STOCK AND STALKS

J. R. ROBERTS

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STOCK AND STALKS

A Book for the Dairy Farmer

BY

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CONTENTS

CHAPTER I

INTENSIVE VERSUS BY-PRODUCT DAIRYING.....	1
---	---

CHAPTER II

THE DAIRY TYPE.....	17
CAPACITY	
TENDENCIES	
PHYSICAL DEFECTS	
DISEASES	

CHAPTER III

THE PURE BRED SIRE.....	23
-------------------------	----

CHAPTER IV

WHAT TO FEED.....	26
CHEMICAL ANALYSIS	
BALANCED RATIONS	
PASTURES	
HAY	
CORN FODDER	
SILAGE WITHOUT CORN	
SILAGE	
GRAIN FEED	
PREPARED FEEDS	

CHAPTER V

HOW TO FEED.....	44
BALANCED RATIONS	
WATER	
CALF AND HEIFER FEEDING	
CHEMICAL ANALYSIS	
RATIONS FOR THE DAIRY COW	

Contents

CHAPTER VI

VARIATIONS IN MILK TESTS.....	56
-------------------------------	----

CHAPTER VII

SUGGESTIONS FOR CONSTRUCTING A BARN.....	61
--	----

CHAPTER VIII

MILKING	63
---------------	----

CHAPTER IX

MILK PRODUCTS.....	66
BUTTER	
CHEESE	
COTTAGE CHEESE	
CREAM	
SKIM MILK	
WHEY	

CHAPTER X

MARKET MILK.....	74
WEIGHT OF MILK	
LEGAL REQUIREMENTS	
CLEANLINESS	
SANITATION	
COOLING MILK	

CHAPTER XI

EXPERIMENTS BEING TRIED OUT ON OUR DAIRY FARM	83
--	----

CHAPTER XII

DIFFERENT POINTS OF VIEW.....	92
-------------------------------	----

INTRODUCTION

In writing this booklet I hope to put into it information valuable to the average farmer who keeps cows. I make no claim for this little book as an addition to dairy science. It is rather a subtraction. I mean that I have been careful to include only the most essential information. Where a great mass of scientific data is gathered, it takes discrimination to distinguish between matters of great and less importance. To do this discriminating and to point out the most essential things, as I see them, is the purpose of this undertaking.

Those who wish more detailed information can easily find it prepared by those who have studied this matter in detail. I have not. In my experience in the dairy business I have tried to use to the best and most practical advantage the scientific knowledge that I could acquire from others. My experience has all been an effort to apply science to business. It has been a business experience, not one of research and investigation. There is much that I have found to be of no particular use to me,

Introduction

but there are many things that I have found to be of great importance.

Science digs out facts, figures, data, knowledge, or whatever it may be called. To take facts of science and make use of them in business is one thing which Webster's dictionary calls an art. This booklet, then, may not be classed as science for the writer is not so very scientific; it is not in itself a work of art for the writer is not strong on artistic ability; but is written on the art of keeping cows and paying the feed bills.

Stock and Stalks

CHAPTER I

INTENSIVE VERSUS BY-PRODUCT DAIRYING

Agriculture as a science is comparatively new. It is not like civil engineering, for instance, which is taught about alike in all places, and much of it the same as was taught a generation ago. Since I can remember most of what is now known about dairy science has been discovered. It is not surprising, therefore, that as the various ideas and doctrines come out they have both adherents and opponents. It takes time to clarify a situation and to prove what is the right conclusion. Some blame our agricultural colleges for not knowing more and knowing it sooner, and for spreading what we now know to have been in some cases misinformation. But the course taken was really the only one possible. Experiment stations have to try out a lot of theories in order to find which are wrong and

which are right. At present there are many things still unknown and much difference of opinion. If the discussion which follows seems to differ in some respects with recognized authorities, I still think that I may be right; and if wrong, I claim as good a right as any one else to make mistakes.

Here are some things to think about. At one time there were more real dairy cattle in Lancaster county than there are at present. There were fairly large herds of grade Holsteins producing milk where now there are scarcely any cattle at all. Intensive dairying at one time had a fine start in Lancaster county, but now there is not a herd large enough to be called a dairy, except those owned by purebred breeders. The city milk supply comes from a large number of farmers who produce milk as a side issue. The methods of feeding and caring for cattle on these farms is in the main contrary to the instructions given by the dairy department at the State Farm. The men who made dairying a business here were learning and following agricultural college methods. They had good grade dairy cattle and produced fully twice as much per cow as do the farmers now in the business. They all quit because it did not pay.

It so happens that I was one of the men thus engaged. I had a fine herd of fifty high-grade Holsteins that were producing as much milk as is now being produced by thirty of our average dairy farmers. My herd was sold after losing money for two years. We were in a cow-testing association at the time and the fine records made by these cows helped to sell them at a public sale. Right in sight of the agricultural college all that had been accomplished seemed to fade away, and the old red cow, which dairy science has tried for a generation to kill, came back to the very skirts of the city. Just now if every dairy cow in Nebraska would be slaughtered, their milk would hardly be missed but if the old red cow would go on a strike, not a wheel in any creamery of the state would be turning next week.

Why this remarkable turn of events? Well, there are two theories. One of these lets the agricultural college and all of us out without disgrace and is something of a slam on the farmer. The other gives the farmer credit for having more sense than we had. Certain it is that the farmer milking his beef cow produced milk for less than we Holstein men could do it. The first theory is

that the farmer did not know his costs and therefore kept right on while the deficiency came out of his hide. The second is that the farmer had us beat on the cost of production. Is one or the other of these theories correct? It must be. It would be like taking the hot end of a poker for me to argue that the farmer is a fool and to have one of his number remark that, even though he was, I went out of business against his competition. Some one else will have to argue that side. I have a different explanation.

In my judgment the difference came about in the general rise in price of labor, grain, and alfalfa. The milk that we produced was like a garment cut out of new cloth—it all cost real money. The farmer's milk was largely produced from corn stalks, wheat pasture, stubble fields, and draws pastured—material that must either be turned into milk or wasted. It had scarcely any market value. Our methods and our cattle were superior to his in many ways, but not enough to make up the difference in the cost of feed. The common method on the farm is to pasture corn stalks during the winter. It is a very wasteful method of feeding but it requires no labor. The cows gather the corn

that was missed in the field and eat the leaves and husks. Few cows may be kept on a farm where such methods are in use, but figuring the stalk of no value, such methods produce the cheapest butter fat in the world. The farmer had us beat on the cost of production. He did not feed grain and forget to figure its value. He fed the grain that the huskers left in the field. It had no value except as it came to the milk pail.

When the Dairy Cow Needs a Friend

At one time I worked on a ranch in western Colorado where a large number of range cattle were wintered. Alfalfa in that community was selling for three dollars a ton, but we fed it to the weaker cattle only. The strong ones could live on sage brush which cost nothing. Sage brush was not a better feed. It was not nearly so good, but the advantages offset the disadvantages. So it was with us. The advantages of the two systems were weighed and ours found wanting.

The average farmer's cow is a "scrub." She usually goes dry for three or four months of the year and, even when fresh, gives about half what a developed dairy animal should give. Why do farmers persist in milking "scrubs," then? Have we not all told them better? I'll say so! Holsteins and Jerseys are not so rare that farmers do not know what they are. Most farmers have owned a few but have gone back to the old red stand-by. Why? Are we wrong again?

In Wisconsin, Michigan, Illinois, Ohio, and all over the east the red cow is disappearing. People there do a great deal more of dairying than we do. Who knows the business better, they who do dairying as a business or we who do not? But argu-

ments are of no use when they go against known facts. The color of the cow is the result of a condition. The red cow has been better suited to a farmer's conditions and requirements. Dairy cattle can not rough it like beef or dual-purpose cattle. Where the custom is to stable feed and give good care to cattle, dairy breeds naturally take the lead. Where the dairy business is a side issue, and besides giving milk a cow is expected to face cold winds and to withstand periods of semi-starvation, the dairy type is not in it.

The strong, lean, well-developed dairy cows that have never been weakened by starvation or cold.

To understand the cattle business we must understand the fundamental principles upon which the various kinds of cattle are built. Hereford cattle, for instance, are a pure beef type. The beef animal is trained and perfected in the tendency to save everything to itself and to load up with fat and muscle. Some Hereford cows can hardly raise their calves because of the tendency of the mother to save all her nourishment for her own strength and protection. The cow boys on the range rarely think of milking a cow that has lost her calf. The typical beef animals give so little milk that they can go dry at any time even on good grass with little or no injury to themselves. Some dairy cows would die even though sucked by a big husky calf if they were not milked, because they give so much more than the calf could take. The dairy cow is bred and trained for generations to digest all she can and to give it all away, keeping nothing with which to protect herself against hard times. She builds no big muscles with which to climb mountains, or wade through mud and snow drifts. The beef animal if treated like a dairy cow simply gets fat and is finally turned to the butcher. The dairy cow treated like a beef cow is a tragedy to behold. I

have seen both Holstein and Jersey steers out on the range where Hereford cattle stay fat and strong and I have heard the cow boys cuss about letting them live, for they were more of a ghost than a reality. Cussed they were by men and God-for-saken, so it would seem. Since even the steers can not protect themselves to live where the Herefords will thrive, what can we ever expect of a producing cow? When she has given all away then goes up against the period of short pasture or semi-starvation, she begins immediately to readjust to meet the new conditions. But the work of generations can not be undone in a life time and she fails to meet the emergency and loses the vitality she naturally possesses.

The red farmer's cow is often called the dual-purpose animal. She is about half way between the beef and the dairy. She protects herself well but not to the limit as does the Hereford. She produces milk well but not nearly so well as do the highly-bred and highly-developed strictly dairy types. Not one of these three types of cows will do to substitute for any other. Each has a place to fill and each is the best animal in her place. There is nothing more foolish than to substitute the dairy

breeds for common cattle before we substitute the dairy man for the farmer or else convert the farmer to the dairyman's methods in feeding. The corn stalks and waste feed make the cheapest milk and the red cow is the most economical means of converting such feeds into milk, provided we want only a small production with the least possible effort. It takes more labor to prepare feed for animals and feed it to them than it does to let the animals range around over the field and do the best they can. If farm dairying is to be carried on in the future just as it has been in the past, the red cow is the farmer's best friend and he is not a fool for recognizing her as such.

