for an agricultural building.

Resolved Further, That we note with satisfaction the action of the trustees of the University in increasing the number of instructors, making it possible to offer courses of study adapted to the special needs of different classes of students, and in admitting students to such courses as specials without requiring general admission to the University.

Resolved, That it is the sense of this Association that a Department of Domestic Science should be added to the University of Illinois, and that an appropriation for that purpose be made by the next General Assembly of Illinois.

Resolved, That we, as members of this Association, are in full sympathy with the National Dairy Union in their efforts to secure national legislation in behalf of honest dairy products, and assure them of our help in every way.

Resolved, We heartily approve the selection of Hon. A. H. Jones as Pure Food Commissioner of Mr. J. H. Monrad as assistant, and that we give the Pure Food Commissioners all the assistance possible in their work.

Whereas, We are greatly assisted in entertaining our audiences by the musical numbers given by our old friend, Jules Lombard of Omaha.

Resolved, That we hereby extend to him our hearty thanks, and hope he may be spared to meet with us for many years to come.

Resolved, We appreciate the sacrifice of time and expense incurred by the Star Union Line in sending Mr. Lombard to us, and we trust they may see their way clear to continue the good work each year, and we extend our thanks to all the Transportation Companies for their encouragement and help at our annual conventions and for their efforts to furnish safe and rapid facilities for the transportation of dairy products.

Resolved, The help received by us from our sister state, Wisconsin, in sending Prof. Henry to this meeting, and who has always extended a friendly hand in sending us such talented instructors as Prof. Henry, Prof. Babcock, and Prof. Farrington and others, who by their addresses and counsel each year have advanced the interest in dairying amongst us; also the state of Kansas by the able address of Prof. Otis.

Resolved, That we hereby extend to them our hearty thanks.

Also to our own State University for sending us Profs. Davenport, Fraser, Kennedy, and Erf, who added greatly to our meetings by the knowledge they imparted to us, and it pleases us to note the increased interest in dairying shown by the officials of the University, and we have confidence that when the new buildings are completed, we shall have one of the best Agricultural Schools of the world, manned with efficient teachers in each department. To all the speakers and officers, the local committee, Geo. Reed and S. C. Fox, the friends who furnished the vocal numbers on our program, and others, who assisted to make our meeting

here a success, we desire to return our most hearty thanks. To the newspapers of Belvidere and of the State, who have treated us generously, we extend our thanks.

Joseph Newman,
Lovejoy Johnson
George Caven,
S. C. Fox,
Committee.

Mr. Newman: I move we adopt the Resolutions as a whole.

Major Loop: I take pleasure in seconding the motion.

The President: Are you ready for the question. All in favor of adopting the resolutions say "I." Contrary? It is carried unanimously.

REPORT OF COMMITTEE ON NOMINATIONS.

READ BY MR. GEO. CAVEN.

Mr. President: Your committee on nominations would respectfully submit the following names for officers of the Illinois State Dairymen's Association for the ensuing year.

For President—Geo. H. Gurler, DeKalb.

For Vice President—J. H. Coolidge, Galesburg.

FOR DIRECTORS.

Geo. H. Gurler ..... DeKalb.
John Stewart ..... Elburn.
Joseph Newman ..... Elgin.
R. R. Murphy ..... Garden Plain.
S. G. Soverhill ..... Tiskilwa.
J. H. Coolidge ..... Galesburg.
J. R. Biddulph ..... Providence.

J. H. Coolidge, Chairman.

Mr. Gurler: Ladies and Gentlemen: I dislike to go back on a friend. I know I have friends here because I can say without fear of contradiction that there never has been an unkind word or action pass between any officer or member of this Association in the four years I have held the office of President, but I expected to get out of the office and I would like to ask the chairman of that committee why he persists in putting me in that office. If he has any good reason I would like to know it?

Mr. Coolidge: I don't like to tell why we want you. I am afraid of making you feel too proud. If you would go out of the room I would tell just why we wanted you here.

Mr. Dorsey: I move that the nominations be adopted

The President: Those in favor say "I." Contrary? It is carried.

I desire to say it is pleasant for a man to succeed himself. I only hope I can be worthy of the office. I recognize the importance of the position and hope to have the co-operation of the officers and members of this Association in the future as I have in the past. I thank you.

JUDGE FULLER, BELVIDERE.

I have the honor to introduce to you Hon. Judge Fuller of Belvidere.

Ladies and Gentlemen: I did not come here this afternoon with any idea of making a speech to you, and if you have an idea I am going to make a speech in relation to dairy matters or anything of that kind, I want you to get away from that idea. I don't think there is a person here who knows less about dairying than I.

I congratulate you that you are about to bring to a close what I understand has been a successful convention, and one that will redound to the advantage of your members and to all of you.

The most surprising thing I have seen is that you had a gentleman so modest that he attempts to decline an office. It is unheard of. We have few people in this country who are not satisfied to fill any office

and always willing. I am glad, and I think you are, that you have prevailed upon your President to accept his office for another term.

I was invited to talk some time ago by the committee and I almost promised to do so, provided I could be here when they wanted me, but I was sure at the time that my duties in court would keep me away.

Your committee informed me that this was, as your resolutions stated here today, no platform convention, and that I would not be permitted to talk about politics. I suppose they thought I might find some other subjects on which I can talk, but I fail to find them. But I am glad of another thing that in your resolutions you express the confidence, that I hope every one of you feel, and that is that the citizens of this state and this country ought to feel in the honesty and uprightness of our judiciary. This system of government depends upon law and upon the enforcement of law. I know, and perhaps some of you have not thought, how difficult it is sometimes for a judge to decide a case as he would like to decide it. If I could decide cases according to my sympathy it would be an easy and a pleasant duty, but I find that very often my ideas of the law, as the ideas of every other judge, must come in conflict with the sympathy of others, and must decide cases as the facts represented comply with the law, and in declaring the law must understand it to be the law of the case, as the safety of our welfare depends on that.

A good government depends upon the observance of the law and when a decision is once made, we have nothing to do but abide by it. Many judges have decided cases different from what I have, but they are honest in so doing, and I hope the time will never come when we as American citizens shall have to doubt the integrity, the honesty, and the uprightness of our judiciary, for upon that depends the safety of our institutions and our welfare. It is what we depend upon and fight for, our liberty, our safety, and security of our property.

I have got nearer to making a speech than when I commenced and I don't know but some may think I am transgressing your rule. Institutions of this kind are for the benefit of the members and of the people. I believe in organization; I believe in dairymen organizing and work-

ing together for their own interests as in other classes doing the same thing, and in order to make that effectual, it is right and proper that any and all interested in the dairy interest should combine, and all means should be used to advance under the law legitimately the interest of the dairymen, and it can be done in organizations of this kind.

I don't know much about the dairy business, and guess I knew more when I was a boy. It is different now to then. I remember the days when I had to get up early and churn the cream. I remember that.

I am glad to note the progress that has been made in consequence of the organization, and the benefits derived from associations of this kind. I wish you well. You have still a good deal in your hands to further advance these interests that are for the benefit, not only of yourself, but our entire country. I thank you.

Convention adjourned.

Illinois Dairy Laws

ALSO THE PURE FOOD BILL PROVIDING FOR A DAIRY AND FOOD COMMISSIONER IN ILLINOIS; AND THE BOARD OF INPECTION BILL, BOTH OF WHICH WERE PASSED BY THE 1899 LEGISLATURE OF THE STATE.

A measure of the greatest importance to dairy men of the State was passed by last year's legislature and were approved by Gov. John R. Tanner. This measure provides for a State dairy and food commissioner. This is an officer of which our association has long recognized the need, and during the Galesburg convention strong resolutions in favor of the bill providing for such state officer were presented and passed by a unanimous vote. This measure will be particularly beneficial to dairymen and

the members of the legislature who support the bill and Gov. Tanner, who signed the measure, deserve the thanks of dairymen.

The bill is here given, together with the dairy laws of Illinois.

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 mis-

demeanor, 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 can 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 products manufactured, the amount sold, the prices received therefor, 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 recorded 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 of 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.

* * * * * * *

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 offences 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 passed by the last legislature.)

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 manufact ure 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 declared 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 substitute 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 "Imitation 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 person 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 name 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.

