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**KANSAS STATE DAIRY ASSOCIATION.**

Thirteenth Annual Meeting at Kansas State Agricultural College, Manhattan, Kansas, November 22, 23 and 24, 1899.

Dairy Department Conducted by D. H. OTIS, Kansas Experiment Station.

The opening session of the thirteenth annual meeting of the Kansas State Dairy Association was called to order at 3.30 p. m., on Wednesday, November 22, by President F. S. Hurd.

The program was opened with music by the college band, under the direction of Prof. Alexander B. Brown, followed by an invocation by Mr. J. K. Forney, president of the Belle Springs Creamery Company, Abilene, Kans.

**ADDRESS OF WELCOME ON BEHALF OF THE COLLEGE.**

ACTING PRESIDENT F. R. NICHOLS.

Mr. President, Members of the State Dairy Association, Ladies and Gentlemen: We are pleased to welcome you to the Kansas State Agricultural College—the largest agricultural college in the world—though as to the need of welcoming you here I am not fully aware, since this is your institution—it belongs to the citizens of Kansas. We are pleased to have you come here and see and learn what we are doing. It is only by this means that we are able to get the valuable work done here before the people.

Educational methods are changing rapidly. A few years ago the college graduate knew Greek, Latin, mathematics, and a little philosophy; to-day he is expected to come nearer to nature and learn the natural and physical phenomena and laws that surround him. It has been said that the college graduate is least able to take care of himself—to make a living. This may have been true of the graduates in the past; it is not true to-day; certainly not true of the graduates of the Kansas State Agricultural College. Here we educate both mind and muscle. Head and hand are taught to work in harmony. While I have no intention of disparaging the education of mind or muscle alone, to accomplish the most both should be educated. The mental and physical workers are each to be commended. There is danger, however, that the mental worker will become a theorizer—a dreamer. There is danger that the physical worker will become a machine, a slave, an animal that works only to satisfy his physical comfort, and frequently receives little of that. At this college each young man and young woman puts in at least one hour per day in actual work.

But in addition to giving the young men and women of Kansas a practical, helpful education, which tends toward work rather than away from work, we have here the experiment station. The experiments, however, can benefit the people only as they are willing to profit by them; and as already indicated the only way the people are likely to profit by these experiments is by seeing and knowing what is being done here, hence I am glad to welcome you here.

The average farmer can not afford the time and money to experiment for himself. The Government has made provision, therefore, in each of the States to carry on these experiments for the agricultural classes. The experimenters here have no whims or theories or hobbies to confirm. They put the question to nature, let the answer be what it

may. The college is favorably situated for these experiments. It is fairly central, east and west, north and south, in the great farming belt of Kansas. Some of the experiments carried on here are: Grasses and clover, wheat and wheat smut, oats and oats smut, sorghum and sorghum blight, potato culture, corn, alfalfa, soy-beans, Kaffir-corn, cow-peas, etc.

Some of the feeding experiments are: Feeding hogs, steers, calves, and dairy cows. It has been said that "the man who can make 2 blades of grass grow where one grew before is a public benefactor," and it seems to me that the man who by proper feeding can make these 2 blades equal to 4 is equally a benefactor. The diseases of animals investigated are: Staggers, lumpy-jaw, corn-stalk disease, tuberculosis, Texas fever, and blackleg. Experiments with sugar-beets, silos and ensilage, cold-storage, keeping milk, weeds, soil moisture, the cross fertilization of corn and wheat.

The money value of these experiments might be given, assuming a saving of so many dollars on each acre of oats, so many dollars on each acre of wheat, and a certain number of dollars on each acre of corn in Kansas, and so on for each experiment, but it would be of little use.

The college has issued in all 89 bulletins of from 8 to 24 pages each, giving the results of these experiments. They are sent free to every person in Kansas who asks for them. Fifty press bulletins of 1 page usually have been issued and sent to all the newspapers of Kansas. How much good have they done? I don't know; do you?

Some of the most prominent experiments for the future will be seed-breeding, and soil physics. Seed-breeding seems to offer as large or larger field than animal breeding. The possibilities of increasing the nitrogen content of corn or any particular constituent of any seed is a very tempting field of research and promises much. Our records of the rainfall of Kansas for forty-two years shows that we need expect no change of rainfall or the other meteorological elements for that matter. We must learn to take advantage of the conditions as we find them, and the problem of conserving the moisture of the soil by proper methods of cultivation and proper cropping is an interesting and profitable one. Those who cultivate the soil must soon meet the problem of keeping up the soil, especially those constituents most needed by crops. The constituent of the soil soonest to be exhausted is probably nitrogen, hence the growing of plants with nitrogen-fixing bacteria is something that every farmer should know something about. These then are some of the problems we are trying to solve.

The college is yours. You are welcome to visit the class-rooms, laboratories, and museums. See what we are doing; what we have, and what we need.

**RESPONSE TO ADDRESS OF WELCOME.**

J. E. NISSLEY, TOPEKA, KANS.

Mr. President, President Nichols, and Mr. Kimble: In my judgment one of

the happy conditions of life is to associate, to meet with those who are engaged as we are engaged, struggling in the same channels in which we are struggling and of like faith as that of our own. This is the history of mankind from its earliest inception to the present day. The phenomenal records that we get through biblical history of the vascllating Jew are characteristic of this thought, through his annual feast of the tabernacle and his solemnized Passover.

The superstition of Mohammedanism sends thousands of these benighted worshippers up to their enshrined Mecca once each year. Our American Indian and his war dance are also symbols of this idea. The Grand Army of the Republic Veterans go up somewhere once each year for practically the same purpose; and so we see it all along these lines as not only the very natural, but eminently a most fitting effort.

It has been my pleasant privilege to attend every meeting of this association; and as this is the thirteenth annual convention you will pardon me for saying that I am not altogether a novice as a convention goer.

We have met often in our capital city, my adopted home; we have been to Abilene, to Newton, and Clay Center; to-day we open our present session in this beautiful city of Manhattan, having come here from the prairies of the west, the hills of the east, the fertile fields of the south and the valleys of the north; aye, from nearly every township of this State we have come; unspeakably proud to be the guests of, and receive the hospitality from, and to be housed under the roof of the largest, the most efficient and the best managed agricultural college in this country. We have come here with rather bright anticipations, lofty ideals, and enthused by an unstinted zeal. While here we renew with pleasure the friendships and acquaintances of former meetings, and especially that of our beloved Cottrell and his noble staff. God knows they are doing a magnificent work and we are here to learn more of it.

Wisconsin has her Henry, Minnesota her Haecker, Iowa her McKay, and I congratulate them all; but thanks to the stamina of a Kansas boy, whom neither the emoluments of the great State of New York, nor the riches of ex-Vice President Morton could induce to relinquish his citizenship to this, his native State, we have Professor Cottrell at the head of the farm department of this illustrious institution.

My friends, I speak as I do to simply remind you of the work that is being done here in our behalf. The serious question confronting us to-day is, not how we can find or develop a better market for our dairy products, but how can we raise them more profitably, how can we handle our cows that, instead of yielding an average of \$14 per head annually, they will return upwards of \$40, as demonstrated by the scrub herd at this place last year under similar conditions as those on the average farm? These and many kindred questions that are theoretically, scientifically, and practically worked out here are what we have come to learn more about; besides, here on this campus there is located the building and paraphernalia for modern butter- and cheese-making that is only another step in our rapid advancement for a still higher standard in these products.

While we have come here especially for the purpose indicated, we are broad and liberal enough to look over the various departments of the college,

scrutinize the work done, and learn in a general way the worth, the value, and the close relationship that the Kansas State Agricultural College bears to the State at large. We mean to see it all while we are here.

And now, Mr. President Nichols, in behalf of my associates and fellow members, allow me to say that we deeply appreciate the words you have spoken and consider it a great compliment to accept the cordial welcome that you have accorded us in behalf of this institution.

While the occasion makes my heart beat happily and arouses within me an honest pride, this is no time for any extended remarks and I shall only say a few words more. We have turned aside the petty annoyances and trifling difficulties of the daily routine. We have arranged our toilet, arrayed ourselves in holiday attire and come up here for a happy good time. We may be a little exacting in our demands. We may be crude in our deportment and untutored in our manner. The dust on our clothes, the scent of our stables, and the odor of our factories may possibly betray our presence. In either event we desire that you refrain from any criticisms until after we are gone. Overlook all our short-comings, and liberally exercise the element of charity in so far as our demeanor is concerned.

Professor Cottrell, when our patrons ask about us creamery people, about our methods of taking and sampling and testing milk, etc., just tell them all the good and—well, you need not mention the bad you know about us. And when we ask about our patrons; for instance, what effect a dipper in a can of milk can have on the test, etc., just tell us that you are too busy and that you will forward your opinion to us later. We may not all have our lives insured, and there might be some things better not spoken while we are all together.

And now, Mr. Kimble, we want to thank you for the city's welcome, which we accept conditionally. First, that you give us a good, wholesome, balanced ration during the three days that we will be in your midst, diluted with neither blue sky nor oleomargarine. Second, that inasmuch as we are all avowed prohibitionists, you will see that we are furnished a daily supply of good, fresh buttermilk, to which we are sorely addicted. Third, that your mayor will rescind all police regulations and lock up every reporter of a sensational disposition during the time of our visit.

We have heard of Manhattan's ability to please and to entertain, and we anticipate a royal good time. In this we know we will not be disappointed, expecting that when we leave here we will have measured up to our fullest dreams, and that even in after years in each recurring session of our body we will think and reflect back joyously to those pleasant days spent with you.

Fellow dairymen, the city of Manhattan is ours; the agricultural college, with its beautiful campus and surroundings, is ours. We are making history, therefore let us make the best of our opportunities. May this college chapel be filled with the echoes of our deliberations so that its very influences may go out to the uttermost part of our fair State and in thousands of ways result in the uplifting and upbuilding to a still higher degree of efficiency, this, the greatest, the best, and the one fraught with the largest possibilities in the catalogue of our State's resources. We are glad to be here, and once more we thank you.

## PRESIDENT'S ADDRESS.

F. S. HURD, MERIDEN, KANS.

Members of the Kansas State Dairy Association, Ladies and Gentlemen: I am grateful to you for conferring on me this the highest honor in the gift of the association, and in the discharge of my duties as president, I ask the earnest coöperation of the members and those taking part in the meeting.

The dairy interests of the State are to be congratulated on the substantial recognition given them by the last legislature in appropriating \$30,000 for dairy purposes, and to show our appreciation we meet for the first time at this, the greatest agricultural college in the United States. We deeply appreciate the good work done by the farm department of the college. They have been untiring in their efforts to make this meeting a success, as well as in their efforts to assist the dairymen all over the State through that grand medium, the farmers' institute. The experiments with the scrub herd, the skim-milk calves, and the milk-fed swine are perhaps the only ones ever undertaken under conditions as found on any farm in the State, and the results should encourage farmers and dairymen.

The association looks with pride upon our dairy school, and will help to make it the foremost in the country. Each member should see that some of his friends attend.

The foundation of our industry is the milk-producer, and we should look well to it that he is given every opportunity to gain knowledge in the selection and breeding of dairy animals, and in the scientific feeding of balanced rations that will yield the greatest results at the least expense.

Our legislative committee will report another failure to secure legislation to restrict the sale of fraudulent dairy products. With the experience of our neighboring States before us, and our own hard experience, it would seem advisable for us to turn our attention this winter to securing national legislation, and I hope that every member of this association will make it a personal matter to see that his Member of Congress sticks to the "ten cent" text.

The National Dairy Union is doing a noble work, and expects and should receive, not only our endorsement but our aid. We should stand united on the question of a ten-cent revenue on oleomargarine when made in imitation of butter, and spare no labor to hold the Kansas delegation in Congress solidly in favor of this proposition.

It seems to me that if this question were properly presented to the National Live Stock Association, which meets at Fort Worth, Texas, January 16, 1900, that we could secure its assistance in this cause. It is a fact that none will dispute, that if every pound of oleo were sold as such and not palmed off on unsuspecting customers as genuine butter, the dairy industry would be greatly stimulated. If this were done, thousands of men who are now handling beef cattle on a small scale, and thousands of "general purpose" farmers would be attracted to the dairy business, leaving a gap in the beef-producing field and resulting in a stimulus to that industry as well.

It is interesting to note that while so many other lines of business are forming trusts, combinations, pools, and monopolies, neither the creameries nor dairymen are attempting any such questionable methods of advancing their business interests. The prices in dairy markets are regulated alone by the laws of supply and demand, and neither the supply nor demand can be controlled by the dairymen in any direct manner. All the dairy people ask is that their honest goods may be sold for just what they are, and not have to compete with cheap imitations and substitutes.

I believe the Kansas dairy interests would be very materially advanced if we had a dairy commissioner, whose duties would be to inspect all glassware used in the testing of milk, and inspect the creameries and the milk delivered to them; also to instruct the farmers how to feed their stock and on all other points where he can improve, or reduce the cost of manufacture. If it pays to have a farmers' institute, why not enlarge on this work until we can

have a farmers' institute at every schoolhouse.

In closing I wish to express my satisfaction with the earnestness of purpose and sincerity in the work which has been evident on every hand during the past year, and which is demonstrated by the enthusiastic attendance here. As the work of the association has shown in the past, so let our motto be "Pluck and patience win first honors," and let us begin another year's sturdy growth with all our accumulated energy and zeal concentrated at the vital interests.

## FUEL AND OIL CONSUMPTION IN CREAMERIES.

C. A. BARNES, PAOLA, KANS.

Ladies and Gentlemen: I am very happy to be with you this beautiful November morning, and to see such an assembly of bright, happy faces before me.

First I want to congratulate the people of Kansas in general, and the citizens of Manhattan in particular, upon having such a grand and noble institution in our State and your city, as the Kansas State Agricultural College has proved to be, and I want you to know

used as wanted. Understand, of course, that we have the other kind, too, but, like our neighbors, we are as yet unable to confine and get it under control.

We have a 15 horse-power horizontal boiler covered with brick, and I find that it takes on the average of 1,200 cubic feet of gas to get a steam pressure of 40 pounds, and that in churning and not separating I will use about 500 cubic feet per hour to hold steam, while in separating and running all the machinery, I will use from 650 to 700 feet per hour, when not heating the skim-milk with live steam; while to use live steam to scald the skim-milk, will take about 175 feet more per hour. As to the expense, we pay 20 cents per thousand and find that it costs a trifle more than coal in car-lots, but at the present prices of coal, believe it to be fully as cheap, if not cheaper, though we have not accurately compared the two.

In burning gas by meter, a person has a chance to keep check on the amount of fuel used and know just what any little change from the regular costs. For instance, if you have to wait one hour for a load of milk and have no use for the steam during that time, the amount of heat taken from the boiler

will give you some of my ideas. Do not put a quick fire under a cold boiler, as it is liable to cause damage. Put in a slow fire and allow it to heat up gradually till the boiler is thoroughly hot, when you can commence to force it a little. Keep a shallow fire over grates, having it thinnest in the center and gradually thickening to the outer side of fire-box if you have an upright boiler, and if horizontal, have the fire even all over the grates. When necessary to replenish, do not throw in a large quantity, but rather from a half to a shovel of well broken coal, and scatter it evenly over the whole fire. Always replenish fire before the steam has lowered, as in that way you can keep an even pressure and with less fuel. Do not stir fire violently, but when essential that it shall be agitated get under it with a good poker and lift gently, allowing it to fall back upon the grates and break up, as in this way you will get better combustion and more economical use of the fuel. You will use less fuel to carry 90 to 100 pounds pressure while working than if you carry a lower pressure.

There is one point I have not touched as yet and it is this: It takes as much fuel and oil to run a separator an hour that will only skim 1,000 or 1,500 pounds of milk as it does to run an improved machine skimming from 2,500 to 4,000 pounds in the same time.

The use of oil in the creamery is very important, and it is the writer's belief that it pays to buy the best grades and not try to do with cheap or unknown brands because they can be purchased for a few cents less.

I almost invariably use the same grade on the engine that I do on the separator, and think it pays to do so. The engine should be fitted up with oilers which can be regulated to feed much or little as desired; then adjust so they will feed just the necessary amount and no more. Keep all bearings clean and be sure they are taking oil properly.

With cylinder oil it is best to get a high-grade oil if you have a high-speed engine, while for a low-speed engine an oil of less viscosity will answer as well. For an 8 to 12 horse-power use 3 to 4 drops per minute.

I find that no two separators need exactly the same amount of oil to keep running properly. Even two machines of the same make, and sitting side by side, will vary in the necessary quantity to keep them running smoothly and economically. Always use an oil of a high fire test for high-speed machinery and one that is free from all impurities and foreign matters.

I have not gone deeply into the matter of the exact cost of fuel and oil to separate a given quantity of milk or to do a specified amount of other work, for the reason that it is impossible to do this satisfactorily, as the conditions are not the same in any two factories and the best an operator can do is to study the individuality and requirements of his machinery so that he may do the work in the most economical manner possible with the materials at hand, and under the circumstances governing his case.

In conclusion, the following rules may be laid for us to follow: Buy the best fuel to be had, also the best grades of oil; have the best machinery to be had, then go to work and find just how little of fuel and oil you can possibly get along with and keep everything going smoothly and properly. If using coal, weigh out what you think will run you a day, and by paying a little closer attention to your fire, see if you can not get along with less the next day. Do the same with your oils and you will be surprised at the results.

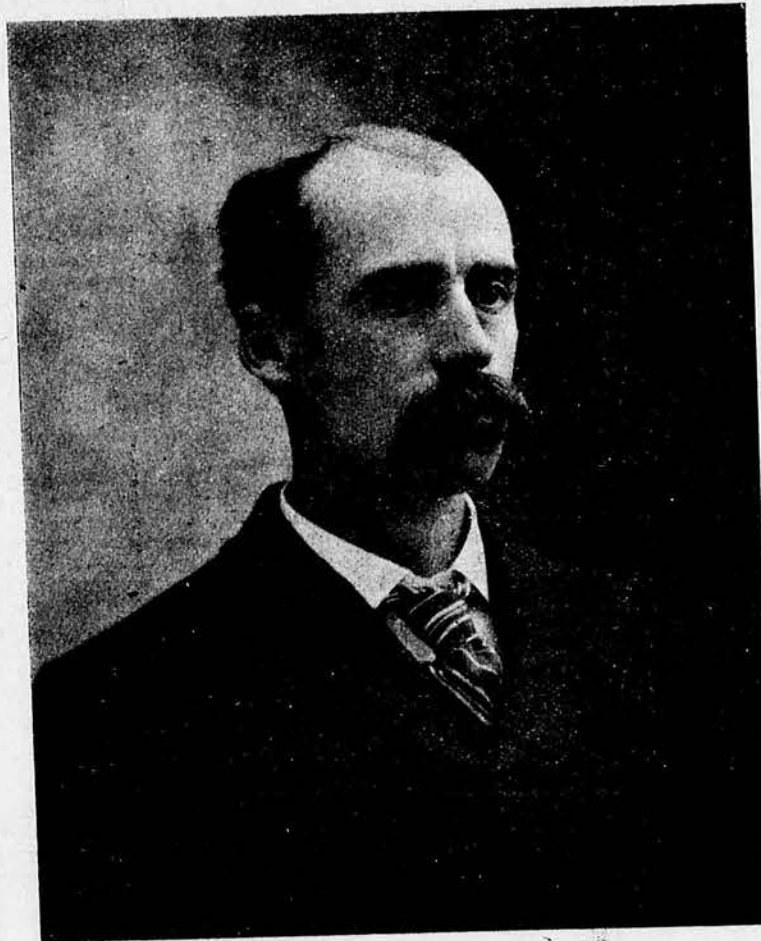
## HOW NEAR ELGIN CAN KANSAS CREAMERIES PAY FOR BUTTER FAT?

A. JENSEN, MANHATTAN, KANS.

The subject, "How Much Below Elgin Can Kansas Creameries Pay for Butter Fat?" is rather a broad question, and it took me nearly three months of study to find a just explanation to creamery-owners and patrons alike.

All Kansas creameries can not pay the same price for butter fat, for several reasons. Some get a large supply of milk, and can produce a better class of butter than others, the cause of which might only be local, but just allowances must be made for conditions as they are.

In the following table the first column gives various outputs of butter; the second column gives several prices for butter at Elgin; the third column gives the corresponding prices in Kansas; the fourth column gives the total cash received for the several outputs at the several prices; the fifth column gives the total expense of producing the but-



F. S. HURD, PRESIDENT KANSAS STATE DAIRY ASSOCIATION.

that I do congratulate myself upon having the privilege, and very great pleasure, of visiting and inspecting this grand gift of noble Kansas.