This is not a pet theory of mine. It is a conclusion that I have had to swallow against my will. The situation has nothing of promise for the future. If we become a dairy state, we will have to put more labor and effort into milk production and do more like they do in other states. The stalks left standing in the field, feeding but a few thick-skinned cattle make the cheapest milk, only in case we figure the by-product feeds as of no value. We could produce a great deal more cattle for beef and for dairy purposes if we utilized what we now

waste. If all the corn in our state was shocked this year, think how much good feed would remain after the grain is husked out. Think how many cattle might be wintered. The stalks from one acre of average corn if properly conserved yield nearly enough rough feed for one cow during the entire winter. Fifty acres yield fully enough for forty head of cattle. Of course we should use alfalfa for part of the ration but alfalfa is our cheapest feed that is not a by-product. Grain will be required for cattle that milk, but raising calves and keeping dry stock is as much a part of milk production as anything else. All such cattle can be well-nourished and developed without grain. It will not pay to refine them to such an extent that they can not live on rough feed.

But conditions are changing again. Labor, grain, and alfalfa are all coming down and land is high in price. We will not long be taking only what we can get the easiest. The time is at hand when we are going to imitate the packer who saves all but the squeal. The conditions existing in the eastern states will be found here. I do not know how soon but they are coming. It will be a long time before the specialized producer can compete with the by-

product feeder, but the latter is going to save more of what he has and use it to better advantage as soon as he can get labor. Dairy products are going to be in great enough demand to pay the extra labor costs. I do not look for all of the system to be reversed. The farmer's idea of feeding cattle what could be used for nothing else has been and will still be his salvation. Those of us who produced nothing but milk were wrong, from the standpoint of economy, in my opinion. What I look for now is a combination between the two systems. Cows will be taken care of as well as we cared for our high producers, there will be a change in the methods of caring for feed, but a large part of the feed will be the by-products of other farming operations. What is the use of feeding all greenbacks when we can make use of feed that costs nothing? We could produce more milk by using specialized methods altogether but we can make enough without, and it will be cheaper.

But the standard methods, that always have been and still are taught, are altogether intensive. Every one talks of high records. There is not enough talk of low-cost records.

A few years ago there was published in the Ne-

braska Farmer the cow-testing association records of herds in Lancaster county. Some of these herds yielded a large production and others yielded much less. But the herds that produced less yielded at a higher rate of profit. The difference was in the amount of grain and expensive foods consumed in proportion to the production. During the last few years those who have fed grain and alfalfa as we used to feed, have found it difficult to meet expenses. We used to be taught that, since a cow required so much to maintain her body whether she produced milk or not and only the amount she consumed above that amount could be available for milk production, it was well to feed as much grain as possible without injuring the cow or reducing her flow. But the price of feed must be reckoned, as all admit now. And if grain is too high the larger proportion of our milk must come from the cheaper feeds. At present the grain market looks very bad and intensive dairying would be more profitable now than it has been for a long time.

But the combination, which I think is ideal, will be the best proposition all of the time. In all further discussions in this booklet I refer to dairy breeds exclusively for I believe that the tide is

turning and if the red cow and the old methods are still to take the lead, it is a waste of time to study dairying. If farmers wish to increase their milk production and find their way clear to devote more time to their cattle, this discussion may be of some assistance.

Dairy cows have certain definite requirements. One of the most important of these is that they go through no periods in which they do not have all they want to eat of at least good grass or good hay or roughage. If the grass begins to get a little short in the summer, we must not neglect to feed. Another important requirement of the dairy cow is that she be not exposed to hardships such as cold winds and rains. Starvation and storms, these two things above all—we must guard the dairy cow against.

I will describe how I think dairying should be conducted for the most profit on the farm so that the by-products may be utilized to the fullest extent practicable and at the same time the dairy type cattle may be kept producing to good advantage. I am not inventing this system, for I am describing the common practice of the people in the dairy states. In Wisconsin, Michigan, and Minnesota cat-

tle are kept largely on by-products. In the cheap feed lies the profits.

Elsewhere I have described my own methods of handling pasture, the idea of which came from Europe. But as to winter feeding, the whole eastern part of the United States sets a good example. I would want one or two silos, small in diameter but tall. I would want one acre of alfalfa and one acre of pasture for every cow that I expected to keep. If we have a large number of young stock, the pasture would need to be increased. I would fill these silos with corn, grain and all, and use the silage to feed only the cows giving milk. I would use a Smalley feed cutter with snapping attachments and use cut-up dry fodder containing no grain as the principal feed for the dry cows and all young stock on the place. The farmer usually milks only one-half as many cows as he has cattle all together. By using "Flink's Perfect Silo Seal" to protect the silage it may be fed all summer whenever needed without waste. What stalks remain to be pastured may be pastured by the milk cows and so may wheat be pastured during good weather. I would depend upon by-product feed for dry cattle and for part of the milk cow's ration. The amount of grain

that is in corn silage is never too much for any cow that is giving milk, but silage, corn and all, is too expensive for cattle that are not milking.

By such methods the eastern farmer easily keeps at least twice the number of cattle that the average farmer here is now keeping, and still he takes but little more of his land away from other farming operations. The intensive dairyman uses all that he raises for his cows and usually buys some besides. The by-product farmer in Nebraska has been in the habit of setting aside hardly any acreage for the use of his cattle. But the combination is positively a success and would have long ago been more in use in Nebraska had not the labor situation presented difficulties almost impossible to overcome. My farm is small and borders on the very edge of the city. Intensive dairying is the only thing practical for me even though I can not expect to produce as cheaply as farmers differently situated. I am re-stocking the farm this year.

CHAPTER II

THE DAIRY TYPE

Capacity. The first thing that we look for in a dairy cow is capacity—capacity to digest feed and to turn that feed into milk. The digestive and mammary systems of the cow should be strongly developed. On account of the location of these organs the dairy type of cow is wedge-shaped, being wider and deeper at the rear. Her wedge-shaped body, however, should be fairly wide over her heart and lung section, for she is required to breathe a great deal of air and to have great blood circulation. Her udder and milk veins should be well-developed. The four quarters of the udder should be fairly uniform in size. Her milk veins are more likely to indicate her history than her capacity, for no cow has very large veins until they have been developed by heavy milk production. Still in all good dairy heifers you will find well-established milk veins carried fairly well forward. These things indicate the capacity of the animal.

Tendencies. We must now determine her ten-

dencies. She must not convert her food into beef nor must she destroy her energy by nervousness and a tendency to too great physical activity. The head of the cow should be clean-cut and lean, the neck long and lean, and the shoulders narrow at the top. The joints should be open so that a man's fist could be thrust between the cow's front leg and her body. The cow should not be beefy at the rear. Even though she be fat she should not be of a square beef type. The udder should be attached high behind and the thighs should be narrow. In fact, we want a cow that is not an "easy keeper" but that will milk out clean. The cow should be soft skinned and fine haired. Beware of the wild-eyed, nervous, quick-moving cow for she wastes her energy. Beware of the sluggish cow for she will be sluggish in appetite and will convert her feed into fat instead of milk. Perhaps the best way to describe the disposition of a good dairy cow would be to say that she is alert and intelligent but calm and sensible.

Physical Defects. If you find that you have a cow with the capacity and the tendency to produce, it is time to look for the physical defects in the animal. Probably more men fail to notice physical

defects than any other thing, when buying cattle. Begin by examining the mouth of the cow. The age of the cow can be approximately told by looking at the front teeth. If the cow is young, her teeth are square, flat, and close together. When the cow gets older, they are round and wedge-shaped and tend to separate. At about twelve years the cow begins to lose some of her front teeth. In judging a cow's development and possibilities her age must always be taken into consideration.

The eye must look bright. A sick cow usually shows it in her face and in the way she holds her head with her nose sticking a little too far forward. She has lost her spirit. If the skin is rough, it is likely to indicate in some cases poor digestion and in other cases coarseness. In either case we do not want the cow. The thin form of the good milk cow without an ounce of surplus flesh must not give the impression of debility, but of efficiency and strength. The cow having digestive trouble is usually shrunk in the paunch and has the appearance of her skin being drawn tightly around her body in front of the udder. She should not be constipated, nor should she have scours.

The udder should not be meaty. After a cow is milked, her udder should be nearly like an empty sack. Each teat should be milked to see that it contains no evidence of garget. Each quarter of the udder should be felt to see that it contains no portion slightly more solid than the others. The teats should be examined for slight lumps which have usually been caused by rough milking and which may make a lot of trouble.

Diseases. Tuberculosis in cattle is a disease that is more contagious among barn-fed cattle than among those kept more in the open. In fact, I have never heard of range cattle being tubercular. Nevertheless, under conditions that exist on the average farm, the tuberculosis germ will thrive and cause havoc. It pays to be careful not to introduce such a disease into the herd. Often the fattest, sleekest cattle are affected and while they do not die from it quickly, yet as it progresses in a herd an animal will now and then die from the disease. Hogs and even chickens running with the cattle become affected and much loss results.

The accuracy of the tuberculin test in the main has been established beyond doubt. Laws now require that cattle which are shipped from one state

to another be tested, and the infected cattle can not be legally shipped except to a slaughter house subject to inspection. However, many cattle are shipped under false certificates sworn to by unscrupulous veterinaries. The only thing that we can do about it is to be careful in buying, deal with responsible men and buy the cattle guaranteed.

The number of cattle infected in Nebraska is probably about two per cent in the average farming districts and a much higher per centage among the strictly dairy herds of some sections. While we do not feel that we are ready for a law compelling all cattle to be tested, we do feel that each individual should protect himself and keep his herd free from infection. Bovine tuberculosis is not so contagious among human beings as it was once thought to be. But it is enough so that no further argument should be necessary to an owner of stock than that his own family or some one else may be infected with the disease from the milk.

Next to tuberculosis, contagious abortion is probably the milk producer's worst enemy. I do not know of any way for a farmer to detect this disease from an animal's appearance. I usually look for evidence, not in the cattle themselves, but on

the farm premises of the man who has cattle for sale. Be suspicious of any cow that does not readily get pregnant. When buying fresh cows always endeavor to see the cow's calf. This is not a doctor book. I need not discuss the symptoms nor the cure. I only wish to warn the buyer to be on the lookout.

CHAPTER III

THE PURE BRED SIRE

There is one law of breeding that does not seem to be recognized by people generally and in our judgment it is of greatest importance. This law is that the influence of the parent animals are not equal upon the offspring. This has been noticed in human experiences. No child is exactly one-half like his father and one-half like his mother, but is likely to be much like either one or the other. He is likely to be nine-tenths like one parent and one-tenth like the other. It is the same in grading live stock and this trait in breeding is of the greatest advantage to the breeder of grade stock. If the calf takes after the sire and the sire is a pure bred of strong type, the calf may be nearly as strong in producing ability as the pure bred ancestors. On the other hand, even pure bred cattle may breed back at times, and their offspring resemble some distant scrub member in the ancestry. Breeders are well aware of this fact and try very hard to keep all inferior cattle entirely eliminated from

their line of breeding. It is important that they should for their line should breed as true as possible, and really poor calves with them are rare.

The pure bred bull of a long established type is more likely to mark his offspring than is the scrub cow. A fairly large per cent, considerably more than half, of the heifers will be good and some of them nearly as good in milk production as the pure breeds themselves. Grade cows are very valuable as milk producers, but grade bulls should not be used as sires because they do not have the ability to breed true like the pure bred.