Laws of 1885, page 207 (Revised Statutes, chapter 38, sections 104a-104c.)

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 of 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 suc-

cessor 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, unhealthful, 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 constitutents 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 therof 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, salesroom, warehouse (except 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 or 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 product, 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 appripriation 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 at 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 labelled so as to plainly indicate that they are mixtures, combinations, compounds or blends, and not included in difinition 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 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 vinegar shall be sold as apple, orchard or cider 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 percent, 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 let-

ters 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 of 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 sell 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 brand, 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 acts or things enjoined by this act, or in any way violates 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 inconsistent 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.

THE RIPENING OF CREAM

PROF. H. W. CONN, STORR'S EXPERIMENTAL STATION.

During the last ten years a very great change has taken place in the attitude of the buttermaker toward the process of cream ripening. In earlier years only the exceptionally expert buttermaker gave the matter much attention; today it is everywhere recognized as one of the most important factors in the process of obtaining good butter. This change has been brought about largely as the result of bacteriological investigations by experiment stations in this country and in Europe. The final word upon the matter of cream ripening has not yet been said, but so much information has been collected as to warrant now a general review of the present attitude of scientists as well as practical buttermakers toward the problem of cream ripening. The present bulletin is not intended as a report of the results of new experiments, but simply as a summary of our present knowledge of the nature of cream ripening and the relation to the process of the use of "starters," both natural and artificial.

PURPOSE OF CREAM RIPENING.

The three purposes of cream ripening are as follows:

First: Ripening is believed to increase the yield of butter, for it has been found by numerous experiments that the return in the form of butter is larger from cream properly ripened than from unripened or improperly ripened cream. This is at all events true for gravity cream,

though less significent in the case of separator cream. In a large dairy business this is of course highly important, for saving of even a fraction of a per cent, means much to a large creamery in the course of a year.

Second: It is thought that butter made from properly ripened cream has better keeping properties than that made from cream improperly ripened. This factor, however, is one of no very great importance and, moreover, is perhaps a little uncertain.

Third: By far the most important purpose of cream ripening is the production in the butter of a desirable flavor and aroma. It has been demonstrated over and over that butter made from unripened cream lacks the peculiar flavor and aroma which are characteristic of high grade butter, and that these characters appear as the result of the ripening. It has been proved beyond question, also, that the character of the flavor and aroma is dependent upon the character of the cream ripening. If the ripening is not satisfactory, the flavor and aroma of the butter are sure to be inferior.

The importance of this factor in buttermaking for our creameries is very great indeed, more so than is commonly appreciated by buttermakers. When we remember that the price of butter in the market depends largely upon the flavor, we can easily appreciate how much the buttermaker is dependent upon this process of cream ripening.

Butter without flavor or with bad flavor brings a price in the market which hardly pays for the making, while a product with a good flavor and aroma will sell for at least 3c or 4c a pound more, and the exceptionally fine flavored product of special creameries brings a fancy price two or three times that of poor butter. The flavor will add at least 2c or 3c, and sometimes one-third or even one-half , to the price which could be obtained for poor flavored butter or for butter without flavor. In ordinary dairying, then, the success or failure of a creamery business will be in large measure dependent upon this factor. A creamery which fails to ripen its cream properly fails to get a desirable flavor in its butter. It inevitably obtains a low price for its product, and may hardly meet expenses, while a neighboring creamery, that is more successful in its

cream ripening, obtains a good flavored product, and consequently a price for its butter which makes the business a financial success. This matter is one of more significance today than in earlier years, because our buttermaking is coming to be concentrated in large creameries. When the butter was made on the individual farm a difference of a cent or two per pound in the small product was of comparatively little importance; but now when it is made by the thousands of pounds per day a difference of even a fraction of a cent per pound may mean a difference between financial success and failure. For all these reasons it is very clear that it will be a decided boon to the dairying industry if it is possible to devise a method of handling the cream ripening that shall produce uniform results.

THE CAUSE OF CREAM RIPENING.

The investigations and experiments of the last ten years or more have shown beyond question that the chief agency in ripening processes is the growth of bacteria. Bacteria find entrance into the cream from a variety of sources, and, during the period in which the cream is ripening, get opportunity to multiply rapidly. The cream is kept at a temperature that favors their growth, and at the end of the ripening process they are present in surprising numbers. Fifteen hundred millions per cubic inch may be commonly found in well ripened cream. The growth of the bacteria during this period produces a number of changes in the chemical nature of the cream, and it is these changes, at least in large measure, which constitute the process of ripening. Whether this process is wholly one of bacterial growth is not certain. Babcock and Russell have shown that certain unorganized ferments, known as enzymes, are present in milk, and that these take an important part in the ripening of cheese. If such enzymes are present in the cream they may have a share also in cream ripening. At present, however, we have no evidence of this, while the evidence of the agency of bacteria in the process is abundant and conclusive. At all events, there is no one who questions that the flavor which is produced in the ripening of cream comes from the

bacteria action and not from the action of unorganized ferments. It must be stated, however, that although this general explanation is beyond dispute there are some problems connected with cream ripening that we do not yet fully understand, and which we must hope in the future to solve more satisfactorily.

EFFECT OF DIFFERENT SPECIES OF BACTERIA UPON CREAM RIPENING.

We have learned, further, as the result of the work of many bacteriologists, that the so-called dairy bacteria are of many kinds. By this is meant that the bacteria which may get into the milk in considerable numbers under ordinary or slightly unusual circumstances are of many different species, just as many different species of weeds will grow upon a piece of land left to itself. The source of these bacteria has been studied and is now more or less understood. They come largely from the exterior of the cow, especially from dirt clinging to her hair, or from the milk ducts; or they may be in the vessel into which the milk is drawn. There are other sources, but these are the chief. Now these various species of bacteria have very different effects upon the cream if they are present during the ripening process. The majority of the species appear to have no especial influence, and may grow in the cream without any especial effect upon the butter. Some of them, however, produce changes in the cream which give rise to the products imparting the desired flavor and aroma. Others produce changes which give rise to an abnormal ripening resulting in an improper consistency in the cream and more especially in unpleasant flavors and aromas. These of course the buttermaker desires to keep out of his cream, for it is these, in large degree at least, which produce the inferior qualities of butter which come from improper cream ripening. Accordingly to our present knowledge the majority of the species of dairy bacteria may be looked upon as neutral so far as concerns an effect upon butter flavor. A few may be looked upon as favorable and a few as unfavorable.

Since the bacteria which are in cream are so varied in their action, it may be perhaps a matter of little surprise that the ordinary process of cream ripening is so likely to give a good result, and that without any artificial means of controlling the species of bacteria that may be present a buttermaker can so commonly obtain a good product. The reason for this, however, is apparently threefold. In the first place, although the number of species which produce a favorable cream ripening is apparently not so very great, these are species which are most common around an ordinarily well kept dairy. Consequently if care is taken to keep the dairy in good condition it is most likely that cream will be especially supplied with species of bacteria which produce good results, and it is only under unusually improper conditions that the unfavorable species become especially abundant. Secondly, there are reasons for believing that the species of bacteria which produce good results, under ordinary circumstances prove to be more vigorous than the others and grow so rapidly as either to crowd the others out of existence or to counteract any effect which they may produce. Third, the temperature used in ripening cream is such as to stimulate the growth of the favorable species while it checks the growth of many other bacteria. Thus the process of cream ripening is commonly satisfactory. But although this is the case, buttermakers the world over are ever and anon troubled with an improper type of cream ripening, and this makes it very desirable that if possible some means of controlling this process should be placed in their hands.