My subject, "Fuel and Oil Consumption in Creameries," is one that will bear analyzing. To take the first part: Fuel is used for the purpose of making heat, and that to make some things warm and others go. There are many kinds, though all have about the same effect. A little of the fuel of dissatisfaction will frequently start a smouldering fire which amounts to nothing for heat and only raises a big smudge, till some good Samaritan (having been brought up outside of the proper influences I have not learned a better name for him) comes along with plenty of wind and creates a draft, when, presto! you have a raging fire, which not only makes plenty of heat, but frequently results in something going—usually the butter-maker or manager, sometimes the whole creamery.

It has been my privilege to burn natural gas for fuel the last year and a half, and I am so well pleased with it that I would advise every creamery in the land to use the extra amount there always is around a creamery, for that purpose if they could. I will say, however, that the gas we are using is different from that around most creameries, in that it can be controlled and

by condensation, evaporation, radiation, and leakage during that hour will amount to 6 or 8 cents. In other words, it will take that much more fuel to separate the load than it would have taken had it been on time.

Another thing we find out in using gas by meter, is that it pays to get the work around soon after the separating is done and not hold steam half of the afternoon, as there will be enough on hand to thoroughly clean up with if the fire is turned out as soon as the milk is through.

I would suggest that in order to get the fullest and most economical use of the fuel consumed in the creamery, we should save all the heat possible from the exhaust, using it to heat feed water for the boiler, for washing purposes, and to scald the skim-milk. Also, in order that no fuel may go to waste, it is necessary that the boiler be kept perfectly clean inside and out, the flues cleaned every morning and the boiler cleaned inside as often as necessary to keep free from scale and sediment, as all fuel used to heat up scale and sediment is lost.

There is a great difference in individuals in amount of fuel used, as one person will use nearly double the amount to do the same work that another will. A few hints on firing may not be out of place at this time, so I

ter; the sixth column gives the net balance to pay for butter fat; the seventh column gives the total butter fat in the output after 14 per cent overrun has been deducted; and the last column gives the net prices that can be paid for butter fat by Kansas creameries at the given outputs and with the given Elgin prices for butter:

Table showing net prices that can be paid in Kansas for butter fat under varying conditions.

Table with 7 columns: Output of butter for one month, Elgin butter price, Price obtained for butter, Total cash received, Total expense, Net balance to pay for butter fat, Total butter fat after 14 per cent overrun is deducted, Net price paid for butter fat.

The Itemized Expense Account Incurred at Various Runs.

Table showing itemized expenses for various runs of butter. Columns include Output of butter in pounds (30,000, 15,000, 8,000, 6,000, 4,000, 3,000, 2,000) and Total expense.

At the present time, and, in fact, for the last two or three years, beef-raising has been the greatest factor in reducing the output of our creameries, and while the price of butter has averaged some higher, the creameries, on account of a reduced output of butter, have been unable to pay the farmers as much for butter fat as a large run of milk would warrant; and here I want to say to the farmers in general: You alone can make a creamery prosperous by patronizing it liberally, and only then will you get your very best returns, as I will soon proceed to demonstrate.

In 1894-7 the creamery industry of Kansas was at its best. For three years the Kansas farmers only raised small crops, and in Mitchell County, where I was located then, or in fact the whole western part of the State, raised no

crops at all. It was considered then by nearly all the farmers that the creameries were the standby, and it was no unusual occurrence to receive from 20,000 to 50,000 pounds of milk per day at each creamery and station. I have with me in this hall a picture of the Beloit creamery, taken in the summer of 1896, about 10.30 a. m. To my recollection our run that day was nearly 40,000 pounds of milk. What conditions exist to-day? The receipts all over the State will hardly average 2,000 pounds of milk daily for each creamery, when it should be at least five times as large. The farmer's milk cow of then is now only a stock cow—an animal that only can produce a calf every year, and if the calf should die, would be a net loss to its owner of at least \$15; and the worse feature about the cow is, she has lost her milking qualities. We have all heard that there was a shortage of cattle, and it would take many years to make up for it. I will just ask you to look at the receipt of cattle at the Kansas City and other markets, and you will find there has been several hundred thousand more cattle marketed since January 1 this year, than at the same period last year.

I will not try to discourage stock-raising, as it is evident it has the balance of supporters at this date, but you only need to look back six or eight years, when just about the same prices and conditions prevailed, and in 1893 the break came, which is only too well remembered by all.

About four weeks ago, while waiting for a train, I got into a conversation on dairy matters with a traveling representative of the McCormick Harvesting Company, who made the remark to me that Dickinson County was the best place in the State of Kansas to collect in during the hard years of 1893 to 1896, and he attributed it directly to the creameries in that county. Again I state, stay by your creamery as long as you are treated honestly, and the creamery will stay by you when you need it.

EXAMINATION OF BUTTER-MAKERS' CLASS.

Examiner, Ed H. Webster. Judge, Prof. G. L. McKay.

1. What is the cause of so much poor milk being delivered at the factory, and how would you remedy it?

J. Metsger: The farmers do not take good care of the cans, and they sometimes wash them out with dirty water. Then they put on the covers without thoroughly rinsing them, and do not let them air; this is the cause of so much poor milk. The only way to remedy this is to wash them, immediately after rinsing.

H. Lindermann: Mainly on the account of the carelessness of the farmer in not keeping his cans clean. I think the best way to remedy it would be to keep the milk sweet and clean.

Mr. Armstrong: One of the causes is unclean cans, and to remedy it would be to convince your farmers that it would be better to wash their cans thoroughly. That is the only thing that will remedy it. Also another cause is keeping the milk too long. You will have to induce the farmers to deliver their milk every day.

G. G. Socolofsky: The chief cause is in not keeping the utensils clean enough, from the time the patron milks the milk until it is delivered to the creamery; and the surroundings where the milking is done, and where the milk is kept, are not clean enough. The way I would remedy it would be this, to steam the utensils and scald them with hot water, and be sure the seams were all clean. Do it right away after they get them from the factory. Turn them upside down to drain thoroughly, and if possible put on a post up from the ground so the sun can shine on them; air them out thoroughly and they will not have any trouble in keeping the milk sweet.

C. B. Humphryville: In the first place it is poor care of the milk when it is milked and after it is, to put it in dirty cans. Unclean cans will put milk in poor shape.

A. L. Beltz: In the first place the farmers do not attend to the milk right. They ought to cool it. The only way to remedy it would be to talk to them and get them to buy a cooler. A cooler for \$2 would be just as good as a \$50 cooler.

B. R. Coggeshall: I think the main reason is in the milk not being taken care of at home. The patron is not educated and does not understand the action of the milk. He does not understand the cause of making it sour. The only way to remedy it is to explain to him the way milk should be attended to at home.

2. If your patron brings 25 pounds of

milk one day and 200 pounds the next, how would you take a correct sample?

J. Metsger: I should use the dipper just the same one day as the other.

H. Lindermann: I would put the milk through the strainer and take a sample as quick as I have it in the bucket and put it in the can and let it stand about a day.

Mr. Armstrong: I have been taking the sample the same for both. This is our rule.

G. G. Socolofsky: The correct way to take a sample then would be, in my judgment, to take it with a dipper, one or one and a half dipperfuls for 25 pounds or two or four dipperfuls when you get 200 pounds. Take one test of each sample in proportion to the number of pounds of milk you get.

C. B. Humphryville: I do not know whether it would be right for a person to use one dipperful for 25 pounds and four for 200 pounds.

A. L. Beltz: By using the milk thief.

B. R. Coggeshall: I should use the dipper just the same one day as the other.

3. Describe best method of taking test sample from the composite milk jars in summer and in winter.

J. Metsger: In summer-time I shake it up well, pour it from one jar to the other, and then take sample. In the winter I keep it as warm as 60° to 65° F., pour it from one jar to the other, and then take sample.

H. Lindermann: I take a bottle of it in the summer-time when it is warm and take sample quick. In the winter-time I warm it about 60°, shake it up well and then take sample quick.

Mr. Armstrong: In the summer-time I mix them thoroughly by pouring from one jar to the other and then take sample. In the winter-time I set my samples in warm water to warm them up, then mix them thoroughly by pouring from one bottle into the other the same as in summer.

G. G. Socolofsky: In summer the milk is always warm enough without warming it, and be sure that you get all the cream loose from the sides, mix it up well, and pour it back and forth from one jar to the other. Take sample immediately after you have mixed it, well loosened from the sides of the jar, for cream is more apt to stick to the jar than the milk is.

C. B. Humphryville: I take sample with a pipette, and in the summer-time it should be a certain temperature, and in the winter, if it is cold, it should be warmed some before it is put into the pipette.

A. L. Beltz: In the summer-time it ought to be shaken up well, and in winter sometimes it gets too cold, and when it gets too cold, warm it. Set the bottle in warm water until it is warm enough and then take sample.

B. R. Coggeshall: I use about the same method at both. In the summer the cream will thicken more or less, and stick to the sides of the can. I generally shake it thoroughly before taking sample.

4. What would you do if your test did not show a clear reading?

J. Metsger: Pour in a few drops of acid, and then if it is not clear take another test.

H. Lindermann: I would throw it away and take another sample.

Mr. Armstrong: I would test it over. G. G. Socolofsky: If I had some more milk of the same test left, I would test it over again to see if I could not get a better test.

C. B. Humphryville: I think there would be several causes of that.

A. L. Beltz: Set the bottle in water to get clear reading. When the fat hangs to the neck of the bottle set the bottle in warm water and the fat will dissolve. By that method you will get a clear reading.

B. R. Coggeshall: A drop of sulphuric acid will help it. I would retest it if I had the sample.

5. Do you use a starter for ripening cream? If so, why? If not, why not?

J. Metsger: Yes, sir. So as to get the same uniform cream.

H. Lindermann: Yes, sir. I find that I get a great deal better flavor in the butter.

Mr. Armstrong: On certain occasions I do. In the summer-time we do not use a starter. In the winter-time I use buttermilk, provided I have good buttermilk.

G. G. Socolofsky: Yes, sir. To improve the flavor of the butter and to keep back the germs if there be any, and develop those germs that would improve the flavor.

C. B. Humphryville: No, sir. I do not think it necessary.

A. L. Beltz: I do not. I do not need it. The cream should be left to ripen of its own accord.

B. R. Coggeshall: No, sir. When you do not pasteurize you do not need

it. Cream will ripen all right without it.

6. At what temperature would you ripen cream? How long would you hold it at that temperature?

J. Metsger: Sixty-eight degrees in the summer-time and 70° in the winter-time, and I churn it the next morning.

H. Lindermann: I would ripen cream from 70° to 75° from the time I get the cream in the vat and hold it about five hours.

Mr. Armstrong: I would ripen the cream at 65°, and in regard to holding it I would like to have it from the time we are through separating until churning time, about 4 o'clock.

G. G. Socolofsky: I consider the best temperature in summer from 59° to 65°. Of course I hold it then until it is ripe enough, which I find out by the tester, which is the best way to do.

C. B. Humphryville: I think that to ripen cream properly it ought to be kept at a temperature of 60°, and I think it ought to be kept not less than twelve hours and not over forty-eight.

A. L. Beltz: Seventy-two degrees or 74°. You do not want to keep it after it has ripened; the sooner you churn it the better butter it makes.

B. R. Coggeshall: In twelve hours ripening I would hold it at 60° the first eight hours, and the last four hours would lower it to about 50°.

7. What is the cause of slushy butter, and how would you remedy it?

J. Metsger: The cream is churned too warm. I would churn it a little cooler.

H. Lindermann: I believe it is churning too warm. I would churn it cool, not too cool, but cool enough.

Mr. Armstrong: One cause of slushy butter is not having your cream cold long enough. You can cool your cream down to 58° and still have slushy butter. If you have cream at 65° over night your butter will not be slushy. And another cause is the feed. In the spring of the year when grass is just getting up you will have slushy butter. I churn as low as 56° when grass is beginning to grow.

G. G. Socolofsky: The principal cause is churning the cream too warm, having it at too low a temperature when you ripen it.

C. B. Humphryville: The cause of slushy butter is churning too warm. If it is too warm it should be cooled down by ice.

A. L. Beltz: Churning the cream when it is too warm. It should be cooled down with ice or cold water. The trouble with most of the creamerymen of this country is they churn the butter too warm and get too much water in it.

B. R. Coggeshall: I think it is the cream not being ripened to the right acidity, although churning too warm will make slushy butter.

8. State benefits and disadvantages of sterilizing skim-milk.

J. Metsger: The benefits are, first the milk would be delivered in better condition, not only to the creamery, but the farmer would get better milk if it were sterilized, and the cans would be in better condition the next day to deliver the milk.

H. Lindermann: I believe there is a great benefit if I get the milk in sweet, but of course if the milk gets a little sour I would not sterilize it.

Mr. Armstrong: I have not sterilized any, but I think there is a great benefit in sterilizing milk, providing you have sweet milk to sterilize, but if you have tainted milk there is no use in sterilizing.

G. G. Socolofsky: I do not know as there are any advantages unless milk is all brought in perfectly sweet condition to the creamery, but if it is not brought in perfectly sweet condition to the creamery, we can not sterilize it to any advantage because it all turns into curdle or whey just as soon as you sterilize it, but if we get all the milk in perfectly sweet condition from the creamery I prefer sterilizing because the milk will keep better. If milk is sterilized you can keep it pretty nearly two days, which is, of course, of great advantage to the farmers when they feed calves on skim-milk.

C. B. Humphryville: I do not see any disadvantage in sterilizing milk, and I think it is a good thing.

A. L. Beltz: I would use the sterilizer. I think there is benefit in it, and I have had patrons keep milk two or three days by sterilizing. Most farmers are careless with their skim-milk and it will keep better when sterilized.

B. R. Coggeshall: In sterilizing the advantage is that it kills the bacteria, if the patron takes it home and tends to it as it should be. Patrons who haul their milk eight or ten miles, by the time they get home the milk would be cold and the bacteria at work in it; that is, they would develop quickly.

**EXAMINATION OF PATRONS' CLASS.**

Examiner, Prof. H. M. Cottrell.  
Judges, C. E. Hill and W. G. Merritt.

**1. How can you handle your cows in December, 1899, to get greatest amount of butter fat?**

T. A. Borman: These cows shall be fed a balanced ration, as nearly so at any rate, as it can be made. They shall have plenty of water and salt, be warmly stabled and kindly treated.

H. S. Bosworth: I want to commence as soon as they are fresh and work them to their very best stage with hay, and cut that right in the milk. I think the great trouble is with most persons in cutting hay, they will cut too ripe. I work the cows to their very best, and I make them eat their hay clean. I feed them corn fodder and bran and in that way, taking them from the start and feeding them all they will eat clean, I get better results.

A. H. Diehl: Put them in a good warm stable and keep it warm, and have plenty of feed that is rich in protein, such as alfalfa and millet, and when the days are nice they can be turned out in the yard.

Mr. Douglass: I shall keep them in a warm shed and shall feed them millet hay, Kaffir-corn, Indian corn fodder, Kaffir-corn heads, and wheat shorts, slop with salt in it. This is the method I shall follow.

Mr. Priest: I will keep them in a warm stable, feed them 5 pounds of bran and 3 pounds of linseed-meal, and feed them all the roughness they want.

Mr. Peak: I shall feed them alfalfa and mixed grain feed—oats mixed with equal parts of bran.

Mr. Voepell: I feed them ground feed and alfalfa hay.

Mr. Clark: I can only tell you what we are doing at present. We are feeding a ration of corn-meal and cottonseed-meal and bran, and they are running in the stalk field during the day, and have access to soy-beans.

Mr. Dickinson: I feed my cows a balanced ration in the first place, and I am very careful that they are stabled well in stormy weather, and they are kept in over night and turned out in the middle of the day in nice weather. I am feeding at present grain and bran and soy-bean meal, and timothy and clover hay.

Mr. Feighner: I feed them a balanced ration and give them pure water, heated with a tank heater to proper temperature. I feed them alfalfa, millet hay, Kaffir-corn, corn fodder, and grain.

Mr. Nicolette: By keeping them as warm and comfortable as possible, feeding alfalfa hay and rations of grain.

**2. Describe the form of cow that is most profitable to you.**

T. A. Borman: The form of cow most profitable to us is that generally known as the true dairy type. By this dairy type I mean one that has no tendency to put on flesh—a cow with a good appetite and a large stomach, indicating a great producing and consuming capacity.

A. H. Diehl: I have but one variety of cow, that is the grade Shorthorn. The cow that pays me the best is the one that has the best dairy form, and I take the best care of her.

Mr. Douglass: I prefer a cow with a rather bony head, large nose, slender in the neck, yellow skin, and of a Durham breed.

Mr. Priest: I think I would sooner have a good graded cow, not too smooth, a cow not liable to be beefy.

Mr. Peak: The Shorthorn red cow; one that will not carry too much fat, or that will not fatten readily.

Mr. Voepell: I have Jersey Shorthorns.

Mr. Clark: The cow giving me the best results is a cow one-fifth Jersey and four-fifths Shorthorn, with rather small hips and large body.

Mr. Dickinson: I think the closer we stick to the dairy type the better, no matter what breed.

Mr. Feighner: She is a long rough cow with long body, slim neck, and good head. If the breed were necessary she is a cross between a Shorthorn and Holstein.

Mr. Nicolette: I have the Jersey and Shorthorn.

**3. How do you handle milk from cow to creamery in August?**

T. A. Borman: Our milk being separated by the farm separator, we separate immediately after milking, or rather while the milking is going on. The separator is run by a calf on a tread power. A few minutes after milking is done the separation is completed. The cream is cooled as much as well water of 54° will cool it, then put into 8-gallon cream cans and held at as low a temperature as our well water will hold it. Most any well water will keep the cream sweet until delivered every

other day. Fifty-four degrees will keep it in good condition.

H. S. Bosworth: Washing the cans is one of the great secrets. I see that all the seams of the cans are cleaned. First when they are emptied I wash out the cans, rinse them, and put them in the sun.

A. H. Diehl: Milk delivered to the creamery in the month of August should be taken from the cow as quickly as possible and run through an aerator and then removed to the coolest place you have on the farm, and leave the lid off the can so that it can get plenty of fresh air; and in milking in the morning the milk should be cooled in the same way, load it on a wagon and cover with a wet blanket, doing it early in the day and getting to the factory early.

Mr. Douglass: Upon milking I immediately strain it and set it in cold water and let it set over night, and then the next morning I strain into a different can and set that in water to cool before mixing them, but I cool both before taking to factory.

Mr. Priest: We cool our milk just as quickly as we can cool it after we milk. We usually take more cans than we fill and we commence to fill all these cans and pour a bucket in the first can and the next bucketful goes in the next can, and so on, and by this method I think it cools quicker.

Mr. Peak: Usually I take it in a spring wagon. The milk every night is set in cold water and then I strain it in the can and put the can in cold water.

Mr. Voepell: I milk the milk, put it in the can, put the can in the tank, cover it, then keep the morning and evening milk separate, and put together in one can when I get ready to go to the creamery.

Mr. Clark: We milk it and as soon as we get it milked, divide it up in different cans, about 40 pounds in a can, and put in cold water and leave the top of the can open.

Mr. Dickinson: I am very careful about milking my cows to keep them clean and also to have myself and my man have clean hands and clean clothes, and I have clean stables, and my milk is run from hand separator into can, and each skimming is kept separate and hauled to the creamery.

Mr. Feighner: I run the milk over a Star cooler and put it in a tank and keep it cool by keeping the temperature down to about 58° with well water, and then put in a light spring wagon and haul it to the station.

Mr. Nicolette: By cooling it and taking it to the creamery every morning early.

**4. How do you handle milk from cow to creamery in December?**

T. A. Borman: The milk from cow to creamery in December should be handled with the same care as it is handled in August. The cream should be cooled, as it is just as necessary in December as in August, before the night separation is placed with the morning separation, and the cream should be held at the same temperature as in summer.

H. S. Bosworth: I have never been quite so particular, as there is not so much danger as in summer. I usually put the milk in some warm place where it will not freeze.

A. H. Diehl: Milk taken in the month of December should also be cooled, but I do not consider it necessary to use the aerator. My method at this time is to milk the cow, strain the milk and put the can in the horse tank and cool the milk. After it is cooled I remove it where it will not freeze.

Mr. Douglass: The same plan of getting it cool as soon as possible. Not necessary to set it in water.

Mr. Priest: It generally cools of its own accord then. We keep it from freezing and keep our cans clean.

Mr. Peak: Keep it where it won't freeze, and carry it in the same way.

Mr. Voepell: I handle the same as I do in summer, put it in separate cans the same as I do in summer.

Mr. Clark: We are, with this kind of weather, doing practically the same thing as we do in answer 3.

Mr. Dickinson: I handle about the same in December as any other time, only I do not deliver quite as frequently to the creamery.

Mr. Feighner: I simply put it in the cans and leave the cans open until it cools thoroughly. Then cover them up to prevent freezing and take to the station.