Most farmers have been in the habit of using a bull a couple of years and then selling him to the butcher before his real worth was discovered. A bull's ability to produce heifers that make good cows can only be definitely told after his heifers have freshened and made records. Some of the best pure bred breeders in the United States will not use a bull on their best cows until one hundred of his daughters are in the Advanced Registry which means that beginning at the age of two years they must produce 250.5 pounds of butter fat annually and must increase the production to 360 pounds of butter fat at the age of five years. In

this way the best bulls are ascertained and are used to the best advantage. But there is also a way for the average farmer to receive the benefits of a good tested-out breeding stock at low cost. I refer to the co-operative bull associations and quote from Kimball's Dairy Farmer concerning them:

“A co-operative bull association is a farmer's organization whose purpose is the joint ownership, use, and exchange of three or more high-class pure bred bulls. The territory covered by the association is divided into three or more breeding blocks and a bull is stationed in each block for the service of the fifty or sixty cows in the block. Every two years the bulls are interchanged. Thus, at a small cost, a bull for every sixty cows is provided for six or more years. The cost of bull service is greatly reduced, the best bulls obtained, and the bulls of outstanding merit are preserved for their entire period of usefulness.”

CHAPTER IV.

WHAT TO FEED

Chemical Analysis. The chemical analysis of feed does not by any means tell the whole story. Wheat straw, for instance shows up very well in chemical analysis but experiments have shown that it takes more energy to digest it than it produces. Even when we figure only the digestible nutrients, the nutrients which by chemical analysis are found to be digested by animals, we do not by any means have the whole story. For instance, in human food we find that the protein in milk is about four times as valuable as the protein in the bean. In the results of a feeding experiment reported in Dr. McCollum's "Newer Knowledge of Nutrition" on page 75, it was found that when the source of protein was the bean, four times as much was required for maintaining the body weight of the animal as when the source of protein was milk. We used to figure protein as protein and carbohydrates as carbohydrates but now we discriminate. We must learn to figure them in the results

they produce. This is extremely difficult to do scientifically. When an animal must have a variety of feeds who can tell just what proportion of her production is due to certain foods eaten?

We can get at these things in a general way, however, by experience. Feeding has long been known as an art. Some day it may be entirely a science. But that can not be said at the present time. We must vary the feeds used and learn by experience and observation what gets the best results. A chemical analysis of tender grass will not show it to contain more digestive nutrients than the old tough grass that the cows will hardly eat, but it requires much less energy to convert it into milk.

One year I listed some squaw corn about the tenth of July in a wheat stubble. By frost this corn was beginning to come into roasting ears. But most of the ears had not developed kernels. I filled the silo from this field and got, as nearly as I could ascertain, just as much milk from my herd by feeding that silage as by feeding silage made from mature corn containing considerable grain. The same amount of dry grains were fed in both

cases. According to analysis this result could not possibly be obtained.

Experiments have been tried in which the whole wheat plant, grain, straw and all, also the oat plant and the corn plant were fed separately to young heifers. The heifers fed the corn plant grew to maturity and bore young normally. The heifers fed wheat and oats did poorly, produced their young prematurely, all but one of which died soon after birth. This does not indicate that oat or wheat feeds are not good for cattle, but in themselves they are not sufficient. I do not think this deficiency can be shown in the chemical analysis but some of the food elements are hard to get. I think if this wheat and oat plant had been young and tender as a growing grass instead of a mature grain the heifers would have done well. Ground oats is one of the best dairy feeds I ever tried.

Balanced Rations. I do not know just to what extent a cow requires a balanced ration. Since some feeds have values over others that the chemical analysis does not show, I think the balanced ration figures and tables have been overworked. They are not entirely valueless, however. Some

will be placed in this book. Everyone knows that a cow should not be fed one kind of feed only. We should give as great a variety of feeds as possible and the cows likes and dislikes, together with the results in the milk pail, give about all the information concerning a balanced feed that the writer has ever used. We do not need to worry about the supply of protein here because we use so much alfalfa, or about the carbohydrates when we are feeding the product of the corn plant.

A variation from a balanced ration does not immediately affect the cow and usually one change offsets another. Experienced feeders of record-making cattle make use of the chemical analysis of feeds in their intense effort to have the cow digest a very large amount of food, yield a large amount of milk, and still keep her bodily weight about normal. But for farm conditions we should know that too great an amount of alfalfa, bran, and like feeds usually results in sleek, fat cattle and that cows fed principally corn and carbohydrates, if they are milking well, will look rather rough and get too thin. The writer at one time had alfalfa in such abundance that he let the milk herd run out in the field and eat all they wanted from the stack. They

had silage and other feeds about as usual, but they did not eat as much silage as they should have. The result was that the herd looked fine and thrifty but produced less milk.

Many people think that a cow is either lean or fat and if she fills out in her body she is always taking on fat, but the amount of lean meat on the body also varies. Protein feeds are muscle builders. They make animals grow. Carbohydrates supply fat and energy which is a separate thing from muscle. Many times if cows become overweight we reduce the total amount of feed consumed and get a large yield in the milk pail. "The eye of the feeder fattens his cattle." It also fills the milk pail. Scientific knowledge can help a good feeder but I doubt very much if it alone can make one. Rules and system can not be made to take the place of interest and attention.

For those who care to go thoroughly into the subject of feeding I recommend "How to Feed the Dairy Cow," by Hugh Van Pelt, Editor of Kimball's Dairy Farmer, Waterloo, Iowa.

I have referred those who wish to go deeply into the subject of feeds to more eminent authorities because I have never raced cows in a record contest

and am not an authority on the subject. The reason I have for writing is that I have viewed the subject from the standpoint of profit making rather than that of high production. Feeding for profit has been too little considered.

Pastures. The way that pastures are generally used is, in my opinion, the greatest mistake in the milk business. Certainly we can make two blades of grass grow where one blade of grass and one weed grew before. Most of the pastures that we see are either bare like a desert or weedy enough to hide a calf three months old. A cow can not get enough feed in the average pasture, no matter how many acres she mows over. There is no need to estimate how many acres of poor pasture a cow requires, but one acre of well-cared for pasture per cow is all the writer has ever had to use. While I have fed a small amount of alfalfa in the summer, I think it is safe to say that our cows had more grass per head than almost any cows in the county. Next year I expect to pasture fifty cows on thirty acres, feeding what is necessary in addition. I expect to get nearly enough grass in a reasonably good year for that number of cows.

The secret of the system lies in the fact that I

have the pasture divided into four parts and pasture one part at a time, then use a mowing machine to clip off all weeds or remaining grass close to the ground. Before turning the cattle into one of these pastures, I wait until the grass has had about four weeks to grow. If the grass gives out, the cow is given enough feed to make up the difference. I do not let the grass stay short, for if it stays short, the roots will also be short and in that condition it can not withstand drought. Any kind of grass will yield two or three times as much feed per acre, if allowed to grow a month at a time as it will if pastured off short all of the time. I let the cattle eat the grass off the pasture about as often as alfalfa is cut. Everyone knows that if they would cut their alfalfa every three days they would have hardly a hat full of hay at the end of the season. I aim to mow the pasture about the time that the cattle are taken out, for I do not want any old, tough grass for the next time that the cattle are turned into it.

Much of our pasture is a mixture of blue grass, timothy and sweet clover with the sweet clover predominating. I do not want to place too much reliance on shallow rooting grasses, such as white

clover and blue grass, although I have some pasture of that kind. I like to have about five acres of sorghum or Sudan grass to pasture once about the first of August and then again about the second week in September.

Sweet clover will root about four feet deep. Alfalfa will root much deeper but is not practical as a pasture. Blue grass and white clover, especially where cropped off short, root very shallow. Sudan grass will draw moisture three or four feet deep. Sudan grass is like sorghum and may at some time turn poison late in the fall, as far as I know, but I know people who use it regularly for pasture and have never had any such trouble. I have never pastured Sudan grass but have used sorghum, and have had no bad results. To get the most out of pasture we must have all the surface available for use and we must give the plant an opportunity to breathe in order that it may root as deep as possible, and then we should use deep rooting grasses such as sweet clover and Sudan grass or sorghum.

In getting at the value of pastures be sure to remember that the cow goes out to harvest the crop. I do not think that pasture is an expensive feed.

It is probably the cheapest feed we can get all things considered, when properly managed.

Hay. Four tons of alfalfa hay contain more nutrients than ten tons of silage, and hay is cheaper to raise and cheaper to harvest. The intensive dairy farmer makes alfalfa hay form as large a part of his ration as practical, for a certain variety is needed. However, figuring alfalfa as against corn fodder, the fodder is the cheaper under average conditions. The by-product farmer will do well to use as little alfalfa as he can and still get good results.

The principal value in alfalfa hay for cattle feeding is in the leaves and the results obtained are so dependent upon the kind of hay we get that we consider that part of the secret of feeding lies in putting up the hay. It has been demonstrated by Headdon of the Colorado Experiment Station that where alfalfa is put up by the most careful method, three hundred and fifty pounds of leaves are lost for every ton of hay put up. Where alfalfa is carelessly handled and most of the leaves fall off, we lose as much as three thousand pounds of leaves for every ton of hay put up, and the hay that remains is of very little value so far as milk cows

are concerned. Not only do we lose the leaves of alfalfa but we can lose the food value out of the leaf very easily. The alfalfa leaf is very easily digested and the nutrients so easily digested are leached out by rain. They even leave the plant when it is bleached in the sun. The stem of the alfalfa has some value, however, if it is cut young enough to be tender. Old, woody stems will show well in a chemical test but will show poorly in a profit test on a dairy farm.

We can judge the feeding value of alfalfa by its color. Well-cured hay should be pea-green, without must and not dusty. We get more alfalfa by raking it soon after it is mowed, and by curing it in windrows or in shocks, than if we let it remain spread out to bleach in the sun. Besides curing hay in the shock, I have seen another method used and good results obtained where the barn was very large in proportion to the amount of hay put in it. Hay was hauled in from the field very green and dumped by slings along the center of the barn without being tramped. After several days it is spread. The heated hay, when lifted up in the air and piled up loose, cools off rapidly, the heat help-

ing greatly to dry off the moisture. Such hay will not heat again and it retains its color.

I do not think there is any other grass so valuable for hay as is alfalfa. Before we had alfalfa we used cane and millet. Sweet clover is favored by some. It is about the same as alfalfa chemically, and I do not doubt that it makes a good hay if not allowed to get woody. I have never used sweet clover as hay. Sudan grass is a sorghum and has come into some favor. It has about the same food value, however, as the corn stalk which the farmer already has available.