For a long time buttermakers have, to some extent, attempted to control the ripening artificially by the use of "starters." For many years it has been the custom, at certain seasons of the year when the cream does not sour quickly, to add at the beginning of ripening a certain amount of soured milk or cream. The purpose for which this has been done is not so much for controlling the character of the ripening as for hastening it. The name "starter" indicates this. But it is at the same time, we shall see later, a means of controlling the character as well as hastening the rapidity of ripening. About ten years ago it was first sug-

gested by bacteriologists that an artificial means of controlling this process might be devised, and Prof. Storch of Copenhagen first conceived that it might be possible to furnish buttermakers with cultures of the proper species of bacteria to add to their cream for the purpose of ripening, somewhat as yeast is used in brewing. This experimenter was one of the first of dairy bacteriologists, and not only conceived the method but put it into practical operation in Denmark. His method consisted in first treating the cream by a process of pasteurization, i. e., heating to about 165 deg. F., for the purpose of destroying most of the bacteria that might be present, and then adding to it a properly prepared culture of bacteria whose value in producing a good flavor had been determined by experiment. This method is, of course logically, perfectly satisfactory; for since pasteurization destroys most of the bacteria present in the cream, it follows that the ripening will be produced by the species of bacteria of which a pure culture has been prepared. Prof. Storch was soon followed in North Germany by Prof. Welgmann and others, and the method adopted in Copenhagen was soon extended more or less widely in Denmark and North Germany. In Denmark it is now used almost uniformly, and in North Germany quite widely, in general dairying. Although occasionally it has been adopted elsewhere, it can hardly be said to be used in any other countries except incidentally in scattered creameries. It is rarely used in ordinary dairying, although resorted to occasionally for the purpose of correcting errors.

In this country the method of the use of pure cultures has had a somewhat different history. It was introduced to our dairymen shortly after its development in Copenhagen; but for some time few dairymen knew anything about it, and it was hardly brought to the attention of the ordinary buttermaker. Our buttermakers have not been in condition to pasturize their cream. For pasteurization there is needed special apparatus, and the process involves considerable expense. For this reason the method as suggested in Copenhagen was not very widely adopted in this country. About five years ago a slight change was made in the process. In order to bring the subject more widely to the atten-

tion of our dairymen, our buttermakers were advised to use the culture without previously pastuerizing the cream. This of course is an illogical method, since the cream is already filled with bacteria, and the addition of a new culture could therefore hardly be supposed to give entirely satisfactory results. With this change in the method of use of pure culture our buttermakers were willing to try them, and in a short time American buttermakers learned of their meaning and experimented with them quite widely. Owing to the method by which the subject was first brought to the attention of American dairymen, our buttermakers were led to expect too much from the use of such cultures in the ripening of cream, and they were naturally disappointed in the results. As a consequence the use of commercial cultures has declined in the last three years rather than advanced. But one thing has resulted from the attempt to introduce the use of pure cultures for cream ripening to American dairymen. Nearly all buttermakers, at least all who have a pride in the quality of their product, have learned of the absolute necessity of a greater attention to the process of cream ripening, and nearly all have adopted such means as are easily within their power for controlling this ripening.

RESULT OF THE USE OF PURE CULTURES.

In attempting to consider the results of the use of pure culture for cream ripening, we must first notice that in this country these results do not appear to be exactly in harmony with those obtained in Europe, and if our experiments are compared with those in European creameries, quite different conclusions will be reached. The reasons for this are twofold. First, it is evident to anyone who has traveled in Europe that the taste of Europeans differs from that of Americans, and the peculiar quality which is there regarded as characteristic of the best butter is not such as is desired here. It is quite certain that the highest quality of American butter would not be regarded in Europe as equal to the highest quality of European butter, and vice versa. The matter of flavor and aroma is purely a question of taste, and if a different product is required in this country

from that required in Europe, it is not to be wondered at that the results of experiments in obtaining good butter may not be in harmony in the two countries. Second, it is quite possible that the European farms and dairies having been used for many more years than American farms, are more thoroughly stocked with bacteria of all sorts, and that there is therefore a greater abundance of unfavorable bacteria and greater tendency to unfavorable ripening in European dairies than in this country. If this is the case we again have an explanation of the difference in results.

METHODS EMPLOYED IN THE USE OF PURE CULTURE.

Before taking up in detail the results of the use of starters in cream ripening it may be well to outline briefly the general method of their use. We notice in the first place that there are two quite different methods. The first begins with the process of pasteurization, the cream being heated to a temperature of 155 to 165 deg. F. for a few minutes and then cooled. This temperature destroys, in a considerable degree the bacteria which are present and thus prepares the cream for the pure culture. The second method proceeds directly to the use of cultures without such pasteurization. In whichever method used, the process of preparing the starter is essentially the same. If a commercial starter is to be used the buttermaker buys a small amount of this, an amount which is insufficient for direct use on his cream, and which he is told must be "built up." He is directed to take a small amount of skimmed milk or whole milk, to sterilize the same by heat and then after cooling to put into it the commercial culture which has been purchased. The mixture is then to be allowed to stand for about one day, and then poured into a larger amount of cream or milk for the purpose of still further increasing the number of bacteria. There is thus obtained after a day or two a considerable amount of milk which has become typhically and properly ripened under the influence of the commercial culture which has been growing in it. The cream thus ripened is used as a "starter" in the general mass of

cream, in proportions which vary with different buttermakers, according to experience, ranging from 2 to 10 per cent.

There are at the present time a dozen or twenty different kinds of commercial cultures upon the market in this country and Europe. They are furnished in various forms, sometimes as a milk culture in bottles, sometimes as boullion cultures, sometimes in the form of a powder, sometimes in the form of a paste. In all cases, however, the culture as furnished consists simply of great numbers of certain species of bacteria intermingled with some material which will give a little greater bulk. It has been found extremely difficult by those who have prepared these cultures to prepare them and distribute them in such a way as to insure their purity, and many of the failures which have resulted, especially in the early years, have come from the fact that the cultures used have not been pure. But with experience it has become possible to avoid the errors of early years, and the cultures which are now furnished are more uniformly pure. It may be also stated that the price at which these cultures are furnished has been constantly lowered, until now they can be obtained by the buttermaker at a price so small as to be really inappreciable in a general business of buttermaking.

THE USE OF PURE CULTURES WITH PASTEURIZATION.

When attention is turned to experimental tests which have been carried on in Europe as to the comparative value of butter thus made and butter made without the pure cultures, it is observed in the first place that apparently the process in question does not produce butter which is quite so good as the very best type of butter that is sometimes produced in dairies that do not use this process. In other words, best quality of butter is aparently made without pasturization and pure cultures. However, these exceptionally fine grades of butter are only rarely found, the average butter being somewhat inferior. While, then, the highest grade of butter is not improved, the general average of the but-

ter made by the process in question is higher than the general average of butter made without these cultures. The use of pure cultures thus increases the uniformity and raises the general average, but does not improve the highest quality of butter made without it. Second, it has become very clear in the course of a few years that the use of pure cultures will not make the highest quality of butter out of poor cream. It is just as necessary that the cream which the buttermaker ripens with pure cultures shall be of good quality as it is when ripened without the cultures. While the quality of butter made from poor cream may be improved by the use of pasteurization followed by pure cultures, some effects of the inferior quality of cream will remain in spite of that. Third, experiments have shown that the use of pasteurization with pure cultures will not correct the errors due to slovenliness in dairy matters. It is just as necessary that care should be taken in all details as it was before the cultures were adopted.

In general dairy practice the results have been perhaps more favorable than in experimental tests. This is doubtless due to the fact that the dairy has a great variety of difficulties to contend with which can be more readily eliminated in experimental tests than in general practice. If the use of pure cultures, therefore, is of any value in correcting errors coming from carelessness, it is very clear that the use of such culture in general practice where carelessness is to be expected would be more valuable than it would appear from the experimental tests where carelessness can be eliminated. It has appeared from the several years of uses of such culture that an advantage is gained in at least three different points.

First, this method enables the buttermaker to handle his cream much more easily and uniformly. He can regulate the ripening in such a way that his cream will always be of a certain grade of ripeness at a certain time of the day; for a little experience tells him how much of his culture, under proper conditions, should be added to the cream to produce the proper grade of ripening at the particular time when he desires to churn. The advantage of this is evident to any one who manages

a creamery, and in itself is regarded by many as of sufficient importance to warrant the use of cultures, entirely independent of any other effects.

Second, there has resulted, as already mentioned, a decided increase in uniformity in the grade of butter that is produced. The buttermaker can depend more certainly upon producing butter of a certain grade, month after month, than he can without commercial culture. It must not be understood, however, that there is absolute uniformity, for variations still appear. But generally dairy practice in Europe has certainly warranted the conclusion that the use of pasteurization and pure culture gives a greater uniformity than the making of butter without their use. In addition to this increase in uniformity, it is a general belief on the part of the dairymen who have used the cultures where they are widely used, that there is an improvement in the average quality of the butter as well as the uniformity.