Mr. Nicolette: By keeping it so that the milk will not freeze, and taking it to the creamery early in the day.

**5. How do you care for milk utensils?**

T. A. Borman: Milk utensils should be thoroughly cleaned. Our utensils are all rinsed with cold water first. Then they are thoroughly washed with hot water, then they are scalded, and after

scalding they are given the sunlight and air before using.

H. S. Bosworth: I clean the cans thoroughly, scald them thoroughly, and give them all the sun possible.

A. H. Diehl: Rinse the can out first with cool water, and then wash with hot water. My method now is to rinse the can with cold water, then scald it out with boiling water, and then leave it out to drain and where it can get all the fresh air it needs.

Mr. Douglass: Upon bringing the milk home from the factory I empty can and rinse with boiling water and set to drain upside down.

Mr. Priest: We empty them just as quick as can after we get them home from the creamery, and we wash them with pure cold water. We do not use any soap or pearline. We wash them and rinse them and then turn them up to dry, or set them on a slatted table so the sun can shine on them.

Mr. Peak: I let my wife and daughter do that, so I don't know. The milk goes to the creamery sweet, however.

Mr. Voepell: I use plenty of hot water.

Mr. Clark: We rinse the cans with cold water and then with warm or hot water, and put them in the sun until used again.

Mr. Dickinson: I generally wash my milk utensils all I can at the creamery where they are equipped for such business. I do not turn my cans upside down but set them right side up where the sun can get at them.

Mr. Feighner: I use hot water and soap, and scrub them thoroughly with scrubbing brush, and set them out in the sun and air.

Mr. Nicolette: By scalding with hot water, and then putting them in the sun.

**6. Describe your method of handling and feeding skim-milk calves 6 months of age.**

T. A. Borman: The calf at our place gets all the whole milk it will drink until its mother's milk is fit to be used; that is usually four days after calving. From that time on its drink is diluted with some of the warm separated skim-milk. By the time the calf is 3 weeks old it is on skim-milk entirely. The fat that the calf needs is supplied through corn-meal or ground flaxseed in the milk.

H. S. Bosworth: I usually let them run with the cow two or three days, and then I take them off and give them milk for about four weeks, and then little by little I add a pint of skim-milk and work them up by degrees on the skim-milk entirely. I use corn and bran mixed, and increase the feed just as they can take it. I feed it dry.

A. H. Diehl: I have no experience with handling skim-milk calves. I have always patronized cheese factory and do not raise calves that way. My method is to take the cows out of my herd that are the poorest and hardest mixers and are accustomed to kicking. Until the calf is from 3 days to a week old I let it go with its mother. I then turn the calf loose but keep it in the stable, letting it go to her in the morning, noon, and night. After the calf is 2 or 3 weeks old it will begin to eat dry feed. After it is 6 weeks or 2 months old it does not need any milk.

Mr. Douglass: I have had no experience.

Mr. Priest: We take the calves from the cow when they are 3 days old and feed them whole milk. At the age of about 10 days to 2 weeks we commence mixing sweet skim-milk with whole milk, and we gradually get them from whole milk on to skim-milk. In a short time we teach them to eat grain chop and then when we get our calves on skim-milk we feed them pure grain chop.

Mr. Peak: I let them stay with the cow until they are 4 days old, then feed them twice a day. The main feed is at noon, as soon as the milk comes from the factory. Each calf is by himself and gets his own feed and no more. I feed in that style.

Mr. Voepell: Usually wean the calf when 2 days old and feed new milk, for about two weeks, and then mix skim-milk with it. Take about one-third at first, and then one-half with ground corn or oats. Have stanchions where I feed them. I keep them separate.

Mr. Clark: When the calf first comes I don't let it suck the cow more than once. I take it away immediately and give it new milk until it is 2 weeks old, and then put in separated milk, and at 4 weeks old we give it separated milk entirely, with shelled grain. I have fresh cows nearly every month in the year.

Mr. Dickinson: I take the calf from the cow when it is about 5 days old, then I commence to take new milk away and add skim-milk. This milk is fresh and warm from the separator, and when the calf is 2 weeks old I add bran or corn, depending upon what I want to

raise the calf for. If I want to raise the calf for beef I feed something that will produce fat, and it is fed that way until 6 months old and then gradually weaned off.

Mr. Feighner: I wean them immediately from the cow, then I feed them new milk for about fourteen days; then I wean them off in the next seven days by increasing skim-milk. I feed them separately in stanchions.

Mr. Nicolette: By feeding skim-milk in addition to ground meal; put the meal in the milk and mix the preparation with hot water.

**7. How much do you realize per cow, per year?**

T. A. Borman: In round numbers we had last year an average production of 9,000 pounds of milk per cow, about 340 pounds of butter fat, worth about \$60. The calves last year not sold. The year before, however, our calves were sold by the hundredweight and brought an average price of \$25 at 1 year of age.

H. S. Bosworth: I did not have time to figure that up. Altogether they have netted me over \$4 per month for the year, just for the milk alone. Figuring in the spring calves each cow will average from \$50 to \$60 for the year.

A. H. Diehl: There is one year that I kept a record and it varied from \$14 to \$52 per cow; the average was some \$34 for 12 head during the year.

Mr. Douglass: I am realizing at the present time an average of \$4 per month.

Mr. Priest: The only thing I can give you will be last year. Our milk averaged about \$35 to the cow. We got about \$15 for our calves on an average, and then we fed some of the milk to the pigs. Of course we have no way to estimate that, but I should judge it amounted to \$5 or \$6 to the cow, making about \$56 for each cow.

Mr. Peak: About \$40. But we are new at the business and I believe we are not getting the same price the older ones are getting.

Mr. Voepell: My cows net me about \$37 this year.

Mr. Dickinson: My gross receipts per cow are about \$70; my net profit this year was about \$40. That is not giving the cow credit for the yearling calf.

Mr. Feighner: I am not prepared to answer that question.

Mr. Nicolette: I realize from the milk in the neighborhood of \$35, and from the calf when it is a year old, \$16.

**8. How are you going to increase your profits?**

T. A. Borman: It is essential for most profitable dairying in Kansas that the dairy farmer produce his own feed. We all know that our general class of feeds, clover, millet, corn-meal, etc., are all too rich in fat, but deficient in protein. We can increase our profit by growing our protein on the farm, and we can do this by producing alfalfa and soy-beans.

H. S. Bosworth: With more study and more care. I make my dairy the first consideration. When I take up that I make it a study and I feed my cows so as to force them to the highest yield until within three months of being fresh, then I begin to take off the feed until they are dry and give them two months' rest.

A. H. Diehl: Take care of my cows, read more dairy literature, attend dairy conventions, and raise dairy feed, sow more alfalfa. I sowed 10 acres last year and hope I will sow 10 more next year. My cows during this fall have had very little feed outside of alfalfa pasture and they are doing well to-day on it.

Mr. Douglass: By building up proper stock, and by proper feeding.

Mr. Priest: I am going to milk more cows for one thing. I expect to feed better for another thing. I expect to come nearer feeding a balanced ration than I have been doing. I expect to feed alfalfa.

Mr. Peak: If the creamerymen can handle milk as was shown by the chart it will make it more profitable for us. I am doing all I can under the circumstances, until I learn to do better.

Mr. Voepell: By feeding a balanced ration.

Mr. Clark: By testing all my cows. Keep those that test above 4 per cent and discard those below 4 per cent and by using a balanced ration.

Mr. Dickinson: I will increase my profit by grading up my herd. The feeding problem I consider one of the most important of all dairy questions.

Mr. Feighner: By proper handling, proper feeding, and proper breeding.

Mr. Nicolette: By taking better care of them and feeding heavily.

Health for 10 cents. Cascarets make the bowels and kidneys act naturally, destroy microbes, cure headache, biliousness and constipation. All druggists.

## TESTING MILK AND CREAM.

LUDOLPH GABE, BELOIT, KANS.

So much has been written and published on the Babcock process of testing milk that any discussion on this subject would seem superfluous. Testing, however, holds such an important place in the creamery business of to-day, that I really think too much can not be said upon this subject.

In treating this subject, I will confine myself, chiefly, to a few obstacles that we meet with in testing for a creamery and system of skimming-stations, and a few practical points gathered from every-day work. In order to get correct results, we must first have a properly kept composite sample. Churned samples, samples with great clots of cream dried on the sides of the jar, and frozen samples in the winter-time, are simply evidences of one's incapability or negligence. The worst condition is the one first named, as it is impossible to get any satisfactory results from such a sample in the average equipped creamery. The other conditions require great care and skill in order to render the sample homogeneous. Composite samples can not be transported from station to main factory for testing, without churning them; especially where they have to be hauled overland. You must either go to the station with your tester or resort to other means. The method we employ is to take the required amount, 17.6 cubic centimeters, and put it in the regular test bottles at the station, cork them up with No. 1 cork and send them in to be tested. You will readily see that, even if these do churn, it will not matter. This method has advantages over the other method first mentioned.

With our samples in good condition, let us look to our tester and other apparatus. You must have a good machine and have it in first-class condition, always. You must be positive of the speed of this machine. If your speed is not high enough, the result will be incorrect and usually too low. After you are sure your machine is all right, examine your acid next, and be sure it is of the proper strength. It should have a specific gravity of 1.82 to 1.83. If below this, your result will be too low, and if above, it will burn and blacken the fat, in either case making even a correct reading impossible. Next comes the glassware, which the majority of us take for granted to be correct. It should be, and there should not be the least particle of doubt about it, but, from my own experience, I can say that it has not all been correct. I will mention some pipettes which we received, which contained a little over 19 cubic centimeters when tested, when they should have contained 17.6 cubic centimeters. We have also received test bottles which were not graduated correctly; have received in shipments, bottles with small holes in them near base of neck. How these bottles could be graduated, I do not understand. I think it is high time for this association to take this matter in hand and in some way provide a satisfactory guarantee to creamerymen and patron alike that the glassware we get be absolutely correct. But, until this is done, I would recommend that each creameryman test his own glassware as much as possible.

With our sample, tester, acid, and glassware all in proper condition, we should obtain a correct and clear test, if the operator be competent. One important factor in obtaining a clear test, especially in the summer-time, is the temperature of the milk sample and acid before mixing. The temperature is usually too high, and by cooling them down to about 60°, the chemical action will not be so violent, and a clear test will be the result. Also, the water must be clean, and soft water is the best to use in raising the butter fat up in the neck of the bottle, and I always obtain best results by making three runs of my machine. Fill your bottles to base of neck after the first five minutes of churning, then run for two minutes, stop and bring fat up in neck, then run for one minute to collect fat.

In testing cream, I use the common 17.6 cubic centimeter pipette, then add to the result whatever the Spillman scale indicates. This is the only way to get correct results where we have a wide variation in richness of cream of from 10 to 45 pounds fat to 100 pounds cream. The 18 cubic centimeter pipette gives correct results only where cream tests about 25 per cent. Great care must be taken in rinsing out your pipette, as a drop of cream makes quite a difference in results, especially where cream is of average richness. To get a clear test of cream, let your sample set awhile after it is mixed with the acid.

This will give the acid time to complete its action in clearing the fat.

In testing skim-milk and buttermilk, the main thing to look after is to see that your Ohleson bottle and pipette used are absolutely clean and free from the least particle of fat. The best way to clean them is to rinse them out with sulphuric acid before each test. Cleanliness of glassware is essential in any case.

The one to whom we must go with the details of the test is the creamery patron. One thing that most of the patrons do not understand is the variation of richness of milk from day to day, or from one test to the other. They are a skeptical class, and, as a rule, suspicious that the variations are caused through some fault of the apparatus or operator. We must educate them in the use of the test until they have full confidence in it and are satisfied with their returns. The sooner this is accomplished, the sooner will the creamery stand on a firmer base. In order to do this, they must have no doubt as to our competency to operate the test.

Would it not be well for us to follow some of the Eastern States in requiring each person who uses the Babcock test in dividend-making to first secure a certificate of competency? I think this would go a great ways in gaining the patron's confidence in the test.

## STATE CONTROL OF MILK-TESTING, AND INSPECTION OF CREAMERIES AND CHEESE FACTORIES.

HENRY VAN LEEUWEN, EFFINGHAM, KANS.

Mr. President, Ladies and Gentlemen: Our assistant-secretary wrote me a short time ago requesting me to prepare a paper for this convention on this subject, which I consented to do.

Mr. Forney thought the idea of the secretary was not the State control of the testing, but the inspection of the glassware and apparatus used in testing. I shall take the liberty of deviating some from my text, and try to give an outline of the work that could be done by one man acting as a State inspector and instructor.

Kansas has made a steady growth in the dairy business. The people interested in this business are wide-awake, energetic, up-to-date, and are endeavoring to push right to the front. We are striving to continually improve our goods. Our butter is recognized as first-class and the quality of our cheese is improving. But our goods are not perfect, and we do not have a perfectly uniform article. Also, all the leading dairy States are doing all in their power to improve the quality of their dairy products. I am sure we do not want to—we will not—be in the rear. We want to be well to the front of the column.

Our new dairy school is a strong proof of this. Our State realized that "our boys" must have thorough instruction if we would keep up with the procession. Our dairy school can do, and I am sure will do a great deal for us in this line. I am sure it will be time and money well spent for any one to take the dairy course. I care not how much experience he may have had, unless he be one of those "know it all men" that we occasionally meet even in the dairy business.

But there is a work our dairy school can not do. We, of course, want to make the work as practical as possible, but we can not have the troubles and difficulties come up as they do in every-day factory work.

What we need, and, in my opinion, must have, is some one to call on at such times. With the work of an inspector I would combine that of an instructor. Especially should we have access to an instructor in the cheese business at this time.

This person, acting in the capacity of an inspector, should call at the creamery or cheese factory and carefully examine the outside surroundings—whey-tank, skim-milk vat, buttermilk vats, etc. On entering the building the floors, vats, pipes, conductors, wash clothes, milk pumps, churns, and, in fact, all the machinery and apparatus should be carefully examined, and the condition of each article as to cleanliness and state of repair noted and record made. The operator should be with you in this examination and questions should be asked him. An examination of the operator, as well as the creamery, or cheese factory, should be made. Especially should this be true when examining the factories or creameries of dairy students with the view of granting them dairy certificates. One should also act as an instructor during the inspection; point out mistakes and suggest changes and improvements.

Perhaps you think there would be trouble ahead for a person going into a creamery or cheese factory in this man-

ner. I think not, if you put on your overalls and took right hold of the work and conveyed the idea that you were there for the purpose of helping and bettering the condition of the operator and his business.

As the milk comes in in the morning you should examine same and note how samples are taken and preserved. If there has been trouble in the flavor of the butter or cheese, a Wisconsin curd test should be made. You should then carefully follow the operator in the work for the day. In the afternoon he should make a Babcock test. By this time you would have a fair idea how the factory and creamery were managed.

You should now make a careful examination of the Babcock tester. Examine and test all the glassware and apparatus used. This work should be carefully done, and the apparatus not perfectly graduated should be destroyed, while that found to be correct should be thus marked. While making this test the operator could be taught how to test the glassware if he does not already know how. A certificate of inspection should then be granted, if the inspection is satisfactory.

As I said before, I think we should have an instructor so our boys could call on him in time of trouble, and as we now expect to take up cheese instruction at the dairy school, I expect we will have quite a number of students who have had but little cheese experience, enter the course and expect to take up cheese-making. They will meet with difficulties, and with the help of an instructor for a day or two, these in most cases could be overcome. We would also secure a more uniform article of goods.

The work, acting in the capacity of an instructor in the creamery or cheese factory, would be similar to that of an inspector in many ways. The instructor, though, should assume control while at the factory; receive and inspect the milk; reject off-flavored and tainted lots, but take samples for the curd test and show the patrons the condition of the milk.

If the trouble has been tainted or off-flavored goods, it would be well to hold a patrons' meeting. Discuss the care of milk. Have your curd tests there and show them the condition of the milk, and explain the effect of such milk on the quality of the goods and the loss it means to them. Other subjects of special interest to that locality could also be discussed, and a meeting of this kind could be made very interesting and instructive.

I think the subject is one in which we are all interested. It is a subject open for discussion; hence I will make my paper short. Let us have an expression from a score or more on this question.

I thank you for your attention.

## SKIM-MILK FOR HOGS.

J. G. HANEY, KANSAS EXPERIMENT STATION.

During the past year at the experiment station the value of skim-milk has been tested in the fattening of nearly 100 head of hogs. The hogs were bought of farmers in the vicinity of Manhattan, and were not above the average in quality. Aside from keeping very accurate account of all feed fed, and weight of hogs, the work was made to conform as nearly as possible to the conditions existing on the ordinary farm.

In the first test, which lasted three weeks, from February 2 to February 24, 18 head of hogs averaging about 160 pounds per head were divided as evenly as possible into three lots of 6 each. All lots were fed Kaffir-meal, and in addition, one lot was given alfalfa hay, another cottonseed-meal, and the other skim-milk. Valuing pork at \$3.50 per hundred, and the Kaffir-corn meal at 30 cents per bushel (56 pounds) as a basis, the alfalfa hay fed brought \$5.75 per ton, the cottonseed-meal \$27 per ton, and the skim-milk 40 cents per hundred. That is, the first lot ate 11½ bushels of Kaffir-meal, 250 pounds of alfalfa hay, and made a gain of 117 pounds, or .88 of a pound per day per head. The second lot ate 10½ bushels Kaffir-meal, 93 pounds of cottonseed-meal, and gained 126 pounds, or .95 pound per day per head; while the third lot ate 15½ bushels of Kaffir-meal, 1,685 pounds of skim-milk, and made a gain of 321 pounds, or 2.43 pounds per day per head.

These hogs had all been used in a previous experiment and were not in first-class feeding condition. But valuing the feeds at the retail prices at that time—Kaffir-meal at 55 cents per cwt., alfalfa at \$6 per ton, cottonseed-meal at \$20 per ton, and skim-milk at 15 cents per cwt.—we find the cost of gain to be as follows: The lot fed alfalfa hay, \$3.59 per hundred, cottonseed-meal lot

\$3.30 per hundred, and the skim-milk lot \$2.26 per hundred.

The second trial was from May 30 to July 11, forty-two days, with 80 head of hogs, averaging 125 pounds per head at the beginning of the experiment. The hogs were all bought near Manhattan, and as hogs of the class desired were rather scarce the average quality was very ordinary. While quality would not effect the comparative results, it undoubtedly cut down the average gains. These 80 hogs were carefully divided in four lots of 20 each and were fed and gained as follows:

Lot 1—Kaffir, whole, 6,736 pounds; skim-milk, 4,200 pounds; alfalfa pasture. Gained 1,411 pounds.  
Lot 2—Kaffir, whole, 6,601 pounds; skim-milk, 4,200 pounds. Gained 1,319 pounds.  
Lot 3—Kaffir, whole, alone, 5,321 pounds. Gained 834 pounds.  
Lot 4—Kaffir, whole, 4,931 pounds; alfalfa pasture. Gained 890 pounds.

The lots weighed practically the same at the beginning, so the difference in gain can be attributed to the feeds. The Kaffir was fed whole, as previous experiments had shown that it not only did not pay to grind Kaffir, but that grinding is an absolute detriment to it as a feed for hogs. Lot 3, which received Kaffir alone, can be taken as a basis to figure from. Valuing pork at \$3.50 per hundred, we find that the Kaffir eaten by lot 3 brought 30.7 cents per bushel. Allowing 30.7 cents per bushel for the Kaffir lot 4 ate, it leaves \$4.10 to the credit of the alfalfa pasture. With lot 1, allowing 30.7 cents for the Kaffir and \$4.10 for the alfalfa, leaves 20 cents per hundred for the skim-milk, and in lot 2, with Kaffir at 30.7 cents, the skim-milk brought 24 cents per hundred.

At the close of the experiment the hogs were weighed on the college scales and shipped to Kansas City, without feed in the car or after reaching the yards, and the shrinkage on 80 head was but 230 pounds.

Each lot was sold on its own merits July 13, and brought as follows:

Lot 1—Kaffir, skim-milk, and alfalfa pasture, \$4.10.  
Lot 2—Kaffir and skim-milk, \$4.075.  
Lot 3—Kaffir alone, \$4.00.  
Lot 4—Kaffir and alfalfa pasture, \$4.05.

Armour Packing Company made a careful slaughter test of the different lots and reported favorably for the skim-milk hog.

The feeding was all done in the open, twice a day, morning and evening. A feed consisted of all the hogs would eat up clean in an hour or so after feeding. The troughs were just the ordinary V-shaped plank troughs. The Kaffir was first poured in the trough and the milk poured over it. In the first trial the hogs were fed about 2 pounds of milk to each pound of grain, and amount fed varied according to the appetite of the hogs. The alfalfa hay was just thrown in the pen loose, and the cottonseed-meal was mixed with the Kaffir-meal.

