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