Third, it has become pretty definitely agreed that the flavor of the butter is improved and rendered more uniform by the use of such cultures. It is somewhat difficult to obtain a definite proof of this owing to the uncertainty of scores in butter tests. Probably the most striking indication of the values of these methods is the fact that the use of pasterization with pure cultures of bacteria is being adopted by the manufacturers of oleomargarine products. These manufacturers, who are certainly good business men, know that their success depends upon getting a good flavor in their product. To obtain this flavor they are adopting the process of mixing with the oleomargarine fats a certain proportion of soured milk, the sour milk giving to the product a flavor something in the same way that the souring of cream flavors the butter. Now the oleomargarine manufacturers have learned that to accomplish this purpose mose satisfactorily they must first pasteurize their milk and subsequently inoculate it with pure cultures of bacteria. Some of them have even established bacteriological laboratories in their factories for the purpose of controlling the matter as rigidly as possible. It is evident enough that this method of the use of bacteria culture would not be adopted at such an expense by the manufacturers of oleomargar-

'ne products if they had not satisfactorily proved to themselves that an improved flavor is thus obtained. In buttermaking the business of individual makers is usually so much smaller than that of the business of oleomargarine manufacturers, that the necessity of the new process has not been so generally felt, and certainly has not been very widely adopted.

It has been questioned whether butter made in this way has as good keeping properties as that of ordinary butter. This matter is not settled as yet. Some experiments seem to indicate that culture butter does not keep well, while others reach the conclusion that the butter keeps perfectly well. There is still a difference of opinion, and certainly the difference in the keeping quality is not markedly great. But the buttermakers say it makes little difference, since their product is consumed almost immediately.

With the exception of Denmark and some of the neighboring parts of northern Europe, the method of cream ripening here mentioned has been only incidently adopted. In the other European countries the use of pure cultures is regarded simply as a means of getting rid of certain dairy troubles. All the creameries are subject occasionally to the occurance of unpleasant tastes in the buttter, due to improver ripening. Understanding these circumstances the dealers recognize that the use of pasteurization followed by pure cultures is a valuable means of getting rid of the trouble. While this method of cream ripening is then regarded as of use at periods of especial difficulty, it is not generally adopted outside of Denmark.

Pasteurization of cream involves a good deal of trouble and expense, and the American buttermakers have generally not been willing to adopt it. They have, however, felt the necessity of some means of controlling the ripening, and they have therefore quite widely worked upon the plan of using cultures without pasteurization. This is undoubtedly a makeshift, and is logically an incorrect process. The cream which they obtain is already well inoculated with bacteria, and it is clear enough that to obtain the proper result from the inoculated culture the bacteria al-

ready present should be gotten rid of. Nevertheless there are not wanting scientific experiments which indicate that if a larger number of certain vigorous species are added to cream, and the cream is kept at a proper temperature, these organisms will grow so rapidly that their own effects will be produced in spite of the other bacteria that may be present. At all events, general dairying in this country has very widely adopted this method, and with what seems to be at least a partial success. It must be remembered that in using this method success depends upon inoculating the cream with a large quantity of an exceptionally vigorous organism the effect of which shall be greater than the effects of those already present. For this reason it must be recognized that we cannot expect the uniformity which would come from the use of pasteurization. We should expect that, whereas the process might be useful in many, perhaps the majority of cases, there would be frequent instances where the method failed.

The result of the use of cultures without pasteurization are not uniform. If we try to compare the results with those of spontaneous ripening, i. e., without the use of "starters," we can obtain our data only from a wide experience of buttermakers. We can hardly expect to learn much from the data given by individual experimental tests, since the question is not whether the method is useful in any individual case, but whether it is of any practical value under the widely diversified conditions of general dairying. Experimental tests upon this subject must therefore always be regarded of less value than the general verdict of dairymen. The use of special starters in this way has been more and more widely adopted in the last five years until it is probably true that a majority of the better creameries and dairies have adopted this process.

Buttermakers emphasize in dairy papers over and over again the necessity of good starters. The advantage in the use of such starters has been threefold. In the first place there has frequently been produced an improvement in the quality of the butter. In very many instances the butter almost at once becomes of a character which demands appreciably higher market value. In general dairying, then, whatever

may be the result of individual experiments, there has been an improvement which has been so satisfactory as to lead a constantly extending use of starters. Second, there is little question that there is a greater uniformity in the butter, although the butter is less uniform than when pasteurization is used. Third, the buttermaker certainly has a better control over the ripening process than by the method of spontaneous ripening, for by the addition of the starter he can with very great accuracy determine beforehand the rapidity of the ripening and the time of churning.

Because of these results this method of making butter has been very widely adopted. Whereas, ten years ago the use of special starters was frequently resorted to, they were reserved practically for cold weather when the ripening took place slowly, and no very especial attention was given toward obtaining the proper starter. But today starters are used very widely. They are used throughout the year, even in hot weather in many cases, and especial attention is given toward obtaining the proper kind of starter. There are, however, two quite different methods of preparing these starters, one by the use of pure cultures, the other by use of natural starters.

Use of non-pasteurized cream with commercial pure cultures.—This method of preparing starters is by the use of commercial cultures which are so easily purchased. These can be obtained at regular intervals from different supply centers, and then, by the use of very simple methods, can be built up into a proper culture for adding to the cream. Such a starter is practically uniform in all cases. This has already been described, and need not be further emphasized.

Use of Non-Pasteurized Cream with Natural Starter.—A far more common method of obtaining a starter for the purpose, one that is now adopted widely in American dairies, consists in using what is known as a natural starter. A natural starter is within the reach of any buttermaker, independent of commercial cultures, for it is something that can be made in any dairy entirely without any aid of a bacteriologist. Of course it does not involve the expense of purchasing a pure culture, and

for this reason has been adopted in hundreds, perhaps thousands, of dairies where commercial cultures have been adopted in one.

The method of making this natural starter is simple. There may be various plans, but one which is satisfactory enough is as follows: A perfectly healthy cow from a cleanly, well kept dairy is selected. After the under part of the body is carefully brushed, and the udder moistened with a damp cloth, the first few jets of milk from the teats are rejected, and the rest is drawn, into sterlized vessel. This is then covered at once and taken to the dairy, heated to a proper temperature and passed through a separator. The skim milk thus obtained is again collected in a sterilized vessel carefully covered, and set aside to sour. After it has become properly soured it serves as a starter for the cream ripening process. Of course there are many other methods of obtaining natural starters, for a natural starter is nothing more than a lot of skim milk or whole milk obtained under especially cleanly conditions from an exceptionally good dairy and allowed to sour naturally.

Of course it is impossible for the dairyman to be sure that such a natural starter contains the species of bacteria that is wanted for ripening. Sometimes it may contain proper species and at other times an unfavorable species. Logically then the use of a natural starter is very unsatisfactory. But our dairymen are not so much interested in the logic of the method as they are in practical results, and care not whether the process they use is theoretically the best, provided it gives them a good quality of butter. There can be no question that the use of natural starters thus made has been a very decided advantage to the buttermaker as it has been adopted in the last ten years. If this were not true, of course we should not expect that this mode of ripening cream would have been so widely adopted and would have been so generally, one might say uniformly, recommended by buttermakers.

We may perhaps advantageously ask why a natural starter thus prepared should commonly be a good one and produce a desirable type of ripening when we remember that the milk obtained in this way has opportunity for contamination with many kinds of bacteria. The only

answer is that the bacteria which are within the cleanly cow's teats, and thence get into the milk, are most commonly of the desired character. Favorable species are more common than unfavorable. This appears to be demonstrated beyond question, and of course if the milk is then drawn into sterilized vessels and kept from further contamination, the resulting starter will have been produced by the growth of advantageous species of bacteria. It will occasionally happen that a starter obtained in this way will not be satisfactory. There are some cows that for some unknown reason do not furnish the proper kind of bacteria. There are cows in a dairy herd in Middletown whose milk when drawn in this manner will not sour at all, and will contain no species of bacteria fitted for cream ripening. But in general this is not the case and the milk of the ordinary cleanly kept cow usually does contain bacteria useful for cream ripening.