In the second trial the lots receiving milk were given the same amount of milk each feed and the Kaffir fed was varied to suit their appetite. The two lots on alfalfa pasture each had the range of 1¼ acres, but apparently they made very slight use of it, much less than the gains show. A quarter of an acre would have undoubtedly made the same showing, as the hay crop was very little damaged by the hogs. The Kaffir used was the red variety. The milk came from the Manhattan creamery and was sterilized, so our conditions conform in every respect to the patron of the skimming-station, and we are very greatly pleased with the feeding of skim-milk to hogs.

We find no grounds whatever for any of the charges made against creamery skim-milk. We fed very regular and were careful to see that the hogs were not overfed. Careful feeding will do away with a great deal of dissatisfaction.

## Why Not Spend Christmas and New Years at Home?

The Nickel Plate Road will sell tickets to any point located in Central Passenger Association territory, at a fare and a third for the round trip, account of Christmas and New Year holidays, on December 23, 24, 25, 30 and 31, 1899, and January 1, with return limit to and including January 2, 1900. Students, upon presentation of proper credentials, can obtain tickets at same rate, with liberal return limit. Complete information may be secured by calling on, or addressing the General Agent, No. 111 Adams St., Chicago. (48)

A Phenomenon: "It's remarkable," said Senator Sorghum, "how differently people are affected by the same thing." "Have you been reading medicine?" "No. I was thinking of my speech. It kept me awake four nights, and put everybody who heard it to sleep."—Washington Star.

## CARE OF BOILER AND ENGINE.

JACOB LUND, KANSAS EXPERIMENT STATION.

In a steam-power plant, the boiler is the foundation, and should be given the greater share of attention. This is very seldom the case, but it often happens that little or no care whatever is bestowed on it. In fact, so far as my observation goes, a boiler is one of the most abused pieces of machinery that we can find anywhere, usually stowed away in the darkest or most inconvenient corner of the building or basement, or set beside the building in a shed lean-to, exposed to all the conditions and variations that the climate is subject to. Added to this are the strains it is subject to in the performance of its work, continued expansion and contraction of its parts by the heating or cooling of its surfaces, and the internal strains caused by the steam pressure within. These causes have a constant tendency to wear out the boiler. No wonder that if not properly cared for it has only a short working life.

## THE WATER.

The most essential thing in taking care of a boiler is to keep the water at the proper height. I would urge you most seriously never to allow your water to get low, because the most serious results might come from it. You may burn or overheat and thus weaken the plates, or crack them. Sooner or later, if not at the very time, damage and disaster would follow. If your fires should get in bad condition, or your steam get low, the consequences would be nothing near so alarming as too low water. It might, perhaps, stop the engine; it might cause embarrassment and financial loss; but that is of but small moment when compared to jeopardizing the lives and limbs of your fellow workmen and yourselves, and those depending on your efforts. Therefore always keep your water at the proper height.

From this it follows that whenever you start your fires in the morning, or whenever you take hold of your work, no matter whom you relieve, always be sure that your water is where it ought to be. Look at it and ascertain before you ever throw a shovelful of coal, or before you open the draft or stir your fire. Let it not be enough that you take a look at the gauge-glass and see it there, but be sure that the gauge-glass shows the actual level of the water in the boiler. You can not be sure of the water level in the boiler by simply looking at the gauge-glass. The gauge-glass is simply an instrument for convenience and should not be relied upon implicitly. Open the gauge-cocks, and see that the water flows freely from those it should flow from, and that the water is not higher than it should be. See also that the opening and closing of the gauge-cocks make the water level fluctuate in the gauge-glass. The reason you should do this is that the gauge-glass connections with the water column might be stopped, by being clogged with mud or dirt, or the valves might have been shut, either intentionally or unintentionally, thoughtlessly or maliciously, you do not know, but if you ascertain by the gauge-cocks where the water stands you ought to be all right. If you will always try your gauge-cocks before you go to work, and frequently while you are at work about the boiler, it will soon become a second nature to you, and you will do it automatically. Nor is it enough that when the gauge-cocks are opened and the water let out of the column, that it returns. It must return quickly. If it takes an appreciable time to find its proper level, then the water passages must be cleaned. But if you will heed my advice and open the cocks frequently there is very little danger that the openings will ever become clogged with dirt. Neither ought you to go to extremes in the other direction, by keeping the water too high. Never allow it to reach above the upper gauge-cock, or clear above your water-glass, for in doing so you endanger your engine, by leaving too scant a steam space. The sprays of water caused by the bursting of the rising steam bubbles will be entangled in the steam currents and carried along with it in its passage to the engine, and before you know it your boiler will be brimming and large quantities of water will be thrown over, that may be the cause of doing serious damage, and may even wreck the engine entirely.

## THE SAFETY-VALVE.

The safety-valve is a very important part of the boiler equipment, yet under certain conditions it may become valueless or even a source of danger. It must be attended to and kept in proper order. When the valve is used very infrequently it sometimes becomes stuck. A stuck safety-valve is a source

of danger, because you place reliance on it when it will not work. It should be blown frequently. Let it blow every day, even if you do not need to carry steam as high as it is set at. If the valve is of the common lever type, lift the weight and let it blow freely. If of the pop type, pull the lever attached to it. Never allow it to stick. If it leaks, grind it down, but do not load the lever with additional weight. It is useless and wasteful to have the safety-valve going a large share of the time. It is dangerous and wicked to load it down so it can not blow off at a safe point, and it is still worse to allow it to become stuck. It will not stick if allowed to blow full and free every day. It need to blow only a moment. In order to obviate the danger of overloading the safety-valve, the lever might be cut off at the proper length. It would then be easy to see if additional weight was added to hold it down.

## WATER-GAUGES.

Gauge-cocks and the gauge-glass should be kept clean inside and outside. They should be blown out many times a day, so that the water will show it quickly as soon as a cock is opened or closed. Blowing them out cleans them on the inside, and rubbing them with a piece of waste cleans them on the outside. A lime deposit often forms on the outside of the glass. This is because the packing around the glass is not in proper order. It may be tight enough but not good enough, or it may be good enough but not tight enough. The latter case is easily remedied by screwing up the gland on the stuffing-box. In the former case new packing is essential. All the valves should work easy, and the pet cocks should turn freely without leaking. The valve between the gauge-glass and the column should be turned often to keep the small passage in them free from sediment. Closing the upper valve and then blowing out the gauge-glass cleans the lower passage, and closing the lower valve and opening the upper, and blowing, cleans that. Care should always be taken so as to be sure that when the operation is performed the valves are both left open, otherwise the true water level in the boilers would not be shown. Should a water-glass be broken a new one should be put in immediately. It should be of the proper size so it will fit nicely. The glands should be packed well, so as not to leak. A soft rubber ring of proper size to make a good fit is a handy and good packing. Candle-wick well oiled is a fair substitute, and should always be kept on hand because it comes in handy in many cases. All gauge-cocks in the course of time become worn and leaky. They all have for a face some composition plug in them. This plug can be taken out or off, as the case may be, and a new one put in or on. In the absence of anything else a small piece of lead will remedy the evil. It will screw down on the valve-seat, and make a smooth water- and steam-tight joint. So there will be no occasion for having leaky gauge-cocks dripping. Fix them up.

## THE BLOW-OFF.

Next to the safety-valve and water-gauge, the blow-off pipe is the most important boiler attachment, and when it is wrongly arranged or improperly handled it is likely to give rise to a plentiful supply of trouble. In the first place, it ought not to be tapped into the end of a boiler an inch above the lowest point, so that the boiler can not be properly emptied, but it should be put in the bottom and the sheet reinforced by a flange, into which it is screwed. In a horizontal boiler, the nipple should be long enough to go below the ash surface. A short nipple brings a heavy strain on a boiler in case it should settle, while a long pipe will always spring some, in most cases sufficiently to make up for any small give in any direction. It ought also to be protected by a sleeve on the perpendicular part, otherwise the heat and attrition of cinders and ashes that are carried against it may abrade the surface sufficiently to weaken it in a comparatively short time. All blow-off pipes, no matter how situated, should be opened every day at least once, and if there be much trouble with mud or scales, oftener than that. They should be open long enough to blow out at least half a gauge of water. It is often supposed that the blow-off pipe is simply a drain-pipe, and its function in aiding to keep the boiler clean is often overlooked.

When water is impure and contains a finely powdered sediment which is of a light and flocculent nature, that is easily suspended in water, it is well to use the surface blow-off frequently. Many boilers are not supplied with surface blow-off pipes. If they are not, they ought to be put in as soon as pos-

sible. A surface blow-off is situated at the height that the water is usually carried in the boiler. It is well if the terminal can be enlarged and spread out fan-shape, as a sort of settling basin is thus provided, which will catch a large amount of the floating impurities. It is asserted by many good engineers that the persistent and judicious use of the surface blow-off enables them to double the time between cleaning. Manufacturers of skimmers claim to be able to remove all impurities from water by catching it on the surface. This claim is perhaps too broad, but it is a fact that a large amount of impurities in the water may be thus caught and blown out of the boiler.

## THE STEAM-GAUGE.

The steam-gauge is another important boiler attachment, and it is necessary to keep it in good working order and correct in its reading. It ought to be kept clean and bright that it may be the easier to observe its reading. The temper and elasticity imparted to the springs in the gauges is easily destroyed by the high temperature of steam. Therefore the gauge should always be attached by a bent pipe or siphon, so that nothing but comparatively cool water can enter the spring. Sometimes the water corrodes the spring and forms a scale in it, that may cause the spring to become stiffer, and when the scale peels off it becomes weaker. A gauge ought, therefore, to be tested for correctness once or twice a year. If the gauge reads correctly and the safety-valve is set at a known pressure one is a check upon the other. They should correspond at the point of blow-off. If the location of the boiler is much exposed, so there is danger of freezing in the winter, the gauge should be drained when not in use, as it is otherwise easily ruined.

## FIRING.

In starting a fire under a cold boiler it is well not to hurry it too much until steam is up, as the difference of expansion of the parts of the boiler that have contact with water, and the parts that do not have such contact, is very great. This has reference especially to an upright boiler, where it would be almost possible to heat the top of the flues red-hot, while the lower end would still be cold. After steam is up the circulation of it around the flues would tend to keep the temperature more nearly uniform. In the management of the furnace, the effort should be made to secure the best possible results. The fuel should be spread over the grate very evenly and the tendency to burn irregularly and into thin spots should be met by skillful firing. The smaller the coal the thinner should be the fire. The stronger the draft the thicker should be the bed of fuel. With too thin a fire we are apt to have an excess of air supply; with too heavy a bed, the coal is distilled and the unconsumed gases pass off through the chimney. In the former case combustion is complete, but the hot gases generated will be mixed with too much air and cooled and thus rendered unavailable. The best results demand a very perfect mixture of the gases with the air, and should this not take place, waste will be inevitable. It takes about 12 pounds of air to burn 1 pound of coal, depending on the quality of the coal. This, in case the mixture of the air and the gases were perfect. But in practice we can not obtain this result, and we probably use not less than about 20 pounds of air for every pound of coal burned, and from that up to perhaps 40 pounds of air, according to how well our fires are kept. This makes a needed volume of about 160 cubic feet of air and a used volume of from 260 cubic feet to 500 cubic feet. "In firing special care should be taken to see that the sides and the corners are properly attended to. The economy of boiler management is dependent on the skillful handling of the fuel and the furnace. Fires should be kept of even thickness and be kept clean. The secret of success in handling the fire lies in first finding the thickness of bed best suited to the kind of coal used and other existing conditions." The grate should be kept clear of clinkers, and the ash-pit free from ashes. Many a set of grate-bars have been warped and spoiled by leaving the ashes under them, and also red-hot glowing coals, which may have dropped through the grates in slashing the fires. The grates are thus heated from below as well as carrying a heavy fire on top. I have seen grates red-hot. No wonder they warp and bend and burn. If the ash-pit is kept free from a large accumulation of ashes, and if constructed so that the bottom will hold a little water, and it is kept there, then there need be no fear of burned grates. Banking a fire consists of fixing it so it will

last for a considerable period, usually over night. It would seem to be a simple matter to do so, but to bank a fire so it lasts well, so the fire can be started readily from it in the morning, with the least consumption of both time and fuel, and at the same time be easy on the boiler, requires some skill. A good way to bank is to push the good live coal back against the bridge wall, rake out the ashes and clinkers; then cover the fire left with green or damp coal to a depth of 6 or 8 inches; then close the fire doors, the draft doors, and the damper. Many firemen leave the fire doors open over night. This usually leaves the fires in good shape for the morning, but it is hard on the boiler and furnace, because currents of cold air are constantly striking the boiler and the hot furnace walls, causing the boiler to contract locally, bringing severe strains on the sheets and causing the furnace lining to shrink and crack. Let it be well understood that local expansion or local contraction is very severe on both boiler and setting; more so than general expansion or general contraction, as in the latter case the whole is giving uniformly, while in the former case there is a tendency for the parts to tear themselves asunder, setting up strains within the whole, and there is a tendency within the shell to buckle or stretch, as the case may be. I might as well remark here that in no case should the boiler or furnace be exposed to chilling drafts and cold air currents any more than is absolutely necessary. The proper amount of coal used for banking purposes must be determined for each individual case, and must be found by experience. Much depends on the proper fit of fire doors, draft doors, and damper. When these are of a good snug fit the amount of coal may be reduced to a minimum, because the air currents will then be insignificant.

## SYSTEM.

In caring for boiler and engine a certain amount of time every day ought to be allotted for each particular job. One thing that is frequently neglected is the cleaning of the flues. This is a dirty job and is often put off as long as possible, especially in a small plant, where the call for steam is not so great as to teach promptness in that particular line. But it is sure that if soot and ashes are allowed to accumulate in the flues or on the fire surfaces the heat is retarded in being taken up by the water, as soot and ashes are poor conductors of heat. Water will take up the heat several times faster from the plates than the plates can take it from the fire, and when soot accumulates in the flues the draft is impeded, thus lowering the capacity of the furnace as well as checking the efficiency of the boiler. The flues may be cleaned either by blowing the flues with steam or by scraping them or brushing them with a steel brush. If a blower is used, the flues should be scraped or brushed occasionally, as after awhile soot will accumulate as a scaly substance and greatly decrease the boiler's efficiency. Before starting to clean the flues make everything ready so the work can be done quickly. This is also a good time to notice the front man-hole or hand-hole and observe if there is a leak around it to eat away the flue sheet.

## WASHING THE BOILER.

The boiler should be washed as frequently as necessary. No rule can be given as to how often, as that depends on the quality and quantity of the water used. The purer the water and the less used the longer can be the interval between washing. I would not advise to blow the water out of the boiler under pressure, with the idea that the mud will be blown out. Better let the boiler cool down over night if possible and let the water run out the next day. In the first place the boiler and furnace are hot, and the mud left in the boiler is likely to bake on the shell and the flues and form a hard scale, and if cold water is then immediately put into the boiler the contraction is too violent, and may cause cracks in the plates and ruin the boiler, while if the boiler has been allowed to stand and cool off over night it can be drained and washed without fear of injuring it, and the mud left in the boiler after draining will not bake on the shell or flues before it can be washed out, but will be in such condition as to be easily removed by water, thus leaving the boiler with less hard scale to remove. After having washed the boiler great care should be taken in getting the man-hole or hand-hole plate tight again, so that there will be no leak to corrode the boiler. The old gasket should be thoroughly removed before the new one is put in. The cutting and corroding action of escaping steam or

hot water under pressure is far greater than most people imagine.

#### INSPECTION.

In Kansas we have no inspection laws and no license laws for engineers. There are, therefore, many who have the care of boilers and engines who have but a slight knowledge of their strength and of the strains they must sustain. I would, therefore, advise every owner of boilers to have them examined every year by a competent man, and it is well to have them insured. A reliable insurance company will not take risks on a boiler not warranted by its condition. Do not believe that because the man who has taken care of your boilers to your satisfaction for a year or longer is always competent to judge of their condition. Boiler-testing is a special trade, and any one who undertakes it should understand the making of a boiler in all details—the proper form, number, size, and distribution of brazes, and manner of putting in man-holes or hand-holes, so as to weaken the boiler the least possible. He should know the strength of material, understand the proper junction of joints, the size and spacing of rivets, and the quality and condition of the workmanship on it. He should be equally familiar with making a water test as a hammer test of a boiler. It requires the trained ear to distinguish a bad plate from a good one by the sound it gives out when tapped with a hammer. It requires a sensitive touch to feel the stoppage of the vibration of a plate caused by an incipient crack as the inspector's fingers glide along the plate a few inches in advance of the hammer with which he is sounding the boilers. To facilitate the work of inspection, every boiler should be easily accessible. It is to be hoped that Kansas some day in the near future will have some sort of a boiler inspection law or a license law. It would prove a saving to owners of this class of property.

#### THE ENGINE.

It is not nearly so serious a matter to take good care of the engine as it is to care for the boiler. If the man who runs it likes his work he will take pride in keeping it looking well, and to do that one is obliged to go over every part of the engine daily, wiping it clean, and rubbing the polished parts to keep them bright. He will at the same time be on the lookout for any loose set-screws or nuts, bolts, keys, or anything that is not as it ought to be. He soon becomes acquainted with every part, and knows where to look for defects. It is an old saying with many that it is best to leave well enough alone, and that when the engine runs well not to tinker with it. That is true to a certain extent, but it must be obvious to every one that at some time or other this can not hold good, and that an incipient fault should not be left alone until it becomes clear to every one around. Time should be taken by the forelock; the engine should be examined in all its parts frequently and the engineer should not wait to do that work until the engine itself speaks for it. All brasses should be taken off and examined occasionally. They will wear some and may not wear true; or, if they be rough, they should be scraped smooth, but do not use sand-paper or emery-cloth to smooth them with. If you do, you may count on more trouble later on. The file and the scraper are the proper tools to use.

#### OILING.

All oil holes should be examined so they do not choke with dirt and grit, and all oilers should be well covered so that nothing like dirt can get into them. There is always more or less dirt in an engine-room, and all the wearing or moving parts of the engine will catch some of it, and a gummy substance is likely to form and clog the oil passages so the oil does not reach the bearings in proper quantities, and the tendency to cutting and heating is correspondingly increased. It always pays to use a good oil, and to use enough of it to insure well lubricated moving parts. This holds good as well with the internal parts as with the external parts. Both valve and cylinder should have a fair amount of a good lubricating-oil. Cylinder oil ought to be of 600° test, and should be fed at the rate of about a drop a minute for every 10 or 12 horse-power work performed on engines rating from 10 to 50 or 60 horse-power, and somewhat more on smaller ones. Should the engine groan under such conditions, then it is probable that it does not get dry steam and there has been water in the cylinder, which has washed out the oil, or else the piston-rings have worn and need doctoring some. They ought to be looked after once in a while to see that they do not wear sharp on the edges, for then they perform a scraping operation every time they glide

backward or forward over the cylinder surface, scraping off the oil and part of the cylinder wall, and causes groaning in the engine. A few strokes with a file on the sharp edges of the rings will make them slightly rounding and will remedy the evil. At the same time it is well to examine the cylinder itself, and see that no grooves are wearing in its surface, that it remains round and true in all its part, and that the counter-bore is deep enough so that no shoulders will be left when the engine has seen much wear, for that will cause thumping. Notice also the valve and valve-seats, if they are wearing true; if not, they should be scraped to a true surface. The piston-rod and valve-stem ought to be well packed with a soft elastic packing, which ought not to be screwed up too tight. A hard or burnt packing will score and groove the rod or stem, after which it is hard to keep them tight. Do not use a long and strong wrench to screw up the packing-gland with. You ought to be able to screw it almost tight enough by the hand alone, if in such position as to be able to get a good grip. It does no harm if there be a very small leak; better that than scored rods.

#### WEAR.

To take up any wear on any box that is set up by a key on an engine, place the engine in such position that the parts of the box is on the line of least wear. Then you will not be in danger of getting the bearings so tight that it will heat when the engine is started. Thus when taking up the wear on the crank-pin brasses place the engine on the center. If taking up the cross-lead brasses, place the engine at quarter-stroke, which is the extreme point of swing of the rod and has least wear.

#### DRY STEAM.

Every precaution should be taken to give the engine dry steam, not only because water clogs the machinery, but more on account of its cutting action on the internal parts and the piston-rod and valve-stem. Water is the great enemy of the steam-engine, and has wrecked many a one. It pays well to have all pipes leading to the engine properly covered.

#### THROTTLE-VALVE.

Do not run with the throttle-valve partly closed. The governor should take care of the amount of steam given to the engine. If it does not, it should be examined and put in working order. If the engine races, the fault lies in the governor. Take it apart and clean it thoroughly; see that all its parts move freely when in position, and do not forget to oil it, any more than you would forget to oil any other part before starting the engine, or as often thereafter as needed.