Corn Fodder. There are thousands of acres of corn stalks being pastured in Nebraska and Iowa that have not much more value as they stand in the field than the dead grass by the roadside. Saved and utilized they are the great source of wealth that as yet is almost untouched. Their yield is like a low-grade ore found in abundance. Dry fodder containing no grain is worth at least half as much per ton as alfalfa and the yield is approximately two tons per acre. I say it is worth half as much but I have to guess at it. It contains just as many pounds of digestible nutrients per ton as alfalfa and more than prairie hay. How

much it is worth depends largely upon the conditions under which it is fed. It costs no more to cut and shock fodder than to husk a field of corn. Cutting up the fodder and husking out the ears by machine is not an expensive operation. Remember that hay must be brought in from the field. The entire cost of cut fodder for feeding can fairly be figured as about the cost of operating the machine that does the cutting and husking. It is the cheapest feed that we can get.

Many years ago there were several large corn shredding machines sold throughout this territory. They husked the corn and shredded the fodder but they did not prove a success because fodder, unless unusually dry, gets musty if cut up fine with an ensilage cutter and piled up. The new and really successful way of handling fodder is with a small machine that runs with a small gasoline engine. A supply of fodder should be cut up every ten days or two weeks until a time comes when the fodder is real dry—not earlier than December. Then the job may be finished and the feed will last indefinitely.

Silage Without Corn. Some feeders put this cut-up fodder in a silo as soon as the corn is dry

enough to keep in the crib. They run water in with it and all reports seem to agree that it makes a good silage. I have not tried this, but I hope the scheme has in it the final solution of the problem. Silo agents have been in the habit of arguing that you can afford to feed silage, corn and all, to all of the stock on the place and let the corn stalks that are not put into the silo go to waste. I do not agree with them. Instead of putting fifteen acres of corn in the silo where much of it is to be fed to young stock and horses, use twenty or even twenty-five acres of stalks alone and you will get just about as good results. But think of the saving. The corn stalks are a by-product. You had to farm so many acres to get them. A part of your business is raising corn and the stalks are paid for by the grain.

Suppose then you feed grain grown on five acres of land. You are using just one-third of the acres to feed your cattle that would be used if you had put in fifteen acres of corn and fed it, corn and all. This shows the advantages of the by-product producer. It fills in the big gap that has been forgotten. It is figuring on a cost basis rather than that of yield or speed in production.

Last winter a feeding experiment was tried at the Wisconsin Experiment Station in which corn silage with grain in was tested against silage from which the corn had been picked. The result showed that the cows ate slightly more silage when it contained the grain and yielded on an average three pounds more milk. The cost of the milk produced with and without the grain in the silage was exactly the same. Silage was figured at \$6.50 per ton, corn and all, and without grain at \$4.00. Since the average farmer has cornstalks to waste and only has to figure the cost of saving them, they should not be figured at nearly two thirds of the corn crop, even after they have been made into silage.

However, it usually pays to feed grain to cows that are milking. The main saving in the use of husked fodder lies in getting cheaper feed for growing young stock and feeding dry cows.

I recommend a system of feeding silage, corn and all, to producing cows only. If you do not have cows enough to prepare to feed them separately, it will pay better to use no silos that have grain in them at all. Feed the grain to those cows only that are giving milk and will pay for it, or the cat-

tle that you are fattening. Hold the rest of the grain for high prices. It will pay better.

Silage. The important thing about a silo is to make it tall enough and small enough around. The following dimensions are approximately correct:

For 12 to 15 cows, silo should be 10 feet in diameter

For 20 to 30 cows, silo should be 12 feet in diameter

For 30 to 40 cows, silo should be 14 feet in diameter

For 40 to 60 cows, silo should be 16 feet in diameter

Silage will spoil on top unless at least two inches are fed off each day. It usually pays to have several small silos rather than one big one because during the summer months you may want to feed only a part of a ration. The figures given are for full rations. Have the silo air tight. Cut the corn fine and put lots of effort on tamping it. The "Flink's Perfect Silo Seal" is a canvas that is treated with some kind of tar preparation. It spreads out over the top of the silo and is filled more than a foot deep with water. This weighs down the silage and makes a good air tight cover. Very little silage decays under it. With such a cover you can feed periodically and still lose hardly a day's feeding of silage.

Grain Feed. Grain should be fed mixed with other feeds. I have often been told how foolish

was the old idea of the cow losing her cud. But a cow can hardly re-gurgitate and re-chew grain by itself, and all food eaten by a cow should be re-chewed. If food passes into the intestines without being chewed a second time, it is likely to sour and cause scouring and loss of appetite or even death, when a large amount of grain has been consumed. We usually feed grains with silage or fine-cut alfalfa. Alfalfa run through an ensilage cutter without any re-cutting attachment, is said to make cows' mouths sore, but I would much prefer to feed it that way and risk sore mouths than to risk the grain by itself. Some farmers feed corn and cob-meal. The cob is of no value except to lighten the ration, but if there is nothing else to dilute the grain with, by all means use the cob. Oats, corn, hominy feed, which is a by-product in the manufacturing of corn meal, bran, which is not very valuable where plenty of alfalfa is fed, and oil meal form our principal feeds for dairy cows. Some get very good results by feeding ground speltz and barley, others by feeding ground rye. Corn, oats, wheat feeds and oil meal will generally form the main part of our ration. The average farmer is hardly warranted in looking farther for

grains to feed. Oil meal helps as a conditioner and is fed in small amounts only. Cottonseed meal may be of value but has never proven so in the writer's personal experience.

Grain should be ground so that all of the nutrients may be absorbed. The amount of grain to be fed varies with the amount of milk that the cow is producing. One pound of grain to every five pounds of milk is a fairly good rule to follow. If more grain is fed there should be another reason for it, and that is that the cow readily responds to more feeding and makes sufficient profit to pay for the extra grain. The old rule, in the main, is true that it takes a certain amount to maintain bodily weight of the animal, and that the more feed above the maintenance ration that she can consume and turn into milk, the more the profit. But even that rule should not be taken too literally. If the extra feed is all grain, it may be too expensive.

Prepared Feeds. There are many kinds of prepared feeds on the market and I have no right either to knock or to boost them, because I know practically nothing about them. Where there are combination feeds, intended to make a balanced ration, I think the farmer would very likely be pay-

ing a good deal for the combining. Where a mill man buys grain from farmers and from those grains prepares feeds that are not by-products of other milling operations, I think the price would be high. I have known farmers to sell alfalfa hay and buy alfalfa meal, but I do not think it pays to do those things. All I would say concerning prepared feeds would be to experiment carefully and to buy them, not on their guaranteed chemical analysis, but on what results they actually show in the milk pail. Some prepared feeds contain oat hulls which are about like wheat straw to digest. Dried sugar beet pulp is a by-product feed containing mostly carbohydrates, and seems to have some benefit as an appetizer. Cattle like it for a change. Where it is not too high and carbohydrate rough feeds are to be purchased, it might be profitable to try it.

CHAPTER V.

HOW TO FEED

Balanced Ration. Cattle like variety in their feed. Not all cattle have the same tastes and desires. When one cow refuses to eat her grain, it is well to try her on some other mixture. A good feeder usually has several grain feeds on hand at a time and is continually changing and trying out rations. By checking his results at the pail, he acquires knowledge that is more practical than any chemist can impart. We know that a cow's food must contain the necessary elements needed for her bodily maintenance and the production of milk. We must supply the substances needed. Rules for figuring values of feeds and examples of balanced rations are given below, but we also let the cow in on the discussion. We should not follow rules so closely that we ignore her likes and dislikes or overlook the results that she puts in the milk pail and the pocket book. There is probably no living creature that has for its natural diet a balanced

ration, unless it be a carnivorous animal that eats its prey whole—feathers and all.

A poorly balanced diet may be fed for several months before any results begin to show. Cattle do fairly well on the corn plant (mainly carbohydrates), and they also do well on pure alfalfa (a protein feed). They do better on a combination of the two, but the combination does not have to be in just the right proportion. In deciding what to feed a cow the good feeder uses his eyes more than his pencil. If the muscle and body of the animal needs building up, he uses protein feeds in large proportions. Cattle inclined to be too sleek and fat often milk better if fed more carbohydrates in proportion. But we should never pass up one or the other completely. Notice that I speak of only two substances in food—protein and carbohydrates. There are others, but we need not be concerned about them. All we want to know from the chemist is approximately the amount of these two elements the feed contains. Fat is considered the same as a carbohydrate but has more than two times the value of carbohydrates.

Dairy cows should be kept sleek and thrifty, but lean while they are producing milk. The dry cow

should be allowed to get as fat as possible, for the fatter and more thrifty she is the more milk she will give, after freshening. To maintain the cow in the right condition, we consider both the kind and the amount of feed. Many times we decrease the grain ration to keep a cow from getting fat and going dry too soon. Too much grain fed is a great waste. The right amount to be fed can not be figured so much by the size of the cow as by what she does with it. The milk pail contains the answer to most feeding problems. Increase the feed slightly and if no more milk is produced, begin to decrease and watch what happens. We have to do this for each cow just as we have to adjust the carburetor on a Ford.

Elsewhere in this book, I discuss pastures and how to make the most of them. I get grass that is tall enough for the cattle to eat to the best advantage and I keep it from getting old and tough by using the system of divided pastures described there. But in doing this, the grass must be pastured off fairly close before turning the cattle into the next pasture. If care is not taken, the cattle are having alternately a feast and a famine by the change. To offset this, I usually feed as much

good alfalfa as the cows will eat all of the time. It does not require much hay but it makes up for the variation in pasture. Even when on fine pasture, cows like a little hay and should have it. I usually pasture cows at night as well as during the day. By all means feed cows at night if they are required to stay in the lot.

Where the heaviest records are made in milk production, they are nearly all made at prohibitive costs so far as the value of the product is concerned. This is because too large a proportion of the feed consumed is high priced. We must take into consideration the price of grain, the price of rough feed, and the price of milk products, before we can determine the proportion of grain and other feed that should be given to the dairy cow.

We can make milk out of rough feed without any grain under the proper conditions. When grain is too much out of proportion in price, we can safely do without it, if our rough feed happens to be good pasture or good alfalfa hay and silage. If our roughage is too poor, it rarely pays to compel good dairy cows to live on it alone, for their future usefulness will be impaired by starvation. A drought in summer with the resulting short pasture often

knocks down the milk flow for all of the next winter and makes all that year's production more expensive. Starve a good cow and she soon becomes a poor one, for she must adjust herself to the new condition. The new condition she adopts is the same as that of the scrub. The scrub is a product of starvation. She has been bred to withstand hardships instead of using all efforts to produce milk. Never let a good cow go hungry for pasture or hay.