If we try to compare the results obtained by the use of commercial cultures and those obtained by natural starters in our general dairying in this country, we reach the conclusion that there is very little difference between the two methods. Both methods are certainly commonly useful and in many cases there has been a very general improvement in the quality of butter as they have been used. As a result of experimental tests it has appeared that in some cases, certainly, a natural starter thus obtained produces results rather better than any one of the commercial cultures compared with them. In other tests the reverse is the case. But in accordance with the general experience of dairymen and tests of experiment stations there is nothing special to choose with regard to the two methods of preparing a starter so far as concerns the effect upon the butter. It may be hoped that in time bacteriologists can produce a commercial culture that shall be superior to a natural starter, but as yet they have hardly done so.

As a result, the method that will be adopted by the buttermaker resolves itself into a matter of convenience. It is frequently easier for the buttermaker to use a commercial starter than to go to the necessary trouble of hunting up the proper barn and obtaining a natural starter.

This is especially true in the case of the large creameries where connection with the individual farm is a somewhat indirect one. Moreover, it is rather easier to make a proper culture from the commercial starter than it is to make a proper culture by the other method. Furthermore the culture made by a commercial starter is practically certain to be constant, while the natural starter is not so uniformly to be relied upon. A commercial starter will be constant if it is a pure culture to start with, while the natural starter made in any of the methods described is not absolutely sure of being uniform. For these various reasons the use of commercial starters is preferred by many rather than to take the trouble of preparing the natural starter.

On the other hand, the commercial culture is a matter of some little expense, although this has been so reduced as now to be insignificant. For this reason by far the greater number of buttermakers at the present time prefer to prepare their own starters, since they can do so without expense, rather than to purchase the commercial culture. Hence it is that in the dairy communities of our own country, except where the ripening is allowed to take place spontaneously, the method most widely adopted for cream ripening is to inoculate the unpasteurized cream with a natural starter.

The following is a summary of the conclusions presented in the bulletin:

1. The market price of butter depends in a large degree upon the character of the ripening of the cream.

2. The only method the buttermaker has of controlling this ripening is by the use of "starters," followed by a maintenance of a proper temperature.

3. The most logical method of using these starters is first to pasteurize the cream and then inoculate it with a pure culture of a favorable species of bacteria. This method is almost universal in Denmark, but it produces very milk flavored butter and has not been extensively adopted elsewhere. It is better adapted to European taste than to the taste of lovers of butter in the United States.

4. The use of starters without pasteurization has been quite widely adopted in American creameries. This is a less logical method, but the results are satisfactory. The butter obtained is more highly flavored than that from pasteurized cream.

5. The starter used may be either a commercial starter or a natural starter. There is little to choose between them. The latter is more commonly used in the United States. The question whether the one or the other should be used is largely a matter of convenience.

6. The use of starters will not make good butter out of poor cream.

The Dairy Department of the University of Illinois.

This department has two well defined divisions. The first dealing with the management of dairy farms, the ecomomic production of milk and its supply to the customer, together with the whole subject of bacteriology, is in charge of Mr. W. J. Fraser, head of the department. The division of dairy manufactures, covering the whole question of creaming and the making of butter and cheese, is in charge of Mr. Oscar Erf, a graduate of the University of Ohio and an expert in designing and operating dairy machinery. Mr. Fraser has spent a number of months in Europe, studying the most prominent dairy questions in that country, but will return in time for the opening of the college year in September. The work of these two divisions is distinct and yet is kept thoroughly co-ordinated. The need of the student is not lost sight of. Whether he is studying dairying from the stand-point of the milk producer, or from that of the manufacturer, he will be kept face to face with the problems that will most intimately concern him. The division of work between the instructors is such that neither is troubled with the details of the other, thus securing his entire time for the problems within his own special field.

The University has been led to make this division within the Department of Dairy Husbandry, because it believes that the education of the farmer who is a milk producer is fundamentally distinct from that of the manufacturer of dairy products, and it desires to meet the needs of both without requiring either to take work that is especially designated for the other. With the completion of the new building there will be in operation, besides offices and class rooms, the following special labora-

tories: One in pasteurizing and bottling of milk, one in testing for fat and total solids, one in cream separation, one in butter making, one in cheese making and one in dairy bacteriology. These subject are kept entirely distinct in the matter of instruction and the student for the time confines himself strictly to the subject in hand. Thus he may take cream separation without taking butter making, though he may not take butter making without having had cream separation.

As showing some of the subjects that are treated in this department, aside from the ordinary questions of dairying, it is well to notice that nine weeks are given to the study of Factory Management under Mr. Erf, and an equal amount of time to city milk supply under Mr. Fraser. Both subjects are elective and offered only for those students especially interested in these particular lines.

The subjects of Stock Judging and Breeding are taught in the Department of Animal Husbandry and only the special dairy subjects are considered under the management of dairy farms as taught by Mr. Fraser. It is the design of this department, not only to offer the study of fundamental studies in dairy industries, but to offer them separately, so that he shall have a clar idea at all times of the problem he is studying, whether it is the cow herself, her feed, her housing, or the care of the milk; or whether it is a question of the machinery of the dairy, the character of the product; or the kind of package in which it is sold.

Variations in Milk and Milk Productions

PROFS. E. DAVENPORT AND W. J. FRASER.

The yield of milk from different cows under the same conditions differs greatly, and that from the same cow varies widely from day to day.

The composition of milk is highly variable; the ratio of fat to other solids, and that of solids to water, are not constant as between different cows or for the same cow on successive days.

The percentage of fat, or of other solids, is not always highest in the smaller yields, but cows that give milk with a high per cent of solids generally show a low total yield.

Fat is the most variable constituent of milk, and its variations are independent of those of the other solids; therefore the yield of milk is a better index of the other solids than it is of the fat.

As regards the first and last milk drawn, the proportion of solids not fat is higher in the first, but the proportion of fat is decidedly greater in the last.

When the milking periods are unequal the longer period will generally, though not always, give the larger yield of milk, of fat, and of solids not fat; but the difference in yield does not correspond to the difference in time; that is, the secretion calculated per hour is greater during the shorter period.

Neither day time nor night time is shown to be superior as a milk producing period.

Different cows differ in their power to make milk from food, and the same cow varies in this respect from time to time.

It pays to select the individual according to her power to manufacture milk from food, and according to the character of the product.

Aside from the influence of food or environment each animal exhibits individual variations of her own, and such variations tend to show something like periodicity in the separate functional activities of the animal body.

HOW THE EXPERIMENT WAS CONDUCTED.

For a period of ten months, beginning May 1, 1897, the yield of milk, of fat, and of solids not fat, was determined for each of five cows and separately for each milking. Of the cows under experiment Dolly and Janet are high grade Jerseys, Jochemke (called Jock) and Lady Pietertje Veeman (Called Lady Pietertje) are registered Holstein-Friesians, and Eva is a high grade of the same breed.

The animals were pastured during the summer, and in fall and winter they received the same kinds of food in such amounts as their appetites required. It was in no sense a feeding experiment, and no attempt was made to compare the yield of milk with food consumed. The sole object was to study the daily and periodic variations in the yield and the character of the milk from the same and from different animals kept under conditions as nearly as possible like those in common practice. Throughout the experiment the milking periods were by design unequal, the period from morning until evening being 11 hours and from evening until morning 13 hours. This inequality is common on the farm, excepting that the periods are generally reversed in length during the summer season.

All tests were made in duplicate. Fat was determined by the Babcock method with accurately calibrated bottles. The solids not fat were determined with the Quevenne lactometer and the results calculated from Babcock's tables.

To discover what the experiment teaches concerning certain general principles the records of all cows for the first three months are compiled and the results tabulated and briefly discussed. The records of all the cows for the month of May though voluminous are published in full to facilitate a study of variations as between individuals. Following this are given full records of one of the cows for the entire experiment in order to afford data for a study in individual variations from day to day and throughout an extended period. All the tables are drawn upon for data bearing upon the constitution of milks produced under varying conditions as to animals and time, but not disturbed by feed. Last are certain miscellaneous data of interest in the same connection.

VARIATIONS IN MILK.

Table 1. Total yield of milk in pounds per month, morning and evening.