#### STARTING.

The engine ought to be started slowly to give it time to warm up and get rid of the water of condensation before it reaches full speed.

There is much more to be said on the subject of caring for boiler and engine. But this must suffice for this time. I will only add the first, as well as the last, great care of the engineer is to keep the plant looking clean and neat. The one who tries to do that, I am confident, will notice any little thing that needs attention and will be sure, somehow or other, to put it in good working order; while the slipshod, slovenly fellow will not even notice that anything is wrong, until the boiler or engine itself calls so loudly for assistance that even the neighbors can hear it.

### THE RESULT OF FIFTY COWS PROPERLY HANDLED.

F. F. FAIRCHILD, TONGANOXIE, KANS.

In order to be successful in any kind of business, a person should require judgment, punctuality, and regularity. Without these no man can be successful. Judgment in the dairy business means how much, or how little, and a thousand and one other things. Punctuality means just so early, or just so late, and never to neglect things. Neglect has ruined many a dairyman. Have some regularity, some system, about your business. Without it you can not be successful. There is no business that requires more strict attention than a dairy, not only to-day but to-morrow and every day during the year. In order to make money we have to get down to a systematic business and stay with it. A fortune is not often made in a day, but it takes years. We started in the dairy business for ourselves twelve years ago. We have not made a large fortune, but we have made one of the most productive farms in Leavenworth County. We started with 3 horses and 15 cows, on a farm of 90 acres, with an indebtedness of \$3,000, bearing interest

at 7 per cent and 8 per cent. Seventy acres of the farm were under cultivation, 20 acres in timber. It was not long until we had 20 cows, and 10 acres of the woodland to good blue-grass. Today the 20 acres are all in grass, and we have bought another 10 acres, which I am having cleaned this fall, and will seed in the spring. In six years from the time we started we were all out of debt, never failing to pay interest or notes promptly when due, with money made from the products of the dairy. I have never had the blues one day or lost one hour's sleep worrying about our financial business. I had something else to do, something else to worry about. I think I made money faster than now, for I did the work myself. I find it very difficult to get milkers that will get on good terms with all of the cows. I have to hire all of my help.

In the last few years we have been keeping about 50 cows. We have the most of them to come fresh in the fall. We seldom ever have a dry cow in winter, every one of them in the stable paying for their feed in milk; if not, they soon go to the butcher and fresh ones are put in their places. We are not heavy feeders, but continual feeders. Our cows are always hungry; they never leave any grain or hay in their mangers. There is not enough feed wasted around the barn to keep a mule alive. What we feed is good and the cows like it. We have tried all kinds of feed—dry corn-stalks cut and soaked with water, and also hay—but like nothing better than corn-meal, bran, clover hay, and sorghum. We have lost only 2 cows in the last three years, so you see they are healthy. We are feeding 13 pounds of corn-meal and bran mixed, two-thirds meal and one-third bran, with a good feeding of first-class clover hay in the morning, and then they are turned out to water and fed a load of sugar-cane. They are kept in the stable when it is cold and turned out only to drink. The water is pumped fresh from the well and drank while yet warm. We use 2 pumps, a windmill and a hand-pump, on cold days to get warm water from the well. We feed sorghum or green corn when the grass is short, stable the cows every day through the summer, and give them 4 or 5 pounds of grain. These cows are milked at 5 o'clock in the evening and 5 o'clock in the morning. They are turned out every night in summer to graze. The milk is shipped to Kansas City once a day, at 3 o'clock p. m., and not put on the milk route until the next day. That makes night's milk 36 hours old when it is first put out; then it has to be saved twelve hours longer, which makes it 48 hours old. Milk that is required to stay sweet that long has to be properly handled. We use no patent milk-cooler. We cool it in a large tank of cool running water as soon as it is milked. The milk is stirred every time the milkers empty their pails. When they are through the milk is cold; it is then put in a large tank made of brick and cement, in a stone spring-house, cold water running through the tank all the time. We never use ice. The milk brings 7½ cents a gallon in summer and 8½ cents a gallon in winter. I could do as well by sending to the creamery, for then I could raise the calves and save some good cows. Now I have to buy the cows and sell the calves to the farmers. I have bought some of them back after they were old enough for cows. We haven't a kicking cow in the barn; never have to tie their legs. Kind treatment makes kind cows. The first six years we were in the dairy business we used the milk in all kinds of ways. We had no established market for it. We made butter, and raised calves and pigs. So you see the old cow will make you money if you stick to her. I prefer shipping the milk, as our farm is not large enough to keep the calves, and it is less labor, as we do not have the calves or hogs to bother with. For you see we are making milk, and good milk, too, testing from 14 per cent to 16 per cent. We are not in the wheat business, potato business, but strictly in the milk business, taking care of the cows and making every gallon we can with as little expense as possible. Three of us take care of the cows, a man, a boy, and myself. I buy nearly all of the grain. We raised 500 bushels of corn this year, and almost all the sorghum the cows will need, besides pasturing them on 115 acres. We made from May 1, 1897, to May 1, 1898, 42,430 gallons, and from May 1, 1898, to May 1, 1899, 40,430 gallons from the 50 cows. It brought us \$7,028.80. Calves sold in the two years for \$400. They were mostly Durhams. They brought \$5 and \$6 a head. The cows made us about \$71 a head per year for the two years. They

## A Dairyman's Profits.



There is more money in working your head than your hands. There is more butter in running a

#### LITTLE GIANT CREAM SEPARATOR

than in skimming by hand—25 per cent more. The Little Giant costs no more than the pans will in the long run. It will pay you to adopt modern, up-to-date dairy methods. Send for Catalogue No. 19. It's free.

The Sharples Co., P. M. SHARPLES,  
Canal & Washington Sts., West Chester, Pa.  
CHICAGO. U. S. A.

have made from the first of May to the first of this month 21,580 gallons that has brought us \$1,618.50. We have also sold \$140 worth of calves. The cows are not all fresh, but will be by the first of January. They are not all doing as well as usual this fall. I think they are on a strike for more feed, and they will get it sure. We are only feeding 13 or 14 pounds of grain a day now.

The subject assigned me for this paper was "The Result of Fifty Cows Properly Handled." The results are, the cows have made us a good living for twelve years, and a good farm, well improved and stocked, that will keep any family their lifetime if rightly managed.

### DOES DAIRYING PAY IN THE SHORT-GRASS COUNTRY?

JAMES T. ROBINSON, SALTVILLE, KANS.

This question, for the past few years, has been discussed, perhaps, more than any other line of business the farmer is engaged in, and I believe that some farmers think that it does not pay. The object of this paper is to demonstrate, by facts and figures, that dairying in the short-grass country does pay—pays better than any other branch of farming.

We have a dairy of 30 cows, grade Durham, no better, perhaps, than the average cows throughout the country. To January 1, covering a period of nine months, they have produced a trifle over 6,000 pounds of butter fat, being an average of 200 pounds per cow. For this we received from the creamery \$915, or an average of \$20.50 per cow. We raised 30 calves, which would readily sell at the present time for \$20 per head, making an average income per cow of \$50.50. We fed, besides thousands of pounds of skim-milk to the hogs. This is not figured in this statement, but considering that three months yet remain to conclude the year's record, and putting the value on this skim-milk, our average income per cow for the year will easily reach \$60.

I wish to state here, that we have never tried to make dairying a specialty, but simply kept the dairy for the purpose of making a good living. While our young stock were growing up to a marketable age, and during the sixteen years that we have depended on our cows, in Kansas, they have never disappointed us, for when all kinds of corn crops failed, as they did very frequently, the cows never failed us, and whatever prosperity we enjoy to-day, is due to a kind Providence and the cows.

These cows were kept on wild grass pasture during the summer season and in winter were stabled in a good warm stable, with all the alfalfa and Kaffir-corn hay they could eat, and a ration of 5 quarts of corn-meal and bran, equal parts, twice a day. On cold days they were kept in the stable and on warm days they were turned out in the yard, from about 9 o'clock in the morning until 4 o'clock in the afternoon. In feeding we give them alfalfa in the morning and Kaffir at night during the feeding season.

We have raised nearly all kinds of feed that Mitchell County will produce, and find that next to alfalfa the Kaffir-corn is the best for milch cows, when properly handled.

We sow our Kaffir-corn from the tenth to the twentieth of June, using 1½ bushels of seed to the acre. In ordinary seasons, it is ready to cut just before the first frost. We let it lie on the ground until it is well cured, then stack it in about 6 or 8 ton stacks.

In conclusion, let me say to the farmers of the short-grass country, stay by your cows and your creamery—two of the best things we ever had. Be as liberal as possible to both—liberal in your care of your cows, making you a liberal patron to your creamery.

Constipation leads to liver trouble, and torpid liver to Bright's disease. Prickly Ash Bitters is a certain cure at any stage of the disorder.

### A VISIT TO AN EASTERN MILK FARM.

F. D. COBURN, SECRETARY KANSAS STATE BOARD OF AGRICULTURE.

Mr. President, Ladies and Gentlemen: It is one of my peculiar weaknesses to believe in Kansas; to believe in the Kansas cow, if you please; but I much more believe in the men and women of Kansas, and especially in the young men and young women of Kansas. I was proud as I sat here and listened to the delightful music made by the young men and young women, which made me more than ever glad that I live in Kansas. And also when I saw those beautiful Sunflower damsels go through with their graceful evolutions I was convinced that they are the sweetest things in the world. (Applause). As I watched their rhythmic movements and looked into their bright eyes I was filled with one regret, just one, and that was that I was not Lieutenant Hobson. (Applause).

And now after speaking of the young ladies, let me refer to the Kansas young men. I wonder how many who are here in the audience who missed hearing that splendid address this afternoon by that bright young man, D. H. Otis. Ex-Governor W. D. Hoard, of Wisconsin, is probably accepted as the highest dairy authority in this country, and when I say that, that means in all the world. I saw Governor Hoard in Chicago a few days ago in a hotel, momentarily, and his mind seemed to be occupied with one little story that he wanted to tell me before the train left. He said: "Coburn, you have a man out there in Kansas who is doing more real good work, that is of actual benefit to students of the dairy industry, than any in the United States. I never met him that I know of, and I only know him by the work he is doing, as the reports of it come to me filtering in through the office of Hoard's Dairyman." I said: "Who in the world is that—which one?" I knew we had them, but I did not know which one he had in mind. He said: "His name is Otis." Of course I proceeded to tell him that Dan Otis was one of my boys. He was glad to hear it. This is as high praise as I have ever heard for any man in any line of work. It made me, as I intimated before, feel very proud.

While in attendance as a delegate to the National Farmers' Congress, recently held in Boston, it was my good fortune to meet and be for a time the guest of Mr. Geo. H. Ellis, proprietor of an extensive Boston printing house, who lives on what he calls Wauwinet Farm, where in many respects he has the best equipment for the production and supplying of high-grade milk direct to a large number of patrons it has been my privilege to see, and as some of his methods, his environments, and the surrounding conditions are so different from those to which we of the Central West are accustomed, I questioned him closely on many of them, and give you some of the interesting information gleaned.

This farm is situated almost in the geographical center of the city of Newton, Mass., about 8 miles from Boston, and is the result of a systematic attempt to furnish, direct to consumers, absolutely pure milk of the highest quality produced, bottled, and delivered under the most favorable conditions. From a beginning with 4 cows, furnishing in 1891 milk for the proprietor's family and allowing of the sale of about 16 quarts per day to neighbors, it has grown to a total daily output now of about 1,600 quarts, all sold and delivered within a radius of 3 miles from the main farm. Where in 1891 the stock was all kept in a small shed, to-day three farms, with extensive barns, are required for the accommodation of the herd, and new buildings, equipped with the most modern devices and machinery, are used in the conduct of the business.

At the home farm, 150 of the best milking cows are constantly kept, while at farm No. 2, 5 miles away, are kept the cows giving the least milk. Farm No. 3 is 16 miles away, and here are kept the dry stock and young things. No. 2 has a capacity of 70 cows, while at No. 3, 100 head can be accommodated. Between these 3 places are now kept about 330 Jerseys, or Jersey grades, producing milk which averages by chemical

analysis nearly 15 per cent total solids and 5 per cent of butter fat. A few cows giving less rich milk are kept for the special purpose of furnishing milk for infants. The cows are not driven, but moved from one farm to another in specially built wagons, carrying 6 cows at a time. A load is made up at the home farm of the cows giving the least milk, and these are taken to No. 2, where they are exchanged for the same number of nearly dry cows, which are transferred to farm No. 3. Here a load of fresh cows is taken on and returned to No. 1, the entire trip consuming a day.

The main farm, where most of the milk is produced, and which is headquarters for its distribution, consists of 25 acres, and has 3 adjoining barns, the largest of which, 1-story with monitor roof, built in 1896, is 127 feet long and 85 feet wide, and contains 92 pens, each 7 feet by 9, similar to box stalls, in which the cows are never tied. Each pen is supplied with a hinged manger, which, when not in use, is turned outward, thus excluding all dirt, and a drinking-trough with a self-closing galvanized iron cover, easily raised by the cow's nose, furnishes a constant water supply.

There are no floors to these pens, but over the surface of the ground—which is part loam and part gravel—are spread about 4 inches of sand; and over this is a good layer of planing-mill shavings. In cleaning the barns, the droppings and dirt are gathered every day in a cart specially built for the purpose, which is driven through the alleys; fresh shavings are supplied, and usually once in from four to six weeks a more thorough cleaning is made, and fresh

after being carefully weighed and credited to the cow that gave it, on a monthly milk sheet posted convenient to her stall, is emptied into a tank at the end of the barn, next to the bottling-room. On entering and leaving this tank, the milk is strained through 4 thicknesses of cheese-cloth, and is piped through the partition into the bottling-room to the distributing trough of a Star milk aerator and cooler. This apparatus, which aerates the milk and gradually but quickly reduces its temperature, consists of a double corrugated surface of sheet copper, heavily tinned, through the inside of which is forced a continuous stream of cold water or brine while the milk passes from the distributing trough in such a way as to flow over the entire surface in a thin film, leaving the cooler at a temperature suitable for immediate delivery. By the construction of this cooler, the water or brine is forced upward through the inside of the cooler while the milk is flowing downward over the outside, thus affording the most gradual and continuous reduction of temperature. The extent of surface is sufficient to insure the milk leaving the cooler at a temperature only a few degrees higher than the temperature of the water or brine within.

This apparatus is cooled by brine from a refrigerating plant manufactured by Westinghouse, Church, Kerr & Co., of a capacity equaling the melting of two tons of ice each twenty-four hours, which effects a reduction in the temperature of the milk from 95° to about 36° during the few seconds required for its passage over the surface of the cooler. When the bottling is completed the temperature of the milk in the bottles is about 40°. This is, of course, a much

gasoline engine has been in operation for more than two years, during which time it has cost almost nothing for repairs, and has easily furnished all the power required for the electric lighting, refrigerating, and other machinery of the farm at an average cost of about 60 cents per day.

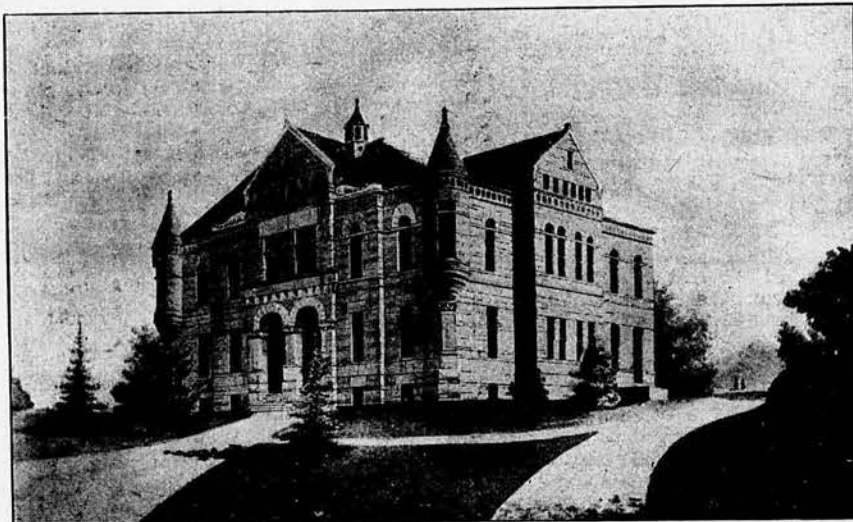
The heating of the bottling-room, engine-room, 7 chambers for help, and a smoking-room for the men, as well as the supplying of hot water for the washing of bottles and all other purposes required, is effected by a Winchester heater, durable, easily operated, and economical.

The milk, on leaving the cooler, is bottled quickly and automatically by means of a Child's patent milk-bottle filler. The milk flows from the cooler into a large tinned copper tank, in entering which the milk is again strained through cheese-cloth. This tank runs on wheels on a track over a slab on which the milk-bottles are placed in rows of 8. In the bottom and at one end of the tank is a row of valves fitted with rubber caps, which, by means of a lever, are pressed down tightly over the mouth of each bottle in the row, while by the same movement of the lever the valves are opened, allowing the milk to flow into the bottles. Since the automatic valve seals each bottle tightly while in position, when a bottle is filled it does not overflow; and when all the bottles in a row are filled the milk ceases to flow. The lever is then raised, closing the valves and raising the tank, which is wheeled into position over the next row of bottles, and the process repeated. An air-vent destroys all foam, allowing the bottles to fill, leaving just room enough for the paper cap—used to close the bottles—to go on without spurting. The "common-sense" wide-mouthed milk-bottles are used, having no cover, being easily and quickly cleaned, and sealed with a heavy wood-fiber paper cap, prepared to resist moisture from within and without, and which, when pressed into the neck of the bottle with the thumb, is held in position by a shoulder blown in the bottle. This forms an air-tight cover, which will not leak, no matter in what position the bottle is placed. The caps can be instantly lifted out by a pen-knife or any sharp instrument, and are so inexpensive that they are discarded after once being used.

The delivery of milk is made night and morning, 4 low-down wagons being used, each starting out as soon as it can be loaded, so that much of the milk reaches the consumer within an hour from the time it leaves the cow.

Situated as the farm is, in the midst of high-priced land, the feed problem is a serious one. At the home farm, the land of which is worth from \$4,000 to \$8,000 per acre, and on which the taxes alone are \$28 per acre annually, the cows are fed in the barns all the time, although they are turned out in a 5-acre lot for exercise every week-day in pleasant weather. This lot, by the way, is little more than a stone-pile or ledge of rock, and is without any sort of vegetation excepting some trees. In winter the daily feed is from 30 to 40 pounds of good ensilage, 8 to 12, and in a few individual cases, as much as 16 pounds of mixed grain in 2 feeds, immediately after milking, and all the good hay, principally clover, that the cows will eat. As soon as good soiling crops can be had in the spring, they are largely substituted for the ensilage, although, preferably, a small quantity of the latter would be fed every day. The soiling crops are, first, winter rye, then winter wheat, followed by clover, and peas and oats, which are sown at various times (beginning as soon as the frost leaves the ground), until good, fairly-matured sweet corn can be obtained. This is then the main reliance until frost comes, then ensilage made from field corn when the fodder is yet green but the ears are well glazed, is resumed. The total acreage of land owned and leased is about 800 acres.

In view of the feeling sometimes expressed, that the conducting of dairy farms upon such lines as these must be the result of a hobby and can not be profitable as a mere business venture, it is only fair to say, the owner tells me, that, while Wauwinet Farm has undoubtedly been developed by the deep personal interest of its proprietor in the problems of a perfect dairy system, its results are such as to amply justify the prosecution of an experiment so congenial to its owner's taste. The enormous increase in the business has come about without the aid of advertising or special effort to secure trade. The milk is sold at 8 cents per quart, 1 to 2 cents higher than the price obtained by other producers in the same field; and the de-



AGRICULTURAL HALL, KANSAS STATE AGRICULTURAL COLLEGE.  
(Containing the Dairy Department.)

sand supplied. In the older barns the cattle are confined by what is known as the Prescott stanchion. Here the cows stand upon 8 inches of sand, laid upon a concrete floor, with a gutter behind the stalls which is thoroughly cleaned every day. The barn cleanings are dumped from the cart into a large wagon, and are immediately carried to the outlying land. It is found that these individual pens are much superior to stanchions, and in any cow-barns built on the farm in future there will be pens instead of stanchions, as experience indicates that the cows not only seem much more comfortable, but actually give more milk in the pens than in the stanchions.

The employees are all dressed in white duck suits at milking time, and are required to keep themselves and their cattle scrupulously clean, the cows being thoroughly groomed every day. Each man milks 15 cows, commencing at 4 o'clock a. m. and 3 o'clock p. m., and occupying nearly two hours at each time.