Water. A milk cow requires about twelve and one-half gallons of pure water per day. In summer it should be fresh and cool water. In winter it should be fairly warm. The water should be as accessible as possible at all times. Twice a day is not often enough for milk cows. Especially when cattle are on dry feed, the more water they can be induced to consume, the more butter fat and milk solids it will put into the pail. In the winter we usually water cows three times a day in the barn with water no colder than comes from the well, and slightly salt their feed so that they will drink water in abundance. I do not know just what effect stagnant, dirty water has on a milk cow, but do not think I would want to drink the milk that

is made up largely of such water. Also if cattle wade in infected water and get their udders and teats in it, the milk will to a certain extent be infected as is the water.

Calf and Heifer Feeding. In raising calves by hand there is more danger of overfeeding than of underfeeding. There is also danger in feeding milk that is too cold. In feeding an average young calf we usually take about two quarts of the first milk that is drawn from the cow, which is low in butter fat, and feed the milk fresh and warm with the animal heat in it. After three weeks, skim milk may be substituted especially if it is warm and fresh. If the milk is artificially warmed it should be fed at a temperature of at least eighty degrees. Do not dilute milk with water. Let the calf have what water it wants separately. A calf should have milk until at least three months old but at the end of a week it will eat shelled corn and oats. These grains should be fed liberally to calves that do not have enough milk for a complete ration. After a calf is one month old it may be raised on milk made from dried buttermilk or condensed buttermilk or on skim milk of any kind, provided it is not fed too much at a time nor fed milk that is

too cold. No changes such as from sweet milk to sour milk should be made suddenly. If feeding condensed buttermilk the milk after being diluted should be tested for solids with a lactometer. Some manufacturers of such products give directions for reducing it with water to such an extent that it would look like ordinary skim milk but have only half its value. This may make it appear that the feeder is getting a lot for his money, but he will not long be fooled by directions of that kind if he is watching the cost of his feed and the growth of his calves and knows what results he should expect for his money.

People sometimes tell of stunted calves that turned out to be good cows but I do not think that a calf can be stunted a minute without being affected. If a stunted calf makes a good cow, which seldom ever happens, certain it is that if the calf had been well nourished the cow would have been even greater. Animals do not grow all of their lives. They grow while they are young. Every minute of that youth period that we lose for growth is lost forever. Growth is the natural development of bone, muscle, nervous system, circulation, etc., that the animal needs for hard work

when mature. Breeders of pure bred cattle, who expect to make records with their young stock, feed them grain every day. I do not think this is necessary or practical for the farmer to do, but certain it is, that no promising heifer should ever be allowed to get thin. She should have good pasture during all of the summer and should have plenty of well-cured feed, corn fodder or corn silage, and a fair amount of alfalfa every day during the winter.

Chemical Analysis. A chemical analysis of some of the most commonly used feeds for dairy cows follows:

FEEDING STUFF	Total Dry Digestive Nutrients in 100 lbs.				
	Matter in 100 lbs.	Crude Protein	Carbo- hydrates	Fat	Total
Alfalfa Hay	91.4	10.6	39.0	0.9	51.6
Timothy Hay	88.4	3.0	42.8	1.2	48.5
Prairie Hay (Western)	93.5	4.0	41.4	1.1	47.9
Clover, Sweet, White..	91.4	10.9	38.2	0.7	50.7
Sorghum Fodder, Dry..	90.3	2.8	44.8	2.0	52.1
Corn Silage	26.3	1.1	15.0	0.7	17.7
Corn and Its Products					
Corn, Dent	89.5	7.5	67.8	4.6	85.7
Gluten feed	91.3	21.6	51.9	3.2	80.7
Hominy	89.9	7.0	61.2	7.3	84.6
Wheat and Its Products					
Wheat	89.8	9.2	67.5	1.5	80.1
Bran	89.9	12.5	41.6	3.0	60.9
Wheat Feed (Shorts and Bran)	89.9	12.9	45.1	4.0	67.0
Rye and Its Products					
Rye	90.6	9.9	68.4	1.2	81.0
Rye feed (Shorts and Bran)	88.5	12.2	55.8	2.9	74.5
Oats and Its Products					
Oats	90.8	9.7	52.1	3.8	70.4
Oat Hulls	93.2	2.0	45.2	1.3	50.1
Emmer (Spelt)	91.3	9.5	63.2	1.7	76.5
Linseed Meal	90.4	31.7	37.9	2.8	75.9
Cotton Seed Meal.....	92.5	37.0	21.8	8.6	78.2

Rations for the Dairy Cow. Haecker's standard for the feeding of dairy cows is as follows:

DAILY ALLOWANCE

	Crude Prot. lbs.	Carbo. lbs.	Fat lbs.
For Maintenance of 1000 lb. cow.....	0.7	7.0	0.1
For each pound of 3% milk.....	0.047	0.2	0.017
For each pound of 3.5% milk.....	0.049	0.22	0.019
For each pound of 4% milk.....	0.054	0.24	0.021

To illustrate the table there follows the allowance for a 1000 pound cow producing 25 pounds of 4% milk daily:

	Crude Prot. lbs.	Carbo. lbs.	Fat lbs.
For Maintenance	0.70	7.0	0.10
For 25 pounds of 4% milk.....	1.35	6.0	0.52
Total	2.05	13.0	0.62

Below are given some balanced rations commonly fed to dairy cows:

		Dry	Diges-	Car-	Total
		Matter	tible	bohy-	Diges-
			Protein	drates	tible
				and fats	Nutri-
					ents
	lbs.	lbs.	lbs.	lbs.	lbs.
No. 1					
Corn	10	8.95	.75	7.24	8.57
Corn Stover	10	8.10	.21	4.31	4.61
Alfalfa Hay	12	10.97	1.27	4.78	6.19
No. 2					
Corn Silage	40	10.52	.44	6.28	7.08
Alfalfa Hay	10	9.14	1.06	3.99	5.16
Wheat Bran	2	1.79	.25	.89	1.21
Corn Meal	6	5.32	.41	4.35	5.08
No. 3					
Corn Silage	35	9.20	.38	5.49	6.19
Alfalfa Hay	10	9.14	1.06	3.99	5.16
Ground Corn	5	4.43	.34	3.62	4.19
Wheat Bran	5	4.49	.62	2.23	3.04
Linseed Meal	1½	1.35	.47	.61	1.13

At the Nebraska State Fair in 1920 there was in the Dairy building a large Holstein cow designated as the champion cow of Nebraska for 1919. She is owned by Chris Stryker of Red Cloud. I copied from the records the amount of feed she consumed

in a year and the amount of her production. They are as follows:

Feed		Returns	
lbs.	lbs.	lbs.	
Corn1790	Beets9645	Milk26,721.5	
Oil Meal1352	Dried beet	Butter1,066	
Barley463	pulp1254		
Bran2312	Hay4068		
Oats498	Silage4680		
<hr/>		<hr/>	
Total6452	Total19,647		

It will be noticed that she consumed a little less than 18 pounds of grain per day on an average throughout the year, that the grain consisted of five varieties, and that the rough feed was of a high order, which makes it more expensive than most of us can afford to use as a regular feed. Beets are chemically about equal to corn silage, but in actual results in feeding they are considerably superior. I have not fed dried beet pulp, but I have fed it fresh and it is a very good milk producer. Cows milk down thin on it. If we would increase the figures on the dried beet pulp to what it would be if the pulp were fed fresh, it would bring the beet ration up to at least three times the amount of the silage ration.

CHAPTER VI.

VARIATION IN MILK TESTS

G. W. Shaw in Hoard's Dairyman of March 10, 1916 says:

"It is a well-known fact that the percentage of butter fat in the milk of cows increases very materially toward the end of a period of lactation. There are also other slight changes in that period. During the first month the fat generally averages higher than during the second month. Under normal conditions of feed, etc., the fact increases from the third or fourth month to the end of lactation.

"Although it is a fact that cows cannot be fed to give beyond a certain percentage of butterfat, yet it has been proven many times that if poorly fed for a considerable length of time, the average test will decrease. This is especially true if cows become thin and poor in flesh. Many times this will account for a farmer's average herd test dropping from one period to the next. It is also noticeable that the quantity of water taken, whether as water or succulent feed, affects the herd. This is

particularly noticeable when cows are changed from a diet of dry hay to green feed or vice versa.

“It has been noted that the change of weather affects the test. A sudden cold period coming will usually decrease the quantity of milk, but increase the percentage of fat. If the cold period continues, this change will tend to right itself. It would seem that there is a connection between the question of heat and cold and the amount of water taken.

“It is a well-known fact that the first milk drawn from a cow’s udder is very low in butterfat, not over 1%, whereas the last drawn is quite high, sometimes reaching 10%. The importance of exhaustive milking is evident. By carefully milking to the fullest extent each time, the test will undoubtedly be higher than if milking were not exhaustive. This, continued over a period of time, would have its effect on the 15-day test.

“Another very important point we wish to make is this, unless a man who does his testing at home understands how to do it thoroughly and is very careful in taking his sample, he will not check with the factory test. There are several reasons for differences between tests made on samples taken at

the farm and those made on samples taken at the factory.

“Many farmers have a habit of taking a little cream or top milk for family use, and think that it will not materially affect the average test. As a matter of fact it will affect materially. For instance, if a farmer were producing 100 pounds of milk testing 3.5% and he used one quart of top milk, testing 10%, his average test would be reduced .2 of 1%; that is, instead of delivering milk testing 3.5% it would actually test 3.3%.

“Some farmers adopt another method; they use, for family purposes the milk from a cow which gives the richest milk, so that the result is always the same, the average test being lower.

“Another cause of difference in tests, and we think this is a very important one, is found in the condition of the milk when received at the factory. Some farmer's milk, when brought in, is smooth and homogeneous; some bring in milk which is slightly churned; that is, there are small particles of butter, which is separated butterfat floating on the surface. This latter milk is very hard to sample; the sampler is plunged into the milk and is likely to miss a due proportion of these floating

particles. In addition, some of the separated butterfat is sure to be left behind, both on the sides of can and on the cover. Butterfat adheres to any surface much more rapidly than any other of the milk solids. It is quite evident that milk which is partially churned will get a lower test at the factory than it did at the farm before it became churned.

“In order to prevent this churning, it is most important that the milk be quickly and thoroughly cooled after milking. If milk is poured into cans and stirred and handled in a half warm condition, it is sure to separate to some extent. While the particles of butterfat are not large enough to be particularly noticeable, they are there and adhere to the surfaces as described.

“Another condition which causes trouble in sampling, is found where some of the cream is firm and floats around in hard lumps but is not churned. This kind of cream is also hard to sample and these lumps are liable to be left behind on the sides of the can and cover. We believe this condition is caused by allowing milk to cool spontaneously. That is, instead of cooling quickly, the farmer fills up his milk can and lets it stand to cool slowly.