	JOCK		DOLLY		EVA		JANET		Lady Pietertje	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	445.5	371.6	338.7	277.1	306.1	271.3	374.6	304.0	583.4	482.9
June	301.4	266.4	335.8	277.0	269.0	234.3	360.7	309.3	491.6	428.3
July	44.6	58.5	292.6	273.4	222.1	213.0	299.4	279.8	390.7	372.2

As would be expected the largest yield is at the morning milking. The only exception is that of Jock in July at the close of her milking period. Why conditions should be reversed in her case is a mystery that is not cleared up by the closest study of her daily performance. The greatest difference in favor of the morning milking of any cow and for any month is 100.3 pounds, or 18 per cent, of Lady Pietertje for May.

The question next arising is whether or not the excess of the morning's milking over that of the evening corresponds exactly to the difference in the length of periods which are to each other as 13 to 11. To throw light upon this question the following table is constructed:

Table 2. Yield of milk calculated in pounds per hour, morning and evening.

	JOCK		DOLLY		EVA		JANET		Lady Pietertje	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	1.10	1.09	.84	.76	.76	.80	.93	.89	1.45	1.42
June	.71	.81	.86	.84	.61.	.71	.92	.94	1.26	1.30
July	.13	.20	.75	.83	.55	.62	.77	.85	.97	1.09

Of the fifteen calculations in the above table ten show that more milk was secreted for each hour of the time from morning until evening, and five show more milk secreted for each hour of the longer period from evening till morning. The differences in favor of the longer period are very slight and never over .04 of a pound per hour, or about 4 per cent. On the other hand the excess in favor of the shorter period is commonly much larger—in case of Lady Pietertje for July rising to .12 of a pound or 11 per cent; and in the case of Eva for June to .1 of a pound per hour, or 14 per cent. This difference in favor of greater rapidity of milk secretion between the morning and evening milkings may be due either to the shorter period or to the time of day. Experiments now in progress in which the milking periods are each 12 hours in length have thus far failed to show any advantage of the day over the night for milk secretions. This seems to indicate that for milking periods of unequal length the yield of the shorter is greater in proportion to the time involved than that of the longer.

VARIATIONS IN FAT.

Table 3. Total yield of fat in pounds per month, morning and evening milk.

	JOCK		DOLLY		EVA		JANET		Lady Pietertje	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	15.30	13.60	15.60	13.40	10.30	9.93	15.70	13.27	18.43	17.73
June	10.60	9.90	14.71	12.23	9.24	8.59	15.15	13.06	15.79	14.25
July	1.73	2.22	13.21	12.23	7.73	7.78	13.17	12.43	13.37	13.70

The general principle appears to hold in the yield of fat as in the yield of milk; namely, that the greater yield is from the longer period. Yet there are three exceptions: one of Jock as she is going dry, one of Lady Pietertje in July in which she yielded 2½ per cent more fat in the shorter period, and one of Eva in the same month with a slight excess in favor of the evening milking. Again, it is interesting to notice below the rate at which this fat has been manufactured per hour during both the longer and the shorter periods:

Table 4. Yield of fat calculated in pounds per hour, morning and evening milk.

	JOCK		DOLLY		EVA		JANET		Lady Pietertje	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	.038	.040	.039	.039	.026	.029	.039	.039	.046	.052
June	.027	.030	.038	.037	.024	.026	.039	.039	.041	.043
July	.005	.008	.032	.037	.019	.023	.034	.038	.033	.040

Even more pronounced than in the case of milk, the calculated hourly manufacture of fat is greater in the shorter period. Out of the fifteen cases there are but three exceptions. In two of these the secretion per hour is the same for the two periods and in the remaining instance the excess in favor of the longer period is but .0001 of a pound per hour, a difference that is insignificant. On the contrary the differences in favor of the shorter period are pronounced and in one instance it is .007, or seven times as great as the greatest difference in favor of the longer period. The evidence is unmistakable, and to the effect that the rate of secretion of fat is more rapid for the shorter period.

Because of the considerable excess in time in favor of the long period more fat was yielded at the morning milking, and yet the tendency to greater production of fat during the shorter time was so marked that in nearly every case the average per cent of fat was higher for the evening milking.

Table 5. The average per cent of fat, morning and evening milk.

	JOCK		DOLLY		EVA		JANET		Lady Pietertje	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	3.43	3.66	4.60	4.84	3.38	3.66	4.19	4.37	3.16	3.67
June	3.51	3.71	4.38	4.42	3.43	3.67	4.20	4.22	3.21	3.33
July	3.88	3.80	4.51	4.47	3.48	3.65	4.40	4.44	3.42	3.68

VARIATIONS IN SOLIDS NOT FAT.

Table 6. Total yield of solids not fat in pounds per month, morning and evening milk.

	JOCK		DOLLY		EVA		JANET		Lady Pietertje	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	y. m.	a. m.	p. m.
May	41.98	35.34	32.01	25.99	26.85	24.18	33.63	26.89	52.51	43.70
June	29.91	26.33	31.77	26.27	24.28	21.32	33.15	27.90	44.39	38.64
July	4.32	5.89	27.81	25.68	20.42	19.36	27.29	25.31	35.79	33.78

With one exception the yield of solids not fat is greatest for the morning milking, and that exception is with Jock in July, whose milk yield for that month is higher during the shorter period. This exception is notable, not only because it is the only exception, but because the excess yielded during the shorter periods amounted to nearly 25 per cent. It will be noted that Jock in going dry reverses nearly every principle established by the other cows. That this is due to individuality and not to the fact of going dry may be seen by a study of the records of Lady Pietertje for October. The following table is prepared in order to learn whether this excess in favor of the morning corresponds with the increased time involved:

Table 7. Yield of solids not fat calculated in pounds per hour, morning and evening milk.

	JOCK		DOLLY		EVA		JANET		Lady Pietertje	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	.104	.104	.079	.076	.069	.073	.083	.079	.130	.128
June	.071	.080	.081	.079	.062	.065	.085	.085	.114	.117
July	.012	.020	.071	.078	.051	.057	.070	.077	.089	.099

Nine of the above instances indicate a tendency to a greater hourly manufacture of solids not fat during the shorter period, but the differ-

ences are inconsiderable and notably less than the corresponding differences in fat production. In the six remaining cases the rate of manufacture is the same for both periods or slightly in excess for the longer. This substantially agrees with the yield of milk as a whole rather than with the secretion of fat which tends much more strongly to be higher for the shorter period. So true is this that the following table showing the average per cent of solids not fat for the morning and evening milking exhibits only inconsiderable differences, which, moreover, are by no means constant as between morning and evening milk.

Table 8. The average per cent of solids not fat, morning and evening milk.

	JOCK		DOLLY		EVA		JANET		Lady Pietertje	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	9.42	9.51	9.45	9.33	9.07	9.11	8.98	8.85	9.00	9.05
June	9.92	9.88	9.46	9.48	9.03	9.10	9.19	9.02	9.03	9.02
July	9.69	10.07	9.30	9.39	9.19	9.09	9.01	9.05	9.16	9.08

VARIATION IN TOTAL SOLIDS.

It now seems well to combine the fat and solids not fat and study the rate of production of total solids.

Table 9. Yield of total solids calculated per hour, morning and evening milk.

	JOCK		DOLLY		EVA		JANET		Lady Pietertje	
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
May	.142	.144	.118	.115	.093	.102	.122	.118	.176	.180
June	.098	.110	.119	.116	.086	.091	.124	.124	.155	.160
July	.017	.028	.103	.115	.070	.080	.104	.114	.122	.139
Average .	.085	.094	.113	.115	.084	.091	.117	.119	.151	.159

With four exceptions the production of total solids calculated per hour was higher during the shorter period. Of these exceptions three were in favor of the longer period and in one the hourly production was equal in both periods. Notwithstanding these exceptions, however, the

highest average for each cow is during the shorter period. The study of these tables seems to show that the constitution of milk varies with the length of the milking period, unless it may be later shown that the day time is more favorable for milk production than is the night, a contingency that has not yet been suggested by experiments at this station, as shown by a careful study of the following table:

Table 10. Yields of evening milkings when the corresponding morning milkings are taken at 100, and the periods between milking are equal.