Adjoining the barns is a 2-story house, about 25 feet by 50 feet, containing a bottling-room, engine-room, cold-storage room on the ground floor, and rooms for the help in the upper story. Behind the barn is a silo, 24 feet in diameter and 40 feet deep, holding about 500 tons of ensilage; and there are several out-buildings for calves, bulls, etc. Sixteen horses are quartered in the large barn, and 5 bulls—all registered Jerseys of the best known milking strains—are kept for the service of the herd. Beyond the bottling-room is a good-sized boarding-house for the help, and in this the farm office is located. On the 3 farms from 28 to 35 men are regularly employed, according to the season; and extra help is employed during ensilage cutting. Most of these men are permanently quartered on the home farm.

During milking each pailful of milk,

lower temperature than could be reached by the use of water in the cooler; it is, in fact, possible to flood the cooler with brine cold enough to freeze the milk in its passage.

This refrigerating apparatus, or process, is similar to that by which artificial ice is made; and, in addition to the use made of the brine in connection with the milk-cooler, the compartment which contains the brine tank, being kept at a temperature of about 40°, forms a perfect refrigerator, used for the storage of milk. The expense of such a process, Mr. Ellis says, is almost entirely in the first cost of the plant, as it does not require recharging with ammonia or a resupply of brine oftener than once a year.

The refrigerating plant is operated by an Otto gasoline engine (size 5 B), of 13½ actual horse-power, which also furnishes all the motive power required at the farm. In addition to running the refrigerating compressor and brine pump, it operates the dynamo, separator, and 2 water pumps. The great value of this engine is its occupying but small space; its simplicity requiring no engineer, being run by an intelligent operative, and its extreme economy. All the barns and building at the home farm, including the proprietor's house, are lighted by electricity, which is furnished by a 10 horse-power Eddy dynamo run by the gasoline engine. In addition to running the electric lighting plant, the dynamo also furnishes power through a 7½ horse-power Eddy motor, which is mounted on a portable car, and operates the machinery used in cutting corn for feed and for the silo. This motor has replaced a horse treadmill formerly used in cutting the fodder, and an engine formerly required for cutting ensilage. The dynamo has proven satisfactory and economical in the highest degree, being entirely automatic, and requiring no skilled labor for its operation. The



mand has from the first been in excess of the capacity for production.

Whenever additional cows are needed they are watched for and bought in Brighton Market, the name by which the Boston stock yards are known.

It is the aim to have all the cows dry from four to six weeks, but much depends upon the individual. Some of them it is impossible to dry at all; with others it pays better to dry them off even for eight or nine weeks.

The profitable years of a cow's life are found to be from 4 to 10, but there are many exceptions to this rule.

It has been found difficult to determine the minimum average quantity of milk per day for 365 days, that would warrant the proprietor in retaining a cow. Something depends upon the breeding, but more upon the fact that not infrequently a cow purchased this fall, for instance, with every promise of being a good cow, does not turn out satisfactorily.

Analyses of 7 samples by Dr. Hudson, milk inspector of the city of Newton, about three weeks since, showed as follows:

Table with 3 columns: Sample No., Total solids, Butter fat. Rows 1-7 and Average.

All of these samples were afternoon's milk. Mr. Ellis thinks that the quality of the morning's milk possibly is not quite so good.

Some cream is also sold, in half-pint bottles at 15 cents each, or 60 cents per quart, testing 40 to 45 per cent butter fat.

All milk and cream bottles are returned, the drivers collecting on each round the empties from the preceding delivery.

As the cows at the home farm are stall-fed all the year, it has not been practicable to make an exact comparison of winter and summer yields, but the best judgment is that there is practically no difference.

Much of the corn from which the ensilage is made for these milch cows is raised on farm No. 3, 16 miles away, and is hauled by 6-horse teams, 6 tons to the load, requiring a long day to make one round trip.

30 feet deep, costing when ready for use \$315; the other 24 feet by 30 feet, costing \$345. A still later one, 30 by 35 feet, on a cheaper plan, cost complete \$320.

The only ill-flavor or odor in milk from ensilage is when beginning to feed a cow sufficient care is not used to begin gradually, and to feed immediately after milking.

The grain or ground feed given varies somewhat in its components, consideration being given to cost, and the analysis of the roughage being used at a given time.

The prices per ton paid, delivered, at present are:

Table with 2 columns: Item, Price. Items: Best bran, Best middlings, Cottonseed-meal, Linseed-oil meal.

At the earlier price of \$16 per ton the H. O. food was considered fairly economical, but at the present price of \$19.60 per ton it will not be used.

The wages paid the men on the farm, besides their board, are, for milk-drivers, \$25 per month, with a bonus of \$60 at the end of each year's service provided the work has been satisfactory.

Now, I have not related these observations nor given these details because of believing that it is practicable for a single cow-owner in Kansas to follow closely along the same lines that this Boston man follows, and I do not suggest for a moment that in most things we should especially imitate him.

Statistics for our State, figures furnished by the cow-owners themselves—which by the way I believe entirely too small—indicate that the Kansas milch cows, one with another, yield a dairy product averaging in value less than \$10 per year, and the figures of our creamerymen that the cow-owner who realizes \$25, \$30, or \$35 per year from his cows, regards himself as quite a successful manager, and the owner of somewhat superior stock; that if his cows, regardless of its quality, give from 10 to 15 pounds of milk per day for 250 or 275 days in a twelve-month, he is a man after whom to pattern, or to be jealous of, as the case may be.

It is well worth thinking about that this Yankee, with a herd of 150 cows, in such a rigorous climate, can so breed, and feed, and milk them that one with another, the poor, the medium, and the good, the fresh and the farrow, the heifers and the old, shall average for every day in the year 7 1/2 quarts of 5 per cent milk, and that his manipulations of them, and his good name, enable its selling, winter and summer, for 8 cents a quart, or from 25 to 35 per cent more than is paid to his neighbors who are in the same business.

worth of milk product in a year, but here is a man, not trained to the business, yet strictly a business man, who mixes his bran with brains, maintaining an extensive herd, larger than any I know of in Kansas, who so manages it that the yearly gross income from each cow is nearly \$219.

We do not have his 8-cent market for our milk, but in well-nigh every other respect we have advantages innumerable to which this man without accessible pasture, who feeds \$4-ensilage and \$20-bran must by the very nature of the circumstances be a stranger.

THE BUTTER EXHIBITS.

Prof. McKay, of the Iowa Agricultural College, who acted as butter judge, spoke on the "Butter Exhibits." He first alluded to some of the subjects that had come before the convention, endorsing the idea of a State inspector, and calling attention to the necessity of proper cooling and aerating milk immediately after coming from the cows. He advocated

strongly the use of either a commercial or home-made starter at all times in order to get the right kind of fermentation. Three tubs of exhibition butter were on the platform, and he called the butter-makers forward to examine them critically. He spoke about the fine body and quality of the sweetstake butter, and alluded to the pasteurized tub as not as high in aroma, but having a palate flavor to perfection.

THE BUTTER SCORE.

By Prof. G. L. McKay, of Iowa Agricultural College.

Large table with columns: Address, Flavor, Grain or Body, Color, Salt, Style p'k'ge, Total. Lists various exhibitors and their scores.

THE CHEESE SCORE.

By Prof. G. L. McKay, of Iowa Agricultural College.

Table with columns: Address, Flavor, Grain or Body, Color, Texture, Finish, Total. Lists cheese exhibitors and their scores.

**FEEDING AND DEVELOPING THE KANSAS DAIRY COW.**

D. H. OTIS, KANSAS EXPERIMENT STATION.

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 Methuselah 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 Kansas young men, have not inherited all the traits and characters of every individual of the species from the day of 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 herd 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 head. The following table gives a summary of the results:

A YEAR'S RECORD OF COLLEGE SCRUB HERD.

Number of cow.	Products.			Cost of feed.	Value.			Receipts less cost of feed.		Cost of producing butter fat per pound.
	Milk, lbs.	Average test, per cent.	Butter fat, lbs.		Butter fat.	Skim-milk 15 cts. per 100 lbs.	Total.	Gain.	Loss.	
<i>Most Profitable Five Cows.</i>										
20.....	9,116	4.21	383.7	\$32.80	\$60.68	\$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	4.50	289.5	29.26	45.90	8.77	54.67	25.41	.....	.101
15.....	6,509	4.27	277.9	29.20	43.69	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
<i>Least Profitable Five Cows.</i>										
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	29.03	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	5.50	30.97	3.38	.....	.166
Average.....	4,420	4.04	178.7	\$27.40	\$27.81	\$5.94	\$33.75	\$6.35	.....	\$ .153
<i>The Debt-Contractors.</i>										
5.....	3,583	3.79	135.7	\$26.75	\$21.39	\$4.83	\$26.22	.....	\$0.43	\$ .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	.193
28.....	2,141	4.74	101.5	24.43	15.30	2.88	18.18	.....	6.25	.240
Average.....	3,089	4.16	128.7	\$26.32	\$19.78	\$4.16	\$23.94	.....	\$2.35	\$ .204
<i>Averages of Herd.</i>										
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 5 cows, the least profitable 5 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 cows is 3,019 pounds, or 68 per cent above the average of the least profitable, and 4,350 pounds 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 143 per cent over the debt contractors. In the column headed "cost of feed" it will be noted that the best cows ate the most, the average cost of the most prof-

itable 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 would have to be met first, and the result would be a very large shrinkage in the profits. A man who 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, difference in annual income of \$37.09, or 1,130 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 11 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 5 cows and we have receipts of \$28.89 per cow. Contrasting this with \$6.35, the average receipts from the least profitable 5 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 5 cows is worth as much as 4 1/2 cows from an average of the least profitable 5 cows. As will be seen from the table there

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 4 unprofitable cows and it cost 12.3 cents per pound. In the above calculations 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 any one 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 Record.

Number of cow.	Period, months.	Butter fat, lbs. 1898.	Butter fat, lbs. 1899.	Per cent increase.
28.....	7	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	85.3	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, respectively. There are 2 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 grandam having produced as high as 600 pounds of butter in a year. They are being fed 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 can not 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.

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 Kaffir-corn meal and produced butter fat at an average of 11.9 cents per pound. For a period of two weeks we fed Kaffir-corn meal one-third, bran one-third, ground oats one-third, and what Kaffir-corn stover they would eat. During this short period we produced butter fat at 10.8 cents per pound. A ration of one-half Kaffir-corn meal, one-half soy-bean meal, with what Kaffir-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 Kaffir-corn are undoubtedly the cheapest. If impossible to get alfalfa try red clover and soy-beans. The clover is worth about two-thirds as much as alfalfa, and soy-beans are richer in protein than oil-meal. By knowing the value of the different foods 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 high-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 can not 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 can not 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 every one in the neighborhood will feel that he can not 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 can not 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 and then 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

to-day 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 of 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.

**THE SKIM-MILK CALF.**

J. A. CONOVER, KANSAS EXPERIMENT STATION.

Every farmer in Kansas who keeps cows is interested in the growth and development of the calf. Some are more interested in the calf than in the milk, and so let the calves run with the cow; others desire to raise good calves but yet have some milk for use; while there is another class whose prime object in keeping cows is for milk, yet who wish to have good calves. Every farmer who so desires can raise a good calf. It is not necessary that it should run with its dam for six months nor be given whole milk for the same length of time. The farmer who will take the pains can raise a good calf on skim-milk, and creamery skim-milk at that, and Kaffir or Indian corn meal.

I will tell you how we raise our calves here at the college. We allow them to run with the cow for the first four or five days, or until the milk becomes fit to use. It is absolutely necessary for the best health of the calf, that it should have the colostrum, or first milk. This is a substance very easily digested, is rich in albumen and salts, and is a perfect regulator of the liver and bowels and must not be withheld from the calf.

At the time of taking the calf from the cow, if we have not done it before, we dehorn the calf, using for the purpose, caustic potash, or, as it is often called, stick caustic. This method is much cheaper than the saw, is more humane, leaves no scar, and, if properly done, no half-grown horns to disfigure the head. It is done in the following manner: With a pair of shears clip off the hair around the little button, or place where the horn would appear if left to grow, then dip the end of the stick of caustic into cold water and rub over the place where the horn would appear, rub good and hard until the skin is broken or eaten away just a little. If taken in time one application will be sufficient; should the horn start to grow repeat the operation. Care should be taken not to get any of the caustic on the fingers or on any more of the calf's head than is necessary. Caustic potash in the stick form is much better than the liquid because you can put it just where you want it.

A good many farmers object to raising hand-fed calves because they claim it is such a bother to teach them to drink. The secret of the whole matter is in letting the calf get hungry before you attempt to give him milk. We do not try to give our calves anything until they have been away from the cow twenty-four hours and sometimes longer. It is then an easy matter to teach the little fellow to drink. If he is a little obstinate at first let him suck the finger a time or two, gradually taking the fingers away when you get him started. In most cases this will not be necessary. Under all circumstances deal gently with the calf. You must remember that he has not been in the world long enough to get used to all the "ups and downs."

The calf just taken from the cow should have about 10 pounds, or 5 quarts of whole milk a day, fed in 3 feeds, 4 pounds night and morning and 2 at noon. This amount should gradually be increased to 15 pounds when the calf is 3 weeks old. At the end of three weeks we begin to get the calf on to skim-milk; do this gradually by cutting off half a pound of whole milk and adding a half pound of skim-milk each feed. Keep a supply of nice, fresh hay, preferably clover or alfalfa, where the calf can get it, for he will begin to eat hay when about 3 weeks old, and sometimes earlier.

As soon as possible teach the calf to eat a little grain; this can be done very easily by putting a handful in his mouth after he has eaten his milk; or if you do not care to take this extra trouble keep some in a little box where he can get at it; he will soon learn to eat it. We have found that Kaffir-corn meal is one of the best grains to be supplied to young calves. There seems

to be a certain element in it, tannin probably, which tends to keep them from scouring. We had very little trouble with scours among our 13 calves and we fed Kaffir-corn exclusively. The calves like it and will eat it in preference to other grains.

Should there be any trouble with scours cut down the milk immediately and give from 1 to 2 ounces of castor-oil, and if very bad, from 10 to 15 drops of laudanum, for a day or two; in most cases the castor-oil will be all that is necessary. The best treatment for scours lies in prevention; keep the stalls and yards where the calves run, perfectly clean and it is well to scatter some air-slaked lime around quite often. Wash and scald out all pails used to feed in and set them out in the sun. Guard against overfeeding the calf; it does not want a pailful of milk just because the milk is skimmed. Many people make a great mistake in feeding, just on this one point. Feed all milk warm and sweet if possible, but if you must feed sour milk accustom the calf to it gradually and then feed it sour all the time, and if possible to the same degree of acidity. You must remember that the calf's stomach is a very delicate piece of machinery and easily gotten out of order.

Nature's way is to feed the milk warm and sweet, and the best results will be obtained where nature's way is followed as closely as possible. I prefer to feed the milk warm from the very first until I have the calf off of skim-milk at the age of 5 or 6 months. The amount of skim-milk varies with the individual calf. It should be increased as the calf grows older. Whenever an increase is made, do it gradually. At the age of 5 months the calf should get from 20 pounds to 24 pounds according to the individual. One authority says that in some cases 30 pounds may be fed.

The heifer calf intended for the dairy should be made to gain about a pound and a half a day. Give bulky feeds, such as bran, oats, and a little Kaffir or Indian corn meal, with all the nice bright hay it will eat. The beef calf should be made to gain every pound possible, and should never be allowed to lose any. It is possible to make a well-bred beef calf weigh a thousand pounds when it is a year old. Give it all the grain it will eat, and if it is not on pasture, plenty of good hay.

To keep calves from sucking each other's ears tie them up far enough apart so they can not get to each other. If the grain is put in the trough immediately after feeding they may be turned loose; if not, keep them tied till their mouths get dry. Stanchions are very nice by which to fasten the calves while they are being fed, but they must be far enough apart that the calves can not reach each other across the space.

Keep a supply of nice, fresh water where the calves can get at it all the time. You will be surprised to find how many sips the calf will take during the day. Our 13 calves drank in seven days 869 pounds of water, or an average of 8.8 pounds per head per day. The oldest calf at this time was about 3 months old, and the youngest, 1 month. We found that a hog-waterer fastened to a barrel was the nicest way to keep the water clean and have it always ready when the calf wanted it.

**EXPLANATION OF THE CHART.**

The experiment carried on this summer was as follows: Four of the calves were fed on skim-milk, Kaffir-corn meal and Blachford's calf meal; 2 out of this set of four, Nos. 41 and 43, received creamery skim-milk and the other 2, Nos. 42 and 44, hand separator skim-milk. Five other calves received skim-milk alone, 2 of them, Nos. 45 and 47, received creamery skim-milk, and the other three, Nos. 46, 48, and 50, received hand separator skim-milk. The last 4 calves received in addition to their skim-milk flaxseed-meal jelly; 2 of them, Nos. 51 and 53, getting creamery skim-milk, and 2, Nos. 52 and 54, getting hand separator skim-milk.

The object of this experiment was twofold: First, to determine, if possible, the difference in feeding value, if any, between the creamery skim-milk and the hand separator skim-milk; second to determine the value of such rich foods as Blachford's calf meal and flaxseed-meal in addition to the skim-milk and grain. Now let us look at the chart.

We see that there is a slight difference of .1 per cent of a pound in favor of the Blachford's meal and a difference of .27 per cent of a pound in favor of skim-milk alone over the flaxseed-meal. By adding the average daily gains of all calves fed creamery skim-milk and dividing the sum by 6, number of calves fed, we obtain 1.76 pounds which is the averaged daily gain of all the calves fed on creamery skim-milk. We go

through the same plan for finding the average daily gain of all calves fed hand separator skim-milk and we find it to be 1.75 pounds.

Flaxseed-meal and skim-milk.	Hand separator.		Creamery.		Average daily gain on hand separator, 1.758.
	No. of calves.	Gain per head.	No. of calves.	Gain per head.	
	54	1.48	51	1.49	
	52	1.48	53	1.48	
	148	1.48	148	1.48	
	211	1.44	244	1.64	
	1.44		1.64		
	1.54		1.575		
Average daily gain on hand separator, 1.557					
No substitute with skim-milk.	Hand separator.		Creamery.		Average daily gain on creamery, 1.706.
	No. of calves.	Gain per head.	No. of calves.	Gain per head.	
	50	1.61	45	1.751	
	48	1.61	46	1.751	
	161	1.61	154	1.751	
	282	1.678	286	1.751	
	1.678		1.941		
	1.709		1.933		
Average daily gain on hand separator, 1.881					
Blachford's calf meal and skim-milk.	Hand separator.		Creamery.		Average daily gain on creamery, 1.706.
	No. of calves.	Gain per head.	No. of calves.	Gain per head.	
	44	1.872	41	1.851	
	42	1.872	43	1.851	
	141	1.872	141	1.851	
	294	1.872	168	1.851	
	1.872		1.851		
	2.031		1.773		
Average daily gain on creamery, 1.902					

This experiment shows that there is no practical difference between these two kinds of skim-milk, and further shows that the addition of rich meals, such as Blachford's meal or flaxseed-meal, is not necessary to the growing of a good calf.

The conditions necessary for raising good calves on creamery skim-milk are these: First, the patron must furnish sweet milk to his creamery, otherwise he must not expect to get sweet milk back. If the milk which he brings in on the turning point, when it is warmed up preparatory to being separated, it sours; this affects all of the milk. Let every patron bring sweet milk to the creamery and this first point will be settled. Creamerymen, insist on having sweet milk brought to your creamery. The second point to be observed is by the creamerymen. Sterilize the skim-milk; simply heating it up to 155° is not enough; it should be heated to 212°. This will kill all kinds of germs and the milk will be sweet when it gets home. If you have the welfare of your business at heart you will be willing to do this. Patrons, insist that the skim-milk must be sterilized. The third point is to the hauler. Get the skim-milk home just as soon as possible, and do not let it set out in the hot sun while you stop in town to talk politics. The fourth and last point is to the patron. Cool down the skim-milk all but what is wanted for the evening feed just as soon as it gets home, and keep it cool until you want to feed it. If we will then use care in feeding it there is no reason on earth why we should not raise good calves. Let us mix brains with our skim-milk and we will not have half the trouble with our calves that we will by mixing something else with it.

**COST OF RAISING CALVES ON SKIM-MILK.**  
The next point to be considered, and one which will interest every one, is the cost of raising these calves. After figuring up the entire cost for six months for each calf, taking the average we find it to be \$9.71. This includes both the Blachford's meal and the flaxseed-meal used. Let us get the cost in another way, which is by the day; and we find that it cost on an average of 5 cents per day per head. The average gain per head, per day, for the six months was 1.56 pounds. We find then that it cost just 3 cents to produce a pound of gain.