This is liable to give a hard cream on the surface which does not break up readily. The farmer, therefore, will get a better test by **cooling his milk quickly and thoroughly and refraining from using the top milk for family use.**

“We have come to this conclusion, namely, that certain conditions affect cows and their work, the same as that of human beings. As someone has said: ‘Put yourself in a cow’s place and try to get her point of view. Could you do good work if a swarm of flies were bothering you all the time? What effect does an extremely warm day or two have on your capacity for work? If you were out in a cold, rain, and wind storm, how would it affect your work? Suppose you were thirsty and had to wait two or three hours before you could get a drink and then got foul and stagnant water? Or, suppose that someone stronger than yourself would chase you away from the shade or sheltered spot or forced you to move when you were resting or eating? Suppose you were forced to eat food that you did not like or enjoy? How long would it be before these things would show in your work? Any or all of them would impair your efficiency and lessen your ability.’ ”

CHAPTER VII.

SUGGESTIONS FOR CONSTRUCTING A BARN.

Since there is so much information available concerning construction of barns, it is not necessary for me to discuss it here except to criticize the standard forms. On most farms at hay-making time there is no time to haul hay to the dairy barn so it is stacked in the field and hauled in during the winter. Many large dairy barn hay mows are constructed at a great deal of expense and stand empty most of the time in this climate. Before building large, expensive barns it might be well to consult those who have built to see how they are getting along. On an average farm I would suggest a one story shed for the cows built as a lean-to or butting up against a hay shed. This hay shed need not be very large.

In most expensive barns there is installed a litter-carrier that runs on a track. If I were going to use a litter-carrier at all I would have the thing so that it could be let down below the level of the gutter and shove the manure down the gutter into

it. This means would save all the liquid manure which is more valuable and would save the effort required to lift the manure with a shovel. When full the carrier could be hoisted, run on the track, and dumped into the wagon or wherever desired. But why use a carrier? Why not have the gutters run through the side of the barn and a wagon or manure spreader standing beneath? It is very easy to push the manure from ten cows down the gutter. Two gutters could run into one wagon which would be left standing outside of the barn on lower ground. The barn could either stand on a side hill or a place could be dug to run the wagon into. If hogs are to work over the manure, a concrete basin should be constructed to hold it.

The feed trough should be so made that it may be used to water the cows during cold weather.

CHAPTER VIII.

MILKING

The cow's milk is partly manufactured in the udder at the time it is being drawn. The process is like digestion and is interfered with by any nervous tension or shock. The prick of a pin that will make a cow jump at the time of milking has been known to greatly reduce the butterfat of the milk given and at the same time to reduce the supply. Shepherd dogs that go after cows are likely to perform their labor at a very high cost in milk. A milk stool used as a weapon knocks a lot of money out of the farmer's pocket. A rough milker who irritates a cow causes much trouble also. If I were to judge a dairyman by just one thing I could tell most about him by noticing how well the cows liked to have him milk them. Where a cow has to dance to the jerking of rough hands and listen to profanity of the milker, that is plenty of information to decide that on that farm dairying does not pay. There are

few cows that will treat a milker any better than he treats them.

For sanitary reasons I do not believe in milking with wet hands, but if a cow's udder is caked, the best cure that I know is to draw the milk into the hands very slowly and rub it into the caked udder until it is absorbed through the skin. I do not know or care why, but there is something about a cow's milk that is good for her caked udder when applied to the outside. One treatment of an hour's duration, milking the milk a stream at a time and working it into the caked udder, is often sufficient to cure even bad cases. Cow's teats should never be allowed to get sore, for clean milk can not be produced from sore, bleeding teats. It may be necessary to apply antiseptic medicines when they are sore, but a good way to keep the teats soft and pliable so the cow will not be irritated by milking is to take the last streams or two in the udder, milk it into the hand and use it to rub into the teat. The solids in the last streams of milk are about one-half butterfat and this greases the teat with the best kind of grease that I know.

Having employed a great many men on the farm I have found from experience that two out of three

do not know how to milk. Of these, some can be taught but many are not worth bothering with. Many are too rough and many do not seem to be able to get all the milk from the udder. To get all the milk from one quarter of the udder the milker should use both hands, using one hand above the teat to squeeze the milk into the teat and with the other hand milk it into the pail.

CHAPTER IX.

MILK PRODUCTS

Every milk producer should make some study of the principal products that are made from milk, for such information may help to market it to a better advantage.

Butter. The law requires that butter contain 80% butter-fat and that it shall contain less than 16% moisture. In 100 pounds of creamery butter there is usually about 3 pounds of salt, 1 pound of casein and between 15 and 16 pounds of water.

Figuring that butter contains 80% fat for the minimum which allows for the maximum amount of water, the following amount may be obtained from 100 pounds of milk:

100 lbs. of 3% milk will produce $3\frac{3}{4}$ lbs. of butter.

100 lbs. of 4% milk will produce 5 lbs. of butter.

100 lbs. of 5% milk will produce $6\frac{1}{4}$ lbs. of butter.

Cheese. It usually takes about 10 pounds of 4% milk to make 1 pound of cheddar cheese, which is the common cheese usually sold at the stores. This

cheese will test out about 36.8% fat, 25.5% protein, 6% sugar, ash, etc., and 31.7% water.

Cottage Cheese. Cottage cheese is usually made from skim milk. 100 pounds of average skim milk will make from 12 to 15 pounds of cottage cheese, such as is usually sold on the city market. Where it is creamed the cream is put in after the cheese is made.

Cream. 100 pounds of 4% milk will produce: 20 pounds of 20% cream and 80 pounds of skim remaining, 13 $\frac{1}{3}$ pounds of 30% cream and 86 $\frac{2}{3}$ lbs. of skim remaining, or 10 pounds of 40% cream and 90 pounds of skim remaining.

The average cream sold tests about 30% butterfat, so on the average the farmer has left about 86 pounds or a ten-gallon can of skim milk for every 100 pounds of 4% milk.

Skim Milk. The value of skim milk on the farm as feed is an important one for the farmer. The price of whole milk in the city is not always high enough so that it pays the farmer to sell his skim rather than to use it for feeding. During the flush season in the spring when milk dealers are all burdened with a surplus of milk, it would be a great advantage if more farmers would separate

and feed the skim milk to hogs. I will endeavor to give here as accurately as possible what real information I can gather from Experiment Station reports concerning the feeding value of skim milk. At the outset it might be well to state that on this question I have never known any two agricultural experts to agree and experiments need to be carefully analyzed before they yield true information.

I can prove to you from experiments published in Henry & Morrison's "Feeds and Feeding" that skim milk is worth only \$.08 a hundred pounds when corn meal is worth \$1.00 a hundred, and I can prove that skim milk is worth \$.31 a hundred pounds when corn meal is worth \$1.00 a hundred. In fact when an experimenter undertakes to prove a thing he has very easy sailing if he can line up conditions to suit the proposition he intends to prove. The trouble with most experiments on this subject has been that they are apparently planned to be used as arguments for the purpose of increasing the feeding of skim milk and they do not undertake to solve the real question involved.

Every one knows that corn alone is too unbalanced a ration to feed to hogs profitably. Where

it is endeavored to show that skim milk has a very high value, one bunch of hogs is fed corn alone, and to compare with it another bunch is fed corn and a small amount of skim milk. Let those who are satisfied with the information that can be obtained by such an experiment use it and I will have no dispute with them. But for most of us the question is whether we should feed alfalfa to the cow and the cow's milk to the pig or let the pig eat his own alfalfa. A hog's ration may be balanced with alfalfa hay or with alfalfa or rape pasture. The question is whether milk and corn makes as cheap a gain as alfalfa and corn. It is very difficult to find experiments that answer this question and it is the most practical one in the world. If it is good sense to use the cost of producing pork on dry corn alone as the basis of getting at the value of milk, it is also good sense to use skim milk alone as the basis of figuring the value of grain. In an experiment published by Henry & Morrison on page 597, where little pigs weighing only twenty-five pounds were used and which are capable of making cheaper gains on milk than older hogs because they have smaller bodies to maintain, it took 2,739 pounds of skim milk to make one hundred

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pounds of gain. But where 233 pounds of grain were fed with 935 pounds of skim milk there was also a gain of one hundred pounds. Figuring now as they do who would set the value of milk by the cost of feeding dry grain, we will use skim milk as a basis of figuring. If skim milk is worth \$.30 a hundred, corn is worth \$2.32 a hundred. This is the same line of reasoning as is used when in an experiment reported on page 598, if corn is worth \$.01 a pound we find that skim milk is worth \$.30 a hundred. All they prove is that a hog must have something besides corn or milk. Corn is the cheapest hog feed but it is too unbalanced a diet to get the best results when fed alone. A small amount of skim milk or something else will balance the diet. According to reports published by Henry & Morrison on page 598 it will be noticed that 585 pounds of skim milk reduced the amount of grain required to produce 100 lb. growth by 179 pounds. If corn is worth \$.01 a pound and we figure on that basis, skim milk is worth \$.31 a hundred pounds. But notice what happens when the amount of skim milk is increased beyond what is needed to supply the elements which corn lacks. When the amount of

skim milk is increased by 463 pounds more, the amount of corn meal eaten was only reduced by 56 pounds, so that for the first 585 pounds the farmer was getting \$.31 but for the next 463 pounds he was getting only \$.12 a hundred pounds, and when the skim milk was again increased by 849 pounds the amount of corn meal required was only reduced 71 pounds and this figures down the last batch of skim to only about \$.08 per hundred pounds. These experiments prove that we must keep somewhere near a balanced ration but do not prove anything regarding a definite value of skim as a feed.

What your skim milk is worth on the farm depends altogether on how much it is needed to balance the diet in hog feeding operations. It is of much more value for little pigs than for larger hogs that are more capable of digesting grasses. Professor Henry says, "Pigs fed skim milk and grain gained nothing from pasture. Grazing stimulates the appetites of pigs getting grain but no milk and they eat more grain and make larger and more economical gains." So we see that pigs will pass up pasture for milk and that when milk is fed to pigs on pasture it replaces the use of pasture so that it does not do much good to pasture

hogs that are fed milk. Experiments reported on page 614 show that pigs on alfalfa pasture require 344 pounds of grain to gain one hundred pounds and that on rape pasture only 340 pounds are required.

Different experiments always vary slightly as to the amount of grain required to make a certain growth. But taking the most advantageous ration that we can prepare with milk and corn as shown by these experiments, we may conclude that something like 300 pounds of grain and 500 pounds of milk will make one hundred pounds of growth on one hundred pound hogs, and that about 350 pounds of grain fed to hogs on pasture will make the same amount of growth. Let each farmer figure out what pasture and grain cost him and he can get approximately the real value of skim milk. For large hogs milk will be worth less than here shown. For smaller hogs it will be worth more.