	Milk		Fat		Solids not fat	
	March	April	March	April	March	April
Lady Pietertje	39	100	102	106	96	97
Eva	101	100	96	92	100	99
Rose	96	100	89	103	95	99

The above is taken from another experiment now in progress and exhibits several remarkable facts. During the month of March Eva gave more milk in the evening than in the morning, but the other two gave less. In April the yield of all was the same morning and evening. Lady Pietertje for both months gave more fat in the evening milking, but the others gave less, excepting Rose in April, leaving the evidence divided. Regarding solids not fat, they all gave less at night than in the morning, excepting in March. Differences exhibited in this table are apparently slight, but being averages should be significant. They are arranged upon opposite sides of the question, and yet the differences in favor of the morning milking are greater than those in favor of the evening.

COMPOSITION OF FIRST AND LAST MILK DRAWN.

A number of tests were made of the same and of different cows in order to discover the difference, if any, between the first pint of milk drawn from the udder and the pint last drawn. The average per cent. of fat in the milk of each cow for a number of days before and after the trial is shown in the table for the sake of comparison. The udders were washed

before milking, except where indicated by a star. It was omitted in these cases under the impression that the manipulation incident to the washing might affect the per cent. of fat in the first milk drawn. The results do not indicate, however, that such was the case. The cows were milked in the usual manner, through a funnel into a pint bottle until the first pint was secured, after which they were milked into a pail until nearly finished. Toward the close they were again milked into bottles containing one-fourth of a pint each, and when the milking was finished, the last four quarter pints were taken as representing the last pint drawn.

It will be noticed that in every case the per cent. of solids not fat is higher for the milk first drawn, and the per cent. of fat lower; but the difference between the fat of the first and last drawn is much greater than the inverse difference between the solids not fat, and its fluctuations are wider from day to day, and between different cows.

Table 27. Composition of first pint and of last pint of this sample milking.

	Per cent fat.		Solids not fat.			Usual per cent fat	Ratio of fat first to last
	First	Last	First	Last	Total milk		
Tina Clay	1.6	6.4	9.7	9.33	16.6	3.5	1:4*
Tina Clay	1.4	3.8	9.45	9.10	20.0	3.5	1:2.7*
Tina Clay	3.0	5.8	9.61	9.35	16.0	3.5	1:1.9
Tina Clay	2.1	5.6	9.65	9.55	18.5	3.5	1:2.7*
Tina Clay	1.2	6.4	9.62	9.15	21.8	3.5	1:5.3
Average	1.86	5.60	9.61	9.30	18.6	3.5	1:3
Nettie	1.5	11.8	10.25	9.12	11.8	4.6	1:7.9
Janet	2.9	6.3	10.16	9.76	6.3	5.5	1:2.2
Pogis	2.5	7.6	10.03	9.74	7.3	5.1	1:3
Jane	2.8	6.7	9.96	9.80	8.4	4.9	1:2.4
Mary	1.2	7.2	9.75	9.10	8.6	3.7	1:6

* Udders unwashed.

COMPARISON OF TWO COWS.

Two mature cows, Elva, a high grade Holstein weighing 1,200 pounds, and Janet, a high grade Jersey weighing 875 pounds, were fresh on the

same day, March 16th. They were immediately put under experiment to test their comparative capacities for milk and butter production. During the first period of 16 days the cows received equal amounts of bran, with whatever corn stover their appetites demanded. During the second period of 21 days the grain ration was of ground oats and corn in equal parts by weight, with corn stover ad libitum. During the third period of 28 days the grain ration was unchanged, but the roughness was clover hay, and during the fourth period of 23 days the grain ration consisted of corn meal and oil meal in the proportion of 4:1 taken with clover hay for roughness. Each milking was weighed, sampled, and tested separately

It will be noticed that the animals always received the same amounts of the same kind of grain, and were allowed to satisfy their appetite in roughness. Though it cannot be said that the refuse from this roughness was always identical in feeding value, yet the animals were so fed that there was no noticeable difference in its amount or character. It will also be noticed that roughness was corn stover the first and second periods, and clover hay for the third and fourth, but that the grain was the same for the second and third periods, so that there was never a change of grain and roughness at the same time. What the cows did with this food for 91 days is fairly well shown in the following table.

Table 28. Amount and kind of feed consumed, and amount of milk and fat produced by two cows on the same feed for 91 days, in four periods.

	1st	2d	3d	4th		
	Corn stover	Corn stover	Clover hay	Clover hay	Totals	Per cent
FOOD CONSUMED						
Eva	308.5	368	452.3	458.3	1587.1	.....
Janet	298.5	332.5	445.8	397.5	1471.3	.....
Difference	10.	35.5	6.5	60.8	112.8	7.6
	Bran	Corn & Oats	Corn & Oats	Corn & Oil meal		
Eva	207.0	293	394.5	289	1185.5	.....
Janet	207.0	295	394.5	289	1185.5	.....
MILK PRODUCED						
Eva	676.2	752.6	1024.7	771.1	3224.6	.....
Janet	411.2	488.6	692.6	574.3*	2166.7	.....
Difference	265	264	332.1	196.8	1057.9	48.0
FAT PRODUCED						
Eva	27.7	26.7	34.3	26.0	114.7	.....
Janet	20.9	23.3	31.1	27.5	102.8	.....
Difference	6.8	3.4	3.2	—1.3	11.9	11.0

We really cannot fail to note that Eva gave 48 per cent. more milk and 11 per cent. more fat on the same amount of grain and with an excess of roughness amounting to only 112 pounds, or 7.6 per cent.. This points to two principles, namely, that some cows are vastly more economical consumers of feed than are others and that the character of pilk produced is so different that one animal may excel in milk and another excel in fat. These cows were both mature, were fresh on the same day, neither suffered accident during the experiment, yet Eva produced 1057 pounds of milk and 12 pounds of fat out of an extra feed of 112 pounds of hay and corn stover. This difference in favor of Eva is far greater than any per cent. of profit the dairyman may hope to make, and it teaches that in the last analysis profits will depend upou careful selection of the animal machine that is to transform hay and grain into milk and fat and money.

THE NEXT CONVENTION

The next convention of the Association will be held beginning the second Tuesday of January 1901 and continuing Wednesday and Thursday. The dates are Jan. 8, 9, and 10. These dates were decided upon at a meeting of directors held at the Briggs house at which President G. H. Gurler presided and Directors Joseph Newman, J. H. Coolidge, and J. R. Biddulph were present.

Reports of the Treasurer and Secretary were presented and approved. Both Treasurer H. H. Hopkins and Secretary Geo. Caven were re-elected.

The place for holding the next meeting was left to President Gurler, Director Coolidge, and the Secretary.

LIST OF MEMBERS WHO PAID DUES FOR 1900.

(This includes some whose contributions of $1 each were made to the fund contributed by Belvidere.)

A

Alexander, C B. (Star Union Transportation Co.), Chicago.
Andrew, H., Argyle.

B

Bills, Frank, Belvidere.
Bennett, Chas., Irene.
Beathke, Wm., Elmhurst.
Barnes, Thos., Belvidere.
Balliet, Jos., Belvidere.
Butler., Fred, Belvidere.
Bennett, E. J., Belvidere.
Barringer, E. G., Belvidere.
Burton, C. R., Kingston.
Barrett, F. E., Union.
Bloyer, Otto, Elkhorn Grove.
Benton, D. C., Kaneville.
Bloyer, Geo., Harper.
Bueler, Anton, Bemes.
Bender, A. C., Durand.
Burton, Geo. F., Mt Carroll.
Bates, A. M. (Worcester Salt Co.), Chicago.
Blood, F. J. (Wells, Richardson & Co.), Waukegan.
Butler, E. J., Elgin.
Branch, H. F., Kingston.
Bennett, W. F., Thomson.
Bagley, F. R. (Francis D. Moulton & Co.), Chicago.
Beckman, H. C. (DeLaval Separator Co.), Lafayette, Ind.
Bailey, O. J., Peoria.
Benton, C. R., Kingston.
Brophy, C. A., Hinsdale.
Burton, C. R., Kingston.
Burton, Truman, Belvidere.

Blakeway, E., Redott.
Biddulph, J. R., Provindence.
Breed, Ira H., Belvidere.