Suppose we had fed these calves on whole milk instead of skim-milk; what would the cost have been? Let us see. It is fair to assume that they would drink as much whole milk as they did skim-milk, and also that they would eat about as much grain. Substituting whole milk for skim-milk we find that the average cost would be \$22.49. The average cost per head per day would be

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12.2 cents. If we take the same average gain that the calves on skim-milk made we find that it cost 7.8 cents to produce a pound of gain. But I hear some one of you say that the whole milk calf would gain more than 1.56 pounds a day. All right, let us assume that it gained 2 pounds a day, which would be a good gain. We find that even then it would cost 6.1 cents to produce a pound of flesh. The average cost of the grain eaten was \$3.40. Suppose the calf on whole milk had eaten no grain, then the cost of raising would have been \$19.04. Cattle will have to be higher than they are now if the man who raises his calves on whole milk ever comes out even on them. These costs were figured at creamery prices on butter fat.

I hear some one say: "Oh, we can not take the time to feed our calves on skim-milk." I find that it took me about two hours a day to feed these 13 calves. If it had not been necessary for me to weigh every pound of milk and grain and to handle 2 kinds of skim-milk for experimental purposes we could have graduated the pails on the inside and fed the calves in one-fourth the time.

We see by the experiment that the Blachford's calf meal and the flaxseed-meal were practically of no value in increasing the gains per head when there was plenty of corn or Kaffir-corn meal. So let us strike them off of our cost of raising the calf. We find then, that the calf can be raised, until it is 6 months old, at a cost of \$8.93. Subtract this from the average income of our cows and we have \$34.65, the amount of money saved by feeding the calf skim-milk. It takes about fifteen minutes a day to milk the average cow; we will assume that she milks three hundred days. The time required to milk her would be forty-five hours. To find the rate of income per hour we divide \$34.65, the amount saved, by 45, which gives us 46 cents an hour for our labor. Very few employments pay better wages.

Our cows increased 32 per cent in their income over that of last year, which amounts to \$13.95. This added to the amount saved (\$34.65) gives us \$48.60 which would be the amount saved the second year. All this would be lost if the calf ran with the cow; yet this is not all, for you lose the opportunity of grading up the herd.

Now patrons and farmers, can we afford to raise our calves on whole milk even at creamery prices, much less if we get 3 to 5 cents a quart for our milk? Take, for instance, the average income from our herd of scrub cows, which was \$43.58. Can any one afford to let the calf run with even the average scrub cows of Kansas?

1. Let the calf run with the cow for the first three days; gives the calf a better start and is better for the cow.
2. Dehorn all calves while young, preferably when they are 2 days old; saves time, money, and pain.
3. Let the calf get hungry before you try to teach it to drink; you will feel better and so will the calf.
4. Be kind to the calf and deal with it gently.
5. Change gradually from whole milk to skim-milk; do not overfeed.
6. Feed all milk warm and sweet; if a young calf, feed often, 3 times a day.
7. Feed grain dry; do not mix it with the milk.
8. If troubled with scours, cut down on feed, give castor-oil or raw eggs. Keep all pens, pails, etc., sweet and clean.
9. Keep the dairy calf thrifty and the beef calf fat.
10. Do not let the calves suck each other's ears and noses. Tie them up.
11. Keep plenty of nice fresh water where they can get at it all the time.

### THE RELATION OF THE PATRON TO HIS CREAMERYMAN.

G. W. PRIEST, MERIDEN, KANS.

In many ways and for various reasons the patron and his creameryman are mutually dependent upon each other. The patron, if a farmer, is necessarily dependent upon his creameryman, because he can not make a success of farming without raising or feeding stock, or both, and a creamery patron must milk cows and raise calves and pigs. Now, in order that he may do that successfully, he must have a market for his milk, and the creamery furnishes him that market, and the more milk he and his neighbors furnish, the better market it makes.

On the other hand, the creameryman is dependent upon his patrons, because a creamery can't do business without milk. Nothing else will do, and as the patrons furnish the milk, the dependence is very marked, because any concerted action or movement on the part of the patrons toward shutting off the supply of milk would immediately cripple the creamery. Then, how necessary it would seem to be, that the patrons and the creamerymen should be on the best of terms—the patron striving to produce and have his neighbors produce all the milk they can, and using his influence whenever and wherever he goes, to make the creamery a success, the creameryman in the meantime keeping his patron posted upon feeds and the best method of feeding to produce the most milk at the least possible cost; also upon the selection of his cows, the successful handling of his milk, and in many other ways making suggestions to his advantage.

But while, as I have shown, a spirit of friendship and intimacy should exist between the patron and his creameryman, I find instead a widespread dissatisfaction existing among the creamery patrons of Kansas, mostly owing, I think, to the principle upon which they do business. I know of no other kind of business institution that does business upon the same principle. The creameryman says to the patron: "Bring in your milk. I won't buy it of you, because I don't know what the price of butter will be; don't know what I can get out of it; but I will make butter out of it, sell the butter, and, after taking out the expense of handling and a profit for myself, I will give you the balance."

Now then, that creamery is doing business for those patrons to the extent of working up that milk for them. It is not the creamery's milk, because the creamery has not bought it. Now if that creamery is doing business in that manner for its patrons, don't you suppose those patrons would like to know something about the business that is being done for them? Don't you think that creamery ought to issue a report every pay-day showing exactly how the business was done the preceding month? Don't you think the patrons would like to know what kind of salaries are charged up to their account, and how much the owners of the creamery take for their profits? Don't you think they would like to know how many bad accounts for sales of the butter made from their milk are made each month that comes off of them? Don't you imagine they would like to know what kind of repairs are made on the creamery that might be charged up to the expense account? Don't you think that if creameries issued such a report, honestly setting forth all the facts relating to the management of their business, and put such report in the hands of their patrons once a month, that the relation of the patron to his creameryman would be changed? Don't you know that any and every other business wherein one man, or company of men, do business for another company, or number of men, would require a report, under oath, setting forth all the facts concerning the management of the business?

The patron does not and can not know under the present system anything about the business the creamery does for him. There has probably been a time in the history of most Kansas creameries when it would not have been best for the patron to know very much about the creamery's business, and especially if he were a kicker or one of those suspicious fellows. But Kansas creameries have passed that period in their existence.

On the 15th of one month the creameryman tells his patrons what he gives them for their milk or butter fat delivered to his creamery the preceding month, and a check accompanies the statement, and that is the end of it. Now I have shown conclusively that the milk did not belong to the creamery but to those patrons. It is the patron who has to be responsible for bad markets, bad butter, bad accounts, and bad creamerymen, if any such exist, and I don't wonder that patrons are a little

suspicious, and want to know more about the business.

It certainly is not pleasant for creamerymen to have a large number of the people with whom they do business look upon them as avaricious and dishonest. I have talked with a number of prominent creamerymen upon this subject, and I find they are sick and tired of this everlasting howl about their cheating somebody.

Patrons are very inconsistent, and some of them very dishonest in their charges against creamerymen. Some of the charges, if practiced, would be a positive disadvantage to the creamery, and I know that creamerymen don't practice things that would be ruinous to their business if they can help it. But creamery patrons, like everybody else, must be heard, and if they think they are not treated right they will kick.

The patron says to the creameryman: "We will furnish the milk, and you furnish the machinery and the market, and we will do business. We are willing that you should take out the expense of handling and a profit, and you can settle up with us once a month." But the trouble is in the manner of settling up. The patron, so far as the business is concerned, is not in it. The creameryman settles up all by himself, with himself, and for himself, and the patron is not represented at the settlement, and knows nothing more than his statement discloses to him, which merely tells him how much milk he had, what it tested, and what the creamery paid him for it.

I don't blame the creamerymen for the system they use for it was the only system in use when they commenced to do business, and they used it because they knew of nothing better, and because it was safe for the creameryman. They say they are ready to adopt a better method if some one will propose something better. I have nothing new to offer. A system based on Elgin, and the amount of milk received, would probably come as near being equitable as any I have heard of, but I don't see much wrong with the present system if the owners or managers of private creameries, or the secretary of incorporate companies, were compelled by law to make a sworn statement of the business done for each month, and let a copy of that report be issued to each patron with his monthly statement on each pay-day. If he did not get as much for his milk as he expected, he could look at that report and see the reason why. He could then give a reason why he patronized the creamery or why he did not patronize it. There would be no guesswork about it.

A law or a system that would give the patron an advantage over the creameryman would not do. Oh, no; his patrons would skin him too quick. The creameryman has all kinds of people to deal with, from the patron who furnishes good milk in the best shape he can, to the fellow who milks 2 cows and 1 pump, and the other fellow who both skims and waters his milk, and both growl at the creameryman because their milk does not test as high as the milk of their more decent neighbors. But give us a system that will give neither party an advantage over the other—a system based on sound business principles, and creamerymen and patrons will soon become fast friends and both will prosper accordingly.

When the creamery business in Kansas gets to running on a principle that will be equitable alike to the creameryman and his patrons; when the creameryman makes it possible for the patrons to see and know that they are getting all they should have for their milk, then the relation of the patron to his creameryman will change amazingly, and when fifty thousand farmers and dairymen of Kansas, and their families, commence to talk and work for their creameries and creamerymen, instead of, as now, doing all manner of evil against them, then will the creamery business in Kansas get such a boom on it as has never been known in the same business in any country. And then and not till then will Kansas become, as she should be, the greatest dairy State in the Union.

### RELATION OF CREAMERYMAN TO PATRON.

C. F. ARMSTRONG, CLYDE, KANS.

The creameryman is far more dependent upon his patron than is the proprietor of any other business. His interests and those of his patrons are, to a great extent, identical, however, as it is his object to increase the quantity of milk received, to improve the quality of the butter, increase his output, and get the highest price for his product, thus allowing him to pay a fair price for the butter fat in the milk delivered to him, secure a fair profit for himself, and

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enable his patron to derive a profitable income from each cow.

We assume that the creameryman wants to make money, which he has a right to do, if he is honest, industrious and capable. His hope of success, however, should be based on a large volume of business conducted on a small margin. An effort to secure a large profit on a small amount of business is a short-sighted policy, and if adopted will end in failure to all concerned.

The successful creameryman should have a thorough knowledge of the business in all its details. He should be familiar with the practical operation of boilers, engines, and all the other machinery, so that economy may be practiced in their operation. He should know how to handle the separator so as to get all the cream out of the milk, and he should make frequent tests of the skim-milk to see that he is doing so. He should know how to churn all the butter out of the cream, proving his thoroughness by the Babcock test on his buttermilk. He should know how to make a grade of butter that will always command the highest market quotations; or, if not a butter-maker himself, he should at least be a good judge of butter, so that any fault affecting the quality of his goods may be quickly detected and corrected, instead of waiting until the butter reaches the market, and getting his information from the other end. He should know how and where to find the best markets, and he should be careful in selling and in shipping only to responsible persons, so that losses will not occur from bad accounts.

After fitting himself for this business, and investing his capital in machinery that is worse than useless if idle, the creameryman must depend on his patron for the supply of milk necessary to keep it running. This patronage he must merit by a deserved reputation for prompt, just, and exact business methods, personal integrity and square dealings, which reputation must be further maintained by satisfying the patron, both as to the correctness of the test and the price he receives for his butter fat. This question of "test" affects not only the relation of the creameryman to his patron, but their relation to each other. There is more contention over this point than over any other, when there ought not to be any. The Babcock test, in careful hands, will determine the butter content in milk with as much accuracy as a Fairbanks' scale will determine the weight of a load of hay or grain. No pains should be spared to explain how the testing is done, and patrons should be made to feel that they are welcome at all times to be present and see their milk tested.

The manner of fixing the price and paying for the butter fat is sometimes criticized by the patron, and not altogether without reason. According to the custom which prevails here and elsewhere, it is arbitrary, being fixed altogether by the creameryman. It is used by cooperative creameries everywhere. The reason for its existence and use is

that after the close of the month it can be more fairly done than at the beginning. It is too much to ask the creameryman to name the price he will pay for a month ahead, for he knows that if there should be a sharp advance in price he would lose most of his milk, while a heavy decline will cause a financial loss. Where patrons are dissatisfied in this respect I should say that it is the duty of the creameryman to fix a price based on some of the leading markets like New York, Chicago, Elgin, or Kansas City. The latter might be preferable, on account of its wider circulation in the newspapers throughout the State, but if not, take any other market that will give satisfaction and promote harmony.

Another duty of the creameryman which has an important bearing upon his relation to the patron is his ability to impart instruction whenever necessary. Not only should he know, himself, but he should be able to impress what he knows upon his patron. He must know what is a balanced ration, and how to form one; he must know the value of feeds, with their comparative cost; he must be able to show his patron how to feed the skim-milk to calves and pigs to the best advantage, and he should make it his business to know that some good dairy paper is read by every patron, paying the subscription price himself, if necessary. If the patron is not doing as well as he ought to with his cows, the creameryman must be able and willing to show him what is the matter, and how to do better. The average patron must be shown how to get more milk, without increasing the cost, and the creameryman must show him how to do it.

But the duties of the creameryman are not ended here. He can materially improve his relation with his patron by seeing that he has the right kind of employees in his creamery and skimming-stations—men who are not only honest and courteous, but who are educated in their work, who can explain all the details to the patron, who can give him the information that will make his milk better in quality and greater in quantity without increasing the cost of production.

If the creameryman does all this, and as many more good things as he can think of, advancing the interests of his patrons on every occasion, he will have properly fulfilled his relation toward them and merit their continuous cooperation and support.

### THIRTEENTH ANNUAL REPORT.

Respectfully submitted by W. F. Jensen,  
Secretary.

In sending out its annual report in the columns of the KANSAS FARMER, the Kansas State Dairy Association has deviated some from the established rules. One object in doing this is to get the report out at an early date, and to put it before the greatest number of readers. The association, through its mem-

bers, will send the paper to some 15,000 creamery patrons, and the regular readers of the KANSAS FARMER will swell this issue to a great total. I had hoped to send out a very complete report, but at the last minute, through some irreparable blunder of the stenographer, I find the valuable discussions on several papers is lost, entirely obliterated.

In adopting this course, the association is following the principles on which it was formed, with the object in view of spreading information and enlightening the Kansas people on matters pertaining to the dairy industry—to closely connect the dairy interest in a representative body, thus enabling us to better secure legislation for the protection as well as development of our great industry.

Secretary's Report.

My duties as secretary commenced April 18, 1899, at which time all books and papers were turned over to me by the former secretary. On that date a meeting of the executive committee was held at Manhattan, Kans. Those present were: F. L. Hurd, H. M. Cottrell, W. F. Jensen, J. E. Nissley, E. H. Forney, and A. Jensen.

The reports of the secretary and treasurer were passed on, adopted, and ordered filed. It was decided to hold the next annual convention at Manhattan, Kans., November 22-24, at the Kansas State Agricultural College. The arrangement of program was left with the secretary.

Report of Legislative Committee.

Report of the legislative committee was adopted and the committee left standing.

Committee on Arrangements.

The president was instructed to appoint a committee on arrangements for attending the National Creamery Butter-makers' Convention at Lincoln, Neb., February 19-23, 1900. The committee is as follows: W. F. Jensen, Beloit; A. G. Eyth, Enterprise; C. A. Barnes, Paola; C. H. Pattison, Abilene; Geo. W. Hanna, Clay Center.

Report of Butter Judges.

A. M. Larsen, Meriden, first premium. A. Jensen, Manhattan, second premium.

Report of Cheese Judges.

H. Van Leeuwen, Effingham, first premium. C. B. Merry, Nortonville, second premium.

Butter-makers' Class.

J. Metzger, Americus, first premium. G. Socolofsky, Tampa, second premium.

Patrons' Class.

A. E. Clark, Pleasant Hill, first premium. A. H. Diehl, Enterprise, second premium. J. L. Feighner, Sterling, third premium.

Treasurer's Report.

Table with columns for Receipts and Disbursements. Receipts total \$527.84. Disbursements total \$527.84.

Members of the Kansas State Dairy Association.

- List of members including G. H. Littlefield, Parsons, Kans.; D. P. White, Lake Chrystal, Minn.; Chas. E. Murphey, Thayer, Kans.; E. C. Tullis, Melvern, Kans.; F. H. Haigler, Ottawa, Kans.; John Rosacker, Stafford, Kans.; E. B. Sutton, Weida, Kans.; Elbert B. Hall, Clafin, Kans.; C. B. Hall, Clafin, Kans.; D. Hall, Clafin, Kans.; D. L. Burnham, Lindsey, Kans.; Jacob Doughman, Industry, Kans.; D. Morning, Parsons, Kans.

- List of members including John Turner, Parsons, Kans.; C. B. Merry, Nortonville, Kans.; P. J. Smith, Waverly, Kans.; W. H. Kahn, Reno, Leavenworth County, Kans.; Edgar Taylor, Louisville, Kans.; F. H. Taylor, Rhinehart, Kans.; Lewis Larson, Canton, Kans.; Chas. Gettys, Canton, Kans.; Amos Schreiner, Canton, Kans.; M. M. Alspaugh, Floral, Kans.; A. W. McKillip, Manchester, Kans.; Geo. W. LaRosh, Spring Hill, Kans.; A. E. Warren, Olathe, Kans.; J. F. Wilson, Olathe, Kans.; C. E. Austin, Burlingame, Kans.; N. P. Reid, Stafford, Kans.; V. V. Tullis, Melvern, Kans.; Ottawa Creamery, Ottawa, Kans.; Alma Smith, Herington, Kans.; Geo. Theddick, Waterville, Kans.; J. L. Fuller, Waterville, Kans.; Chas. B. Humfreville, Waterville, Kans.

- Continuation of member list including E. F. Fortin, Admire, Kans.; A. F. Sable, Sabetha, Kans.; R. R. Coggeshall, Emporia, Kans.; M. B. Weaver, Harper, Kans.; T. G. Hanna, Beloit, Kans.; O. M. Lewis, Beloit, Kans.; H. Van Leeuwen, Effingham, Kans.; H. A. Martin, Lyndon, Kans.; A. L. Goble, Riley, Kans.; W. H. Hollenbeck, Larkin, Kans.; Robt. Keener, Keats, Kans.; P. G. Hoffman, Salina, Kans.; W. B. Snodgrass, Salina, Kans.; C. O. Musser, Abilene, Kans.; J. G. Engle, Abilene, Kans.; Ben Jury, Holland, Kans.; A. Pyke, Abilene, Kans.; D. J. Eisenhouse, Abilene, Kans.; C. H. Goble, Denmark, Kans.; A. A. Farnham, Haven, Kans.; W. C. Wolcott, Tonganoxie, Kans.; Clyde George, Tonganoxie, Kans.; A. Jensen, Manhattan, Kans.; Clark Mansfield, Manhattan, Kans.; W. J. Perkins, Wichita, Kans.; H. J. Tiermeier, Lincolnville, Kans.; J. L. Senter, Gardner, Kans.; Chas. Dille, Edgerton, Kans.; Wm. Graham, Edgerton, Kans.; O. L. Hicks, Garnett, Kans.; D. L. Tweed, Chanute, Kans.; Alfred Graham, Chanute, Kans.; Wm. Williams, Meriden, Kans.; A. M. Larsen, Meriden, Kans.; Ed. H. Webster, Meriden, Kans.; A. W. O'Brien, Shady Grove, Kans.; Geo. Huckstead, Beloit, Kans.; Chas. Henry, Clafin, Kans.; Geo. W. Hanna, Clay Center, Kans.; G. G. Eye, Clay Center, Kans.; John Heinz, Clafin, Kans.; H. Lindeman, Greenleaf, Kans.; A. L. Beltz, Ramona, Kans.; J. L. Pitt, Wichita, Kans.; F. T. Stewart, Overbrook, Kans.; F. H. Teator, Wellsville, Kans.; R. P. Chalender, Wellsville, Kans.; J. H. Dickson, Edgerton, Kans.; O. E. McDowell, Hillsboro, Kans.; D. S. Brandt, Newton, Kans.; S. W. Hauck, Newton, Kans.; H. Behrens, Greenleaf, Kans.; P. K. Gish, Topeka, Kans.; Wm. Perry, Greenbush, Kans.; J. G. Goodrich, Mankato, Kans.; F. H. Pugh, Omaha, Neb.; J. C. Rundell, Omaha, Neb.; W. S. Hammond, Ottawa, Kans.; O. Hosford, McLouth, Kans.; J. F. Schlappi, New York, N. Y.; J. A. Harris, Owatanna, Minn.; M. Delaney, Waterville, Kans.; W. F. Jensen, Beloit, Kans.; T. M. Erb, Harper, Kans.; E. C. Lewellen, Newton, Kans.; W. R. Noble, Manhattan, Kans.; F. S. Hurd, Meriden, Kans.; J. Lundberg, Meriden, Kans.; H. M. Cottrell, Manhattan, Kans.; J. K. Forney, Abilene, Kans.; E. H. Forney, Abilene, Kans.; J. S. Engle, Acme, Kans.; W. C. Tabor, New York, N. Y.; I. T. Dutton, Portis, Kans.; H. F. Wilfersberger, Lindsey, Kans.; H. G. Hoffman, Talmage, Kans.; L. Gabe, Beloit, Kans.; Peter Heil, Topeka, Kans.; J. A. Shannon, Kansas City, Mo.; W. McCables, Lincoln, Kans.; C. J. Walker, Marysville, Kans.; J. A. Walker, Marysville, Kans.; J. G. Otis, Topeka, Kans.; M. Moore, Fulton, Kans.; T. C. Mathews, Eskridge, Kans.; C. A. Barnes, Paola, Kans.; E. W. Curtis, Manhattan, Kans.; Ed. Davis, Concordia, Kans.; E. B. Cowgill, Topeka, Kans.; J. E. Nissley, Topeka, Kans.; Ed. Sudendorf, Chicago, Ill.; F. A. Leighton, New Hampton, Iowa.; J. A. Conover, Manhattan, Kans.; T. A. Borman, Navarre, Kans.; W. G. Merritt, Great Bend, Kans.; G. A. Elder, St. Paul, Minn.; F. H. Hill, St. Joseph, Mo.; S. C. Cornwell, Kansas City, Mo.; A. H. Diehl, Enterprise, Kans.; M. L. Dickson, Edgerton, Kans.; A. E. Lasner, Concordia, Kans.