It may be interesting to know the cost per pound of skim milk solids figured at different prices, but the chemical analysis we are not considering. One hundred pounds of milk usually contains about 9.25 pounds of solids. If 100 pounds of skim milk is

worth \$.20, one pound of dry matter would be worth \$.0216 and a ton would be worth \$43.20. At \$.40 a hundred, one pound of dry matter would be worth \$.0432 and a ton would be worth \$86.40. At \$.50 a hundred, one pound of dry matter would cost \$.0540 and one ton cost \$108.00.

Whey. The average composition of whey is about as follows: water 93.12%, and total solids 6.88%. Of the total solids there are about .27% fat, .81% nitrogenous substances and 5.80% sugar, ash, etc. For pigs whey has a feeding value about half that of skim milk.

CHAPTER X.

MARKET MILK

Weight of Milk. The weight of milk varies slightly with the temperature and also because of the difference in the amount of solids it contains. An average gallon of milk at 60 degrees weighs 8.6 pounds. A ten-gallon can filled to the lid should weigh 86 pounds.

A can large enough to hold 100 pounds of water would hold 103.2 pounds of average milk at 60 degrees, 103.6 pounds of skim milk, or 90 pounds of pure butterfat. Cream weighs less than water. The butterfat in milk is in the form of little particles or globules, which float around in the milk. In Holstein milk they are small, in Jersey milk they are larger. Cream is simply milk containing a large number of particles of fat.

Legal Requirements. The law requires market milk to test not less than 3% butterfat. Milk containing 3% butterfat but less than 11½% total solids is usually considered watered milk. We determine fat content by Babcock test and the solids-

not-fat by an instrument called the lactometer, which is simply an accurate means of determining the weight of milk.

Milk from cows known to be diseased, or from cows fifteen days before coming fresh can not legally be sold. After freshening, milk can be sold as soon as it attains a normal condition. It is illegal to sell milk to which water or any other substance has been added, or milk which has been exposed to disease-producing bacteria, or milk that has been stored, handled or transported in an unclean or unsanitary manner.

Cleanliness. The greatest handicap in the milk business is the difficulty of getting milk that is as clean as other food which people eat. It is not impossible to do, but it is rarely done. In most all cities of the United States milk that meets the highest requirements as to cleanliness and sanitation is being sold for from 20 to 35 cents a quart. Such milk is guaranteed to be pure by a medical board and is labeled certified milk. There are various requirements in producing certified milk that need not all be explained here. But to the average consumer the main difference is that the producer of certified milk is as careful concerning cleanliness

in milking and caring for the milk as a clean, respectable housekeeper is in making bread. In regular market milk we do not require cleanliness up to the standard for certified milk, but all producers and dealers in milk should recognize and admit the truth that common milk is not nearly as clean as it should be.

The public is well aware of this fact, and the demand for dairy products would be immeasurably increased if thousands of people did not feel an aversion to drinking milk because as they say, "It's so dirty." We can not go to the public and ask all we would like to have unless we, in turn, give them just what they want. The public wants clean milk and I believe that if milk improves in quality the public will use more of it. No person with dirty hands should ever milk a cow and use the milk for human food. A cow's udder should be washed. The hair on the udder and flanks should be clipped short, and to prevent dust and hair from getting into the milk, her flanks and udder should be slightly dampened before milking. A gunnysack cut up in pieces about 14 inches square makes a very good towel on which to dry the udder and the

milker's hands. A clean towel should be used for each milking.

The cleanliness of milk is usually judged by filtering a small amount through a disc of cotton. This is called the sediment test. This test, in a measure determines the amount of filth and foreign matter which milk contains. Sufficient straining will make most any milk so that it will show a clean record on the sediment test. But remember that a strainer acts as a sort of pulverizer. Milk running through a strainer gradually dissolves and washes away the particles until they are so thoroughly in solution that we can not get them in a clarifying machine. We would prefer milk strained through a metal strainer only, but in many localities health departments require that it be filtered through cloth or cotton. Where this is required we oppose no objections. The greatest difficulty with cloth strainers is that they do not get washed clean enough. A farmer usually rinses out his cloth in cold water and hangs it up to dry. Sour strainers are about the first thing we look for on a farm where the people have been having trouble keeping milk sweet.

Absorbent cotton is all right, providing no cloth is used with it, but that it be held between metal straining discs, or that the cloth be thrown away each time with the cotton. Since to throw away cotton strainers each time is expensive, I do not think the system is practical for general use. It is easier and far better to keep dirt from getting into the milk than to let everything go in and then try to get it all out again.

Sanitation. Sanitation means "pertaining to health." Clean milk might be unsanitary for it might contain injurious bacteria. Bacteria are plants. To avoid infecting milk with bacteria which cause souring and decay we can not depend upon cleanliness alone. The first few streams of milk from each teat of the cow will be found already infected to a considerable extent. In certified dairies the first streams of milk are never used. When cows are not milked dry at each milking there is a considerable development of bacteria that takes place in the teats and udder. Careless milkers have their trouble starting before the milk leaves the udder. Various diseases infect the milk of the cow. Milk from cows with garget or diseased udders causes sore throats in children and

should never be used as food. Dirt that gets into milk is of itself objectionable, but it is also one of the greatest sources of infection.

Milk utensils should be sterilized. This may be done by the use of a chlorine solution called Bacilli-Kill, by boiling water, or by the direct rays of the sun. Most sterilization is not perfect and even the dust particles in the air contain enough bacteria to, in a measure, re-seed any surface. Bacteria can not grow without moisture. If utensils are not washed perfectly and food particles are left for bacteria to grow on, there will immediately start a new development from the re-seeding that will take place after the sterilization. Tin cans can not be washed well enough to make them perfectly free from foodstuffs on which bacteria may live. When milk dealers put cream in cold storage, expecting to hold it sweet for as long as two months they use cans that have never been used before. A metal surface is rough and I know of no way to wash a milk can as perfectly as a milk bottle. The milk utensils should be thoroughly cleaned with washing powder, rinsed thoroughly with boiling water, then carefully dried. In the operation of cleaning cans the most difficult thing to do in a fac-

tory is to get the can properly dried. When it cools down there is likely to be a certain amount of moisture deposited on the inside of the can and there is always enough food left on which bacteria may grow if the can is moist. In milk plants we sterilize all equipment just before using. Cans washed and sterilized at the plant and used on the farm twenty-four or thirty-six hours later become rancid because of being shut with moist air in them. It is our ambition to sometime be able to send cans to the farmers that will remain perfectly sweet, dry and sterile, even if they are kept closed for a week. But now we must confess to imperfection, and cans that get stale before being used are perhaps the greatest menace to our milk supply. If a farmer can set these cans in the sun with the lid off, it will help greatly. If he can scald them with boiling water just before he uses them, it will help even more.

Some farmers have great difficulty in delivering milk once a day and having it sweet when it arrives at the plant. We have kept a bottle of certified milk for more than three weeks in a refrigerator where the temperature is above forty degrees and at the end of that time it had not turned sour.

Such results can be only obtained by experts, but it is not difficult to become expert enough to always be able to sell milk that is in a good marketable condition, delivered once a day.

Cooling Milk. The growth of bacteria in milk depends a great deal upon its cooling. Milk has a great tendency to take up bad odors, and its tendency to do this depends upon its temperature. Milk should be cooled within thirty minutes after it is drawn from the cow. If cooled below seventy degrees immediately and kept at that temperature or below, there will be very little difficulty of milk souring, provided due care has been taken regarding sanitation and cleanliness.

Well water temperature in this climate is usually fifty-four degrees. By pumping fresh water through a tank, having it overflow so that the warm water will flow off, it is easy in a short time to get milk as low as sixty-five degrees. When running water is not available, it is better to stir the milk until it is as cold as it will get in such water as you have, then set the cans in a small tank of fresh water that can be pumped by hand if necessary. Many farmers use the stock tank to cool the milk in first, then use some half barrels cut off at

a height so that the water can not overflow into the milk but that it will stand slightly higher than the milk in the cans. Use one half-barrel for each can of night's milk. In the morning cool the milk in the tank only. However, the most satisfactory arrangement would be to have a small engine with which fresh water may be pumped at milking time, and let the milk tank overflow into the stock tank until the milk is cooled and the tank is full of cold water. A tank should be divided by partitions made of slats running up and down so that a can partly filled may float without tipping over. It is not absolutely necessary that milk be uncovered while it is being cooled, but the cover prevents the milk from cooling as rapidly. Remember that warm water always rises. The cold water will be at the bottom of the tank. Some farmers divide their milk so that the cans will all float. The milk warms the water and the warm water rises above the level of the milk in the cans. Milk should always be covered when left sitting by the road waiting for the hauler, and should always be covered in the wagon or truck. Wet the blanket or canvas that covers the milk. This helps to keep it cool.

CHAPTER XI.

EXPERIMENTS BEING TRIED OUT ON OUR DAIRY FARM.

On our farm we are equipping to produce certified milk. This will be a new business for us. When we have had more experience along this line we may write up the results for publication. However, none of our experiments are far enough along now for us to be justified in giving the results as final.

Those things which would probably be of greatest interest to farmers are our small grain elevator, the layout of machinery to shell corn, grind feed, cut and re-cut alfalfa and our facilities for handling manure. We use electric power which, so far as we know, is the most satisfactory power where it is available. The motor requires no firing up as does a steam engine, and no tinkering such as goes with the use of gasoline. The motors generally run when you want them to and as long as you want them to and give very little trouble.

Our ensilage cutter is permanently installed at one side of a driveway in the barn. It will fill three silos without re-setting. By the use of a re-cutting attachment with the ensilage cutter we make finely-chopped alfalfa of all the stems that the cows will not eat. Cattle will eat these stems after they are

Showing arrangement of machinery. The conveyor to the silage blower is just below the floor. Silage or cut hay drops from the ensilage cutter to this conveyor. Opposite the ensilage cutter is the feed grinder into which runs the grain spout from the corn sheller. The ground feed also flows to the conveyor and by shifting the spout of the corn sheller the shelled corn will go to the conveyor without being ground.

Rear view of the barn showing the arrangement of silos. The blower pipe for the ensilage cutter will extend through the barn and with a long arch swing around from one silo to another.

cut up fine and they make excellent feed for our delivery horses. The blower (made by the American Harvester Company of Minneapolis) which we use for elevating is separate from the cutter. It is also used to elevate shelled corn, oats and ground feeds to bins overhead. The conveyor to this blower is slightly below the floor level so that ground feed will run from the feed grinder to the conveyor, so also will our shelled corn, or oats that we are unloading from wagons, and the re-cut alfalfa. Everything goes to the blower and is distributed to different bins by turning the spout. An ordinary ensilage cutter can be used as an elevator for grain just as well as the separate blower that we use.