C

Cobb, E. N., Monmouth.
Camp, L. E., Elmoville.
Chamberlain, D. S., Belvidere.
Crosland, Henry S., Capron.
Carr, J. W., Aurora.
Crosior, Eli I., Utica.
Christ, John, Washington.
Cassons, G. D., Hamel.
Caincross, A. D., Amboy.
Carpenter, K. B., Thomson.
Cahoon, O. S., Belvidere.
Coolidge, J. H., Galesburg.
Caven, Geo., Chicago.
Clapp, C. E., Quincy.
Concklin, J. E., Harvard.
Crouse, F. M., Belvidere.
Collins, A. S., Belvidere.
Champlin, C. H., Belvidere.
Coleman, Lee, Belvidere.
Cunningham, Ray, Belvidere.
Conklin, J. D., Belvidere.
Coolidge, C. D., Winnebago.
Cooley, J. H., Hillsdale.
Cutter, Geo. A., Belvidere.
Conklin, D. T., Rockton.

D

Davis, C. W., Woodstock.
Davis Bros., Fairfield.
Duell, H. R., Sandwich.
Davenport, Prof. E., Urbana.
Dorsey, H. E., Mora.
Dorsey, L. S., Mora.
Davis, A. H., Belvidere.
DeWolf, Wm. C., Belvidere.
Dreelan, Andrew, Garden Prairie.
Doran, Thos., Bonus.
Doolittle, John, Belvidere.
DuBois, F. S., Belvidere.

E

Erf, Prof. Oscar, Urbana.
Early, W. I., Belvidere.
Eaton, Wm. E., Rockford.
Eldredge, B., Belvidere.

F

Faulkner, Albert, Cherry Valley.
Fredericks, Andrew, Manhattan.
Fox, S. C., Belvidere.
Fraser, Prof. W. J., Urbana.
Fleming, W. W., Alden.
Frint, Chas., Belvidere.
Frint, Geo., Belvidere.
Fair, John, Belvidere.
Fuller, Dufave, Belvidere.

G

Gullickson, Martin, Frankfort Station.
Gibbons, T. H. (Elgin Butter Tub Co.), Elgin.
Graham, A. F., Harrison.
Gurler, G. H., DeKalb.
Gorman, W. E., Belvidere.
Gleason, L. E., Colvin Park.

H

Hostetter, W. R., Mt. Carroll.
Hoppensteadt, Geo. W., Eagle Lake.
Havens, Geo., Belvidere.
Hardiker, F. H. (Merchants' Dispatch Transportation Co.) Chicago.
Hawes, J. S., Belvidere.
Hopkins, H. H., Hinckley.
Holden, R. V., DeKalb.
Hostetter, A. B., Springfield.
Hall, F. I., Belvidere.
Hicks, R. P., Belvidere.
Hall, Harvey, Belvidere.
Halbert, H., Grandon, N. D.
Hoffman, Herman, Kingston.
Hannah, John, Belvidere.

J

Jennings, A. A. (Star Union Transportation Co.), Chicago.
Johnson, Lovejoy, Stillman Valley.

K

Kerns, Walter, Warren.
Kremer, A., Stockton.
Kinkaid, Miss Ella, Monmouth.
Kennedy, Prof. W. J., Urbana.
Keating, Thos., Garden Prairie.
Kingsley, E. L., Bolton.

Kingston Co-operative Creamery Co., Kingston.
Keating, John, Garden Prairie.
Krunner, C. F., Belvidere.

L

Ludwig, Matt, Goodings Grove.
Lindall, W. K., Malta.
Lewis, W. L., Belvidere.
Lucas, O. F., Blood's Point.
Long, M., Woodstock.
Lloyd, W. B., Glen Ellyn.
Loop, C. B., Belvidere.
Lucas, W. H., Belvidere.
Leehman, S. H., Belvidere.
Landis, W. H. (deceased), (Creamery Package Manufacturing Company), Chicago.
Lawrence, Luther, Belvidere.
Leach, F. M., Belvidere.
Lawler, R. G., Belvidere.

M

Merrill, Thomas, Belvidere.
Moore, W. H., Belvidere.
Muller, Frank J., Milledgeville.
Merritt, S. S., Henry.
Monrad, J. H., Winetka.
Moody, Geo. H., Richardson.
Musselman, M. L., Kent.
Munn, W. H., Belvidere.
Mallory, Grant, Freeport.
McCall, Alex., Roscoe.
Mack, H. S., Rockford.
Murphy, R. R., Garden Prairie.
Moan, F. D., Bonus.
Melindy, G. N., Thomson.
Meyers, O., Little Rock.
Mann, W. E., Batavia.
Moore, W. S., 131 South Water St., Chicago.
Main, Wm., Irene.
McFadden, John, Belvidere.
Markley, Dr. A. J., Belvidere.
Moran, F. F., Belvidere.
March, Geo., Belvidere.
Murrin, Patrick, Belvidere.
McEwan, C. F., Belvidere.

N

Nowlan, Irvin, Toulon.
Nelson, Peter, Creston.
Newman, Joseph, Elgin.
Newman, John, Elgin.
Norlan, H., Hinckley.
Nolting, August, Elgin.
Neff, M. B., Belvidere.

P

Peak, S. W., Winchester.
Prosse, Conrad A., Union.
Powell, J. W. (Merchants' Dispatch Transportation Co.), Peoria.
Parker, A. B., Shirland.
Patterson, J. P., East Wheatland.
Powell, L. A., Bowen.
Pritchard, C. H., Belvidere.
Phillips, Louis, Germantown.

R

Rotermund, H. F., Bemes.
Richard, Fred, Somonauk.
Rice, H. B., Lewiston.
Root, L. E., Lena.
Reed, Geo., Herbert.
Richmond, D. L., Wheeler, Ind.
Redpath, R. C., Baldwin.
Reed, Frank, Herbert.
Reed, Fred, Herbert.

S

Stockwell, Frank, Belvidere.
Smith, B. B., Belvidere.
Seyfried, O. A. Dakota.
Spencer, C. F., Santa Fe R. R., Chicago.
Springer, Mrs. Eva H., Springfield.
Slouborg, Thos, Savanna.
Spicer, J. G., Edelstein.
Sulley, A. J., Bonus.
Steidley, A. B., Carlinville.
Soverhill, S. G., Tiskilwa.
Schlappe, J. F. (Heller & Merz Co), New York.
Sawyer, J. Y. (A. H. Barber & Co.), Chicago.
Sheldon, E. C., Winnebago.
Sudendorf, E. (Wells Richardson & Co.) Elgin.
Segar, J. W., Pecatonica.
Sherman, W. H., Belvidere.
Sawyer, W. M., Belvidere.
Spencer, Edward, Irene.
Seiders, C. H., Belvidere.
Smith, E. S., Alden.
Smith, Geo. M., Belvidere.
Sands, Beecher, Belvidere.
Sweesy, White, Bonus.
Sweeney, Geo., Fairdale.
Shearer, A. J., Aurora.

T

Thompson, F. B., Greenwood.
The Sharples Co., Chicago.
Teeple, S. M., Belvidere.
Teeple, S. F., Belvidere.
Teeple, E. E., Iowa Falls, Ia.
Tripp, F. A. (Genesee Salt Co.) Chicago.

V

Van Patten, David, Tokio.
Van Stone, O.
Vickers, John, Popular Grove.
Vickers, Frank, Popular Grove.

W

Wheeler, J. W., Enos.
Woodard, J. E., Kaneville.
Werner, J. H., Naperville.
Welford, R. G., Red Bud.
Wolcott, F. E., Leroy (Sharon, Wis.)
Waspi, J. S., Spring Grove.
Winter, Albert, Waterman.
Wilderman, W. H., Freeburg.
Waterman, Geo. E., Garden Prairie.
Welden, W. E., Stillman Valley.
White, Frank, Dana.
Wilton, W. W. (Chicago, Milwaukee & St. Paul R. R.) Chicago.
Wilcox, R. G., Elva.
Wolverton, D. C., Chicago.
Wetter, R. E., Bissell, Wis.
Wilter, S. P., Capron.
Wheeler, G. G., Cherry Valley.
Wheeler, C. O., Cherry Valley.
Willard, J. E., Belvidere.
White, C. L., Beaucamp.

Y

Young, F. L., Kaneville.

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