- List of members including Thos. Parker, Hutchinson, Kans.; F. L. Huxtable, Turon, Kans.; A. Nicolet, Great Bend, Kans.; H. C. Golden, Kansas City, Mo.; A. A. Jennings, Chicago, Ill.; L. J. Warner, Kansas City, Mo.; T. C. Portevus, Kansas City, Mo.; H. C. Nash, Kansas City, Mo.; H. M. Brandt, Canton, Kans.; Mrs. H. M. Brandt, Canton, Kans.; C. A. Stauffer, Soldier, Kans.; C. F. Hutchinson, Bellaire, Kans.

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**TRIALS AND TRIBULATIONS OF A MILK-HAULER.**

G. R. GARRETT, M'LOUTH, KANS.

There is a good deal to be said in regard to the trials and tribulations of a milk-hauler, if the right man had been put on the program for this paper, but as it falls to me, I will try to say something in regard to them.

In the first place, to the casual observer there is not much meaning in those words. He simply says to himself: "Oh, it's nothing to haul milk." But to a man who has hauled milk for more than three years, the words have nearly the same meaning as the State penitentiary has to the convict.

In the second place, the man who hauls milk must be on the route every day (except Sunday), whether the weather be cold or warm, the sky clear or covered with clouds that are pouring their moisture over Mother Nature and running down the back of the milk-hauler, making him think of his happy patrons at home by the fire and under shelter. No matter if the roads are in a shape that there seems to be no bottom to them, still the milk-hauler is supposed to start and get his load to the station without ever losing his patience or telling his patrons he would like to rest a few days. If he did ask for a rest, some would say: "If you don't go, you will lose your job." He is expected to arrive on time, the same as the main system of railroads. If, some stormy morning, he is a little late, they will say: "What's the matter with you this morning? Why, I have had my milk on the stand for an hour." They don't then stop to consider that the milk-hauler might have had to call his first patrons out of bed to milk, or go on and leave them to accommodate some of the others; but, if he is a little early and the milk is not on the stand and he calls for it, out they come and say: "What's the matter with you? You must have stayed up all night. We did not expect you for an hour yet; you will have to wait, the girls are a little late milking this morning." If he drives on, they are out of humor. So there stands the milk-hauler in the cold, waiting on the careless patrons. After he gets this can, on he goes to the next man. This man has his can on the stand (if he has one), but out he comes and says: "Say, wish you would bring me 50 cents worth of coffee and 10 cents worth of tobacco. Go to Reynolds and get it." (His store is in the south part of town and the creamery is in the north part; distance, nearly one-fourth of a mile). "The weather is so bad," or "Jim's too busy and don't want to go to town." Of course the milk-hauler says, "All right," and moves on his pleasant journey, as some would term it, but not the hauler.

Perhaps two or three, or maybe half a dozen, hail him in the same way before he gets to town. By the time he gets there, he has a half-load of groceries to bring back, besides the mail, and lumber, if he will haul it. (Too bad for them to go, or they are too busy). Some think it no trouble for the milk-hauler to run all over town for a yard of calico or a certain kind of thread. Some never think of giving him anything for his trouble; they think the honor is enough; but let them put themselves in the hauler's place, and they will think differently.

The next thing is, woe unto the milk-hauler if the milk comes back sour. He gets nothing for the milk, except the scolding given him by the patrons, or if not to him, to the manager of the creamery. If he does not bring back every pound of skim-milk that is due them (or a little more) some are not satisfied. So is the life of the milk-hauler.

**KANSAS CHEESE—OUTLET AND PRICES.**

J. W. TAYLOR, REINEHART, KANS.

From statistics kindly furnished by our State Board of Agriculture, we find that Kansas made, on the farm and in the factory, over 1,000,000 pounds of cheese in 1879; about 700,000 pounds in 1880, 1881, and 1882; not quite 600,000 pounds in 1883; almost 800,000 pounds in 1884; dropped down to 500,000 in 1885; over 400,000 in 1886-'87-'88; over 500,000 in 1889; over 700,000 in 1890; gradually dropped down to 320,000 pounds in 1894, the year of lowest production in the past twenty years; increased to 700,000 pounds in 1895; over 1,100,000 pounds in 1896-'97; and over 1,400,000 pounds in 1898, last year.

Our local consumption is our best market. For our own system of factories, it consumed during the past season, 46 per cent of our output. Kansas

people desire a soft mild cheese, quite a different article from the export cheese, which is made to stand long sea voyages.

America. Canada ships most of her cheese to England. The consumption of cheese in England, per capita, is about six times that of the United States.

TABLE OF CHEESE PRODUCTION IN KANSAS FOR TWENTY YEARS.

per annum pounds	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	
100,000	1,059,640	706,447	786,269	723,264	591,770	774,577	565,723	442,734	496,604	443,233	559,863	743,884	613,772	540,609	365,911	320,763	729,489	1,141,869	1,143,500	1,418,965

Our local consumption has been increased largely by lower retail prices; the effect of home production, and a better quality of goods now made than formerly; also, by a better distributive system, by means of refrigerator cars, and our large wholesale houses, with their numerous "drummers." Railroad men, miners, and all those who carry dinner-palls, are our largest consumers.

Our next largest market is Texas, the largest State in the Union. She has no factories, and takes at present, about 33 1/2 per cent of our production. While Texas produces the largest amount of cattle of any State in the Union, she seems to be averse to doing any milking, or making any cheese.

Oklahoma, with her large increase in population, furnishes also a good market, as there are few factories there. Arizona and New Mexico, with their mining industries, absorb about 8 per cent of our production. Colorado has a number of small factories, which produce cheese of a very fine quality on account of the perfect condition in which the milk comes to the factory. Old Mexico has received several lots of Kansas cheese, and, notwithstanding the heavy Mexican import duty, is a promising outlet for surplus. Nebraska has very few factories, and the present system of refrigeration does not permit shipments there in very hot or very cold weather.

Kansas, being situated in the center of the United States, has a great advantage in the matter of distance, when seeking an outside market. However, the way the railroad schedules are arranged at present, the difference is not very great. For instance, the rate on cheese from Kansas to Fort Worth, Texas, is 99 cents a hundred, while from Chicago to Fort Worth it is \$1.29 a hundred, a difference of only 30 cents per hundred, while the distance is 500 miles more, twice the distance from here.

Our best prices are from our local consumers. Heretofore, Kansas was supplied principally from Wisconsin and New York. But we are now gradually getting control of the local market, because of the saving of freight from these points. Our next best prices are from the South and West, as the railroad system of refrigeration is so arranged that we can supply this territory once, twice, or even three times per week, regularly. We use the refrigerator system in both summer and winter; in summer because of the heat, and in winter because of the cold, and endeavor to maintain a regular temperature for our goods.

Our prices depend largely upon the prices prevailing in Wisconsin and New York, the leading cheese-producing centers of the United States. These prices in turn, depend upon those of Canada, the largest producer of cheese in North

They eat cheese largely, as a substitute for high-priced beef, finding in it a palatable, already prepared, economical food. England, although a small country in area, about one-half the size of Kansas, produces annually about 300,000,000 pounds of cheese. The production in Kansas last year was the largest in her history, being about 1,500,000 pounds. If the American people, because of the high-priced beef of which some are now

complaining, should turn their taste to cheese, as their English cousins have done, there will be room for all the expansion in this line, that the American people crave.

The average quality of Kansas cheese has been greatly improved, and we are now able to command eastern prices for our goods, and oftentimes more. We ought to have eastern prices, with the freight added, but competition demands a slight concession.

Formerly, Kansas cheese had a very poor reputation for quality, and was often traded for groceries at the stores, as is now done with country butter; prices were as various as were the views of each individual merchant.

There has been some work done, along the line of organizing a Kansas cheese board. If this can be done, it will have a tendency to keep the prices at a level throughout the State, and give Kansas cheese as good a name in the markets of the country, as Kansas butter now enjoys.

**The Resolutions.**

The following amended report of the committee on resolutions was unanimously adopted:

Resolved, first, That we appreciate the interest that the agricultural college is taking in the dairy industry in encouraging and holding dairy institutes all over the State, in opening the doors of this college for this meeting, thus making the thirteenth annual convention one of the best in the history of the association, and that we hereby express our thanks and pledge them our cooperation in further promoting our work.

Second, That we recognize in the railroads of our State staunch friends to the industry that we represent, and that they are materially assisting us in granting us reduced rates to this meeting, thus enabling many to come who would not otherwise have been here.

Third, That we express our most hearty thanks to Prof. A. B. Brown and the students of the college on the most excellent music provided especially for the sessions of this meeting.

Fourth, That our thanks be extended to Prof. F. A. Metcalf and his assistants for the drill in callisthenics so appreciated by our people.

Fifth, That our officers receive the heartiest appreciation of their efforts in behalf of this meeting, that no time and pains have been spared to make it the successful meeting that it has been.

Sixth, That we believe that the peculiar conditions which the Kansas butter-

**"Always in the Lead and Now Better Than Ever."**

## THE UNITED STATES CREAM SEPARATORS.

THE Improved United States Cream Separators have been proven by tests repeated from year to year, at all Agricultural Experiment Stations in the last four or five years, to be superior to all other Cream Separators, many tests of the skim milk showing only .01 or .02, and are now still further improved and greatly increased in capacity for

**1900 OR THE NEW CENTURY.**

All experienced Cream Separator operators concede that the United States is unapproached in thoroughness of separation and perfection of manufacture. All gears are enclosed; Bowl Spindle covered with brass shield; have ball bearings. The most cost is put into their manufacture, and they are therefore better and will wear longer, yet are sold for less than others considering capacity and close skimming—are therefore the cheapest, because the best.

**Examine "New Century" Prices and Capacities.**

No. 9. Low Frame.	Capacity 150 to 175 lbs.	\$50.00
No. 8. " "	" 225 to 250 "	\$65.00
No. 7. High " "	" 350 to 400 "	\$85.00
No. 6. " "	" 450 to 500 "	\$100.00
No. 5. " "	" 450 to 500 "	\$125.00
No. 3 1/2. " "	" 650 to 700 "	\$165.00

Don't be inveigled into purchasing a Cream Separator until you have first sent for the "New Century" Catalogue of the United States, which will be mailed you free.

**Agents wanted in all towns not at present canvassed**  
**VERMONT FARM MACHINE CO.,**  
 BELLOWS FALLS, VERMONT.

**THE IMPROVED UNITED STATES SEPARATOR**

	List Price.	Our Cash Price.
No. 7	\$ 75.00	\$ 60.00
No. 8	\$100.00	\$ 80.00
No. 5	\$125.00	\$100.00
No. 3	\$200.00	\$160.00

PETER HEIL & SON, 210 West Sixth Street, Topeka.

maker must meet in his efforts to make fine butter should be recognized in the appointment of an instructor for the dairy course at the forthcoming term, and that it is the sense of this meeting that the board of regents appoint a man to that position who is familiar with, and has made butter in Kansas.

Seventh, That this committee at this time endorse the efforts of the editors of the Kansas Dairy Farmer in their efforts to promote the welfare of the creamery patrons of the State of Kansas for whom the paper is especially purposed to assist.

Eighth, That the newspapers represented here and containing reports of our convention be commended for their enterprise.

Ninth, That we as an association regret that favorable action to restrain the manufacture and sale of oleomargarine colored to imitate butter was not taken by our last legislature, therefore, resolved that we give all possible aid to the National Dairy Union in their efforts to secure a national law taxing yellow oleomargarine 10 cents per pound.

**Prizes for Patrons' Class.**

The following provision was made for prizes for the patrons' class next year:

Believing, as we do, that the patrons' class will result in great good to the Kansas creameries, we hereby agree to pay \$5 each, such amount completing a purse of \$50 to be awarded as first prize to the patron who regularly delivers milk to any creamery in the State, and who answers the schedules. The person answering the questions in the most satisfactory manner, will be awarded first prize, provided he has not previously won any first prize at our former patrons' class, and that the association offers a second and third prize for like examination, said questions to be arranged by our executive committee.

Signed: W. G. Merritt, Great Bend, Kans.; F. S. Hurd, Meridan, Kans.; H. M. Brandt, Canton, Kans.; T. W. Brady & Co., Kansas City, Mo.; Ed. F. Davis, Concordia, Kans.; Chas. Patterson, Abilene, Kans.; G. W. Hanna, Clay Center, Kans.; Walker Bros., Marysville, Kans.; Parker Creamery Co., Hutchinson, Kans.; F. H. Hill, St. Joseph, Mo.

**Election of Officers.**

The following officers were elected for the ensuing year:

President, W. F. Jensen, Beloit.  
Secretary and treasurer, A. L. Goble, Riley.  
Assistant secretary and treasurer, T. A. Borman, Enterprise.



**1900 DAVIS 1900 CREAM SEPARATOR**

Makes the work easy and profitable to the dairy farmer. Agents wanted. Catalogues free.

DAVIS CREAM SEPARATOR CO. 88-90-92 W. Jackson St. CHICAGO.

**THE AIR-TIGHT GRANITE PACKAGES**

Will keep butter fresh and sweet from summer to winter in an ordinary cellar.

A money-saver for the farmer and a money-maker for the agent. Country rights for sale.

A. D. ROBBINS,

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Smokes Meat Right. It is a liquid made by condensing hickory smoke. Applied with a brush or mixed with the brine when salting down meat. Gives meat a delicious flavor and protects it from insects. A 75c. bottle smokes from 250 to 300 pounds. Sold by druggists. Made by E. H. Wright & Co., 915 D. Mulberry St., Kansas City, Mo. Write for free book on curing meats and mention FARMER.

**LURKINS**

PIPE AND ELBOW FASTENER.

No Hardware Dealer or Individual Can Afford to Be Without Them. No danger of your stove pipe falling down and setting fire to your house, or scattering soot all over it while you are asleep or away from home. This pipe holder is perfectly safe and easily attached. Price by mail, 10c. each; 3 for 25c.; 1 doz. 75c.; special prices by gross. ED. S. CUSHMAN, Box 1203. CENTERVILLE, IOWA.

**THE WEAR COAL CO.**

Weir City,  
Pittsburg,  
Cherokee,  
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Anthracite,  
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WE SOLICIT THE CREAMERY BUSINESS.

Our Steam Coal is Unequaled. **TOPEKA, KANS.**



**HYDRAULIC CREAM SEPARATOR**

The only practical Farmer's Separator made. It does its own work and is thoroughly reliable.

10,000 Sold This Year Proves the Worth and Popularity of this Separator.

This separator saves more labor and makes more money than any machine you ever had on your farm.

Three Sizes.	Capacity of Milk—Gallons.	Price.
No. 1	5	\$ 8.00
" 2	10	10.00
" 3	20	15.00

Send at once for circulars, testimonials etc., sample separator.

Patented August 2, 1898. Special Prices for Quantities. ED. S. CUSHMAN, Box 1203. Centerville, Iowa.



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**NORCROSS BUTTER SEPARATOR AND CHURN.**

Awarded diplomas and premiums at State fairs. First-class Dairy Butter brings handsome returns.

**HOW USERS OF OUR GOODS EXPRESS THEMSELVES ON ITS MERITS:**

We have hundreds on file at this office, where any one interested may call for original: WESTLEIGH FARM, LAKE FOREST, ILL., August 22, 1899. **GENTLEMEN:**—We have been using the Norcross Butter Separator for more than three months with perfect satisfaction. The machine works easily and the butter is such that it brings the highest price in the market. The grain and flavor of the butter made in the Norcross Separator are perfect. We make from ripened cream but have, as a matter of experiment, tried it in churning both sweet milk and sweet cream, or that which has absorbed odors of any kind. I congratulate you on the production of a perfect machine which will be no more need for creameries, as farmers can then make gilt-edge butter for themselves and reap the benefits of the highest market prices. Very truly yours, MILLER PURVIS, Manager.

Write for Special Introductory Offer to First Buyers. Free Catalogue. Mention this paper when you write. **NORCROSS MFG. CO., 3517 State St., Chicago, Ill.**

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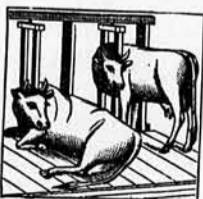
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Pig Troughs,  
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In Cast Iron

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200 registered rams, 150 registered ewes, also ram and ewe lambs. Sheep are true type, and square built beauties. Prices reasonable. Foundation stock a specialty. Come or write. Address

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 160 COWS, 40 BULLS.  
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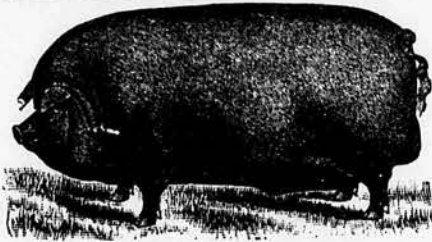
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THE SCOTCH BRED BULLS  
 Lord Mayor 112727 and  
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 HEAD OF THE HERD.



LORD MAYOR was by the Baron Victor bull Baron Lavender 2d, out of Imp. Lady of the Meadow and is one of the greatest breeding bulls of the age. Laird of Linwood was by Gallahad out of 11th Linwood Golden Drop. Lord Mayor heifers bred to Laird of Linwood for sale. Also breed Shetland ponies. Inspection invited. Correspondence solicited. A few young bulls sired by Lord Mayor for sale.

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 Past is  
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The Weavergrace  
 Future  
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The Weavergrace present will bear the closest investigation and comparison. No Hereford is too good for Weavergrace. Neither time, labor, money nor any other factor within our reach will be spared in an open, honest, energetic effort to make the **WEAVERGRACE HEREFORDS** the best herd of beef cattle in the world. Nothing from the herd offered privately. All reserved for annual spring auction. Three hundred and sixty-four days of the year devoted to the general Hereford interests, one day to the sale of the Weavergrace Herefords.  
 I have an Unrivalled List of registered Herefords (both sexes) and of grade Hereford steers and few aies on file for sale throughout the country, in my office, New York Building, Chillicothe. There are several great bargains. All are invited to inspect this list, and spend a day at Weavergrace.  
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CONSISTING of 32 BULLS, from 12 to 18 months old, 21 2-year-old HEIFERS, the get of Wild Tom 51292, Kodax of Rockland 40781 and Stone Mason 18th 42897, and bred to such bulls as Wild Tom, Archibald V 54458, Imported Keep On 76015 and Sentinel 76063, Java 64046.

40 1-year-old HEIFERS and 7 COWS.  
 These cattle are as good individuals and as well bred as can be bought in this country.  
 Finding that 400 head and the prospective increase of my 240-bred cows is beyond the capacity of my farm, I have decided to sell the above-mentioned cattle at private sale, and will make prices an object to prospective buyers.

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In order to reduce stock for winter farrows, will give bargains in young male and sow pigs. Fifteen choice young males ready for use. Some young gilts to be bred, and some older ones safe in pig, also a few yearling sows. I now offer two grand good yearling boars which I can not use longer. I prefer parties to visit herd; if not convenient, write your wants, giving postoffice, county, and State and mention KANSAS FARMER.

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**KANSAS FARMERS**

should try our Personally Conducted Tourist Excursions, going East or West, passing through Kansas every Week.

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Apply to Local Agents for Itinerary and Particulars.

Are you going to the National Creamery Association at Lincoln, Neb?



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