Our system of hauling manure is probably more original than our arrangement for handling feed. We do not shovel the manure out of this barn, neither do we push it out. We wash it out with a two-inch stream of water. The gutters slope from the ends of the barn toward the center, being two feet deep at the center of the barn and one foot deep at the ends. Over these gutters we have cast-iron grates to prevent a cow from slipping down. A ten-inch tile leads from the gutter to a large cess-pool outside of the barn and from this cess-pool we

Showing the gutter behind the cows with some of the grates removed. The gutter is being filled with water. When full the cover to the opening to a 10-inch tile is removed and the rush of the water carries all with it.

pump the sewerage along a ridge to the highest ground of the farm and irrigate it down over the fields. We have an abundant water supply available, cheap power, and hope this plan will prove a practical means of handling manure. So far it has

Electric-driven sump pump with 3-inch intake and 2-inch discharge which pumps manure and water at the rate of 200 gallons per minute.

been a very easy matter to flush the manure from the gutters and our sewerage pump throws 200 gallons per minute through a four-inch pipe up the hill as far as we want to go. We use cut straw for bedding and run plenty of water in with the manure so the pump will not clog. The picture of the pump shown is taken from the catalogue of the American Well Works and does not represent our cess-pool but is similar to the outfit we use.

Our water pump requires a ten horse-power motor and will throw 150 gallons per minute. Besides a means of getting manure hauled out, we expect to do some irrigating in dry weather. While running both the pump at the well and the sewerage pump we require about ten kilowatts of current per hour. This costs us about five cents per kilowatt.

We have installed the King ventilating system. Where a large herd of cows are kept in a barn such a ventilating system is a great help. Our barn is warm and comfortable but not steamy and close.

These systems cost a good deal of money and may not all prove practical. We are not urging that our example be followed but will be glad to give any of our readers such data as we may have concerning

the success of these operations. At our barn we prepare the feed for all of our delivery horses and we expect to keep sixty cows. The method of handling manure will eliminate most of the breeding places of flies. Since this milk will be used raw and is produced for babies especially, extra precautions are necessary in our case. These things we have taken into consideration when planning so

Interior of the barn showing large ventilating flues. At the side of the room are the air-intakes.

expensive a layout. In a few months we will know more about these systems and in a few years we will have a conclusive test made. Those who wish to drop in occasionally to see how we are getting along will be welcome.

Interior view of milk house showing sterilizing oven, cooler, bottle filler and conveyor for cases.

CHAPTER XII.

DIFFERENT POINTS OF VIEW

Even though I have a farm that at one time I went in debt for and which I paid for by milking cows, and even though I have spent more of my working years on a farm than in an office, I can not always pass as a farmer. At one time I attended a farmers' meeting where the city man was up for discussion and a fellow nudged me and said, "Old man, how do you like it? Haven't we got you city guys figured out about right?" I answered, "City people are just like country people in at least one respect. They are just as much inclined to think their own troubles are greater than any one else's."

Farmers sometimes speak of themselves as the producers, and so, too, do the labor union men. Even the business men at their meetings are inclined to pat themselves on the back and to take credit for a very liberal share in production. We all look at things from our own point of view. We have gone through certain experiences and have

not experienced others. We can not all expect to be of the same opinion.

But we all have the ability to understand each other when we are given the chance to see things as other people see them, and it is this understanding which I hope to promote as I write this brief chapter. I write this not as a farmer but as a city man giving opinions gradually formed in several years as a city milk distributor.

To me all are producers alike. The man who sews the shoe for the miner who digs the ore that makes the plow that plows the field that raises the wheat that makes the bread that the grocer distributes, does what is just as important but no more so than any other man or woman in the long line which production takes. If one may insist that his task forms the foundation, another man may claim that his forms the roof. But what is the difference? Without whom can we well get along?

We hear much about the "middle man" who is considered a luxury or rather an extravagance that ought not to be permitted. Well, I am one of those middle men and the thing does not look that way at all to me. I think that all we do for the

people—all the service we render, is worth what we get for it. We middlemen have our troubles and call ourselves producers and are not in any way conscious of being “parasites.”

What economic laws apply particularly to one set of people but do not apply to others down the line? What makes one man's lot harder than that of another, and who really has the hardest row to hoe? What shall we do to the other fellow to keep him from crime and have justice? These are questions answered in as many different ways as there are people with different viewpoints. Do we doubt the patriotism of the club women in cities who decided to boycott eggs and milk to bring down the price just at the time when these commodities were very hard to produce and the price already too low for the cost? If we do, it is because we do not understand their viewpoint and their lack of information on which to form different conclusions.

A few years ago I often used a certain argument which now I do not use any more because now I am over on the other side, as they say. From the other side of the fence the proposition does not look at all the same. The argument is that the farmer sells his produce in town at the

price the city man is willing to pay and then must buy at the price that the city man will sell for. Since the city man does all the price fixing the farmer gets the worst end of the bargain all of the time.

I have no doubt that various markets are juggled by speculators of various kinds and that there are many exploiters in cities who have their knives whetted for any one's meat they can get. The world has not yet worked out its complete salvation. We all have a few suggestions that we would not mind making to the party in power. But of this I feel sure, the majority of business men make their living by rendering service the same as do farmers. They are up against propositions that are a good deal alike. I have not noticed much difference. I have to pay my farmers a good or better bargain than they can get any where else. In the same way I must compete for labor. I must render the best service the customer can get for the money. After I do all of these things, if there is anything left I may have it, and my luck at different times is good, bad, and all shades between good and bad. All of us city business men would make more if we could. You can

at least credit us with being ambitious, but more of us fail than do business men in the country.

At this time probably half of the factories in the United States are closed down, banks are practically all in a critical condition, stores are advertising merchandise at half price and yet no one seems to buy and the farmers' troubles need no description. What shall we do? Well, I know some things we should not do that I can illustrate with a story.

A man in Arizona looked down over a ledge of rocks on a cliff and saw several rattle snakes sunning themselves on a ledge thirty feet below. Having a small pistol he shot a bullet down among them. Immediately there started a battle at the end of which all the rattlesnakes were bitten. In a few minutes they were all dead. An examination showed that the bullet had apparently not hit any snake. The snakes had all lost their lives as a result of a misunderstanding.

I heard Major General Wood make a speech in favor of universal military training but his argument had a different meaning for me than he intended it should have. He argued that there will be war as long as people have honest differences of

opinion—therefore always be prepared for war. To me it seems that since no amount of preparation and war equipment can insure peace we must prevent that honest difference of opinion. We must keep with all people a better understanding. Wars are misunderstandings and well meaning people murder each other because the misunderstandings are kept up with censorship and propaganda. People are armed with poisons more deadly than the rattlesnake and all will fight at the drop of the hat if they feel that they are wronged. What then brings any hope of things better? It is the spirit that says "Come let us reason together" that points the way to "Peace on earth, good will toward men."

There is one thing that all should remember and that is that we are all of us the public. There is no corporation "without a heart and without a soul" more heartless than the public. All men strive to do the thing the public wants most to have done for only those who please the public's fancy get paid for their efforts. The public pays no one interest on investment. It pays no one for time or effort spent. It pays for the service it wants at the time it wants it and all who misjudge the public

demand may get nothing. Any new process or new invention puts many people out of business for the public turns coldly from the old to the new service which it more desires. If we produce too much of anything the price always goes below cost. Where there is an undersupply of any thing, there is the best market and the more profitable business. So it is that by paying or withholding the price this great Dame Public keeps all courting her favor and doing the things she wants most to have done. She wins with every winner and then taxes his income, and lets the loser lose alone.

But although we are all up against the same general laws that govern business there is a difference between farming and most other business. A contractor will build a building for us if we agree to pay a price that he figures will pay his cost plus a profit. Otherwise he will not do the work. Contracting is supposed to be a somewhat hazardous business but it is not so risky as farming for the builder knows before he starts what price he is to get. A farmer can not tell until he is ready to market his crop what the market will be. The farmer must pay the cost, hoping. Weather has a

great deal to do with results in farming operations and that makes the business more risky.

Business men in cities as a rule can work much closer to their pay checks. This makes it possible for them to come much nearer a system of always getting cost plus a profit. Manufacturers usually aim to take orders ahead of their output so that knowing their cost and having their goods already sold at a profit leaves them comparatively clear sailing. How the farmer can get on the same basis I do not know.

But city business is not all a round of pleasure, for city competition is keen. If one farmer raises forty bushels of corn per acre and another can raise sixty, each receives compensation in proportion to his crop. But if one merchant had that much advantage over his competitor the unfortunate one would be put clear out of business. Customers to a merchant are as valuable as pigs are to a farmer and it is perfectly legal to get the other fellow's customers in broad daylight. So we in competitive business keep busier than some people think.

I have often been asked what I think of farmers' organizations. Well, most business men in other lines of business have associations. They usually

result in some good. It is those who expect too much that are disappointed. So simple a thing as an organization can not cure all of the difficulties in farming. Some farmers in Kentucky organized to boost the tobacco market by agreeing among themselves to plant fewer acres. After the agreement many expected a high price for tobacco and planted more acres. This is about the kind of co-operation we all have learned to expect in associations where money interests are involved. These farmers were right, however, in realizing that in order to boost the market they had to limit the supply of the product. The law of supply and demand always works. It works to the advantage of him who can limit the supply or can increase the demand.

Let me tell you how a trust operates. There is an agreement to fix prices and production is limited to what will sell at the fixed price. Then there are fights made against any one outside of the combination who undertakes to produce that line of goods. The trust magnate knows well that to control a market he must limit the amount of goods for sale by combining to fight competition. Without that feature trusts would be harmless. A trust

is a "combination in restraint of trade"—a fighting organization. Common business men are not afraid to compete with trusts. It is always the trust that is afraid. To compete means to race. Trusts always want to hamstring the fellows against whom they are racing.

To go back to farmers' organizations, on account of the nature of their business farmers can never successfully organize to fight down competition of other farmers and prevent them from producing. They can not then create an artificial market. Others can sometimes combine to take advantage of farmers. Farmers can never "get even." But here is a truth that many do not realize and it is that although some may have a less difficult business than farming, not one person out of a thousand can avoid competition or has any unfair advantage over other people. Those who would differ from this statement could only change the figures in the proportion. Change them as you like, and yet we must agree that it is a good thing that a majority must earn a living in which there is no graft for they will stand for truth and fairness in the land. We want freedom in the country and there cannot be freedom without fair competition—equal

opportunities for all as nearly as the law can insure them.

Where co-operation among farmers can increase efficiency they should co-operate. The same is true of any other business. For any one to co-operate in a legitimate way for legitimate purpose is always a legitimate thing to do. Co-operation need not interfere with free competition or fair play. I have no word of warning to give to farmers' organizations that I would not apply as well to others. But I have a warning that I would like to sound to all the world. Beware of him who accuses all others of guilt. Beware of him who sees only bad in the world. There are those "reformers," they may be called, who would poison us against our fellows. Watch closely the suggestions of such. Test their advice by the golden rule. A propaganda of hate is never needed in a good cause. Peace on earth can only come by fairness and good will. We need each other's point of view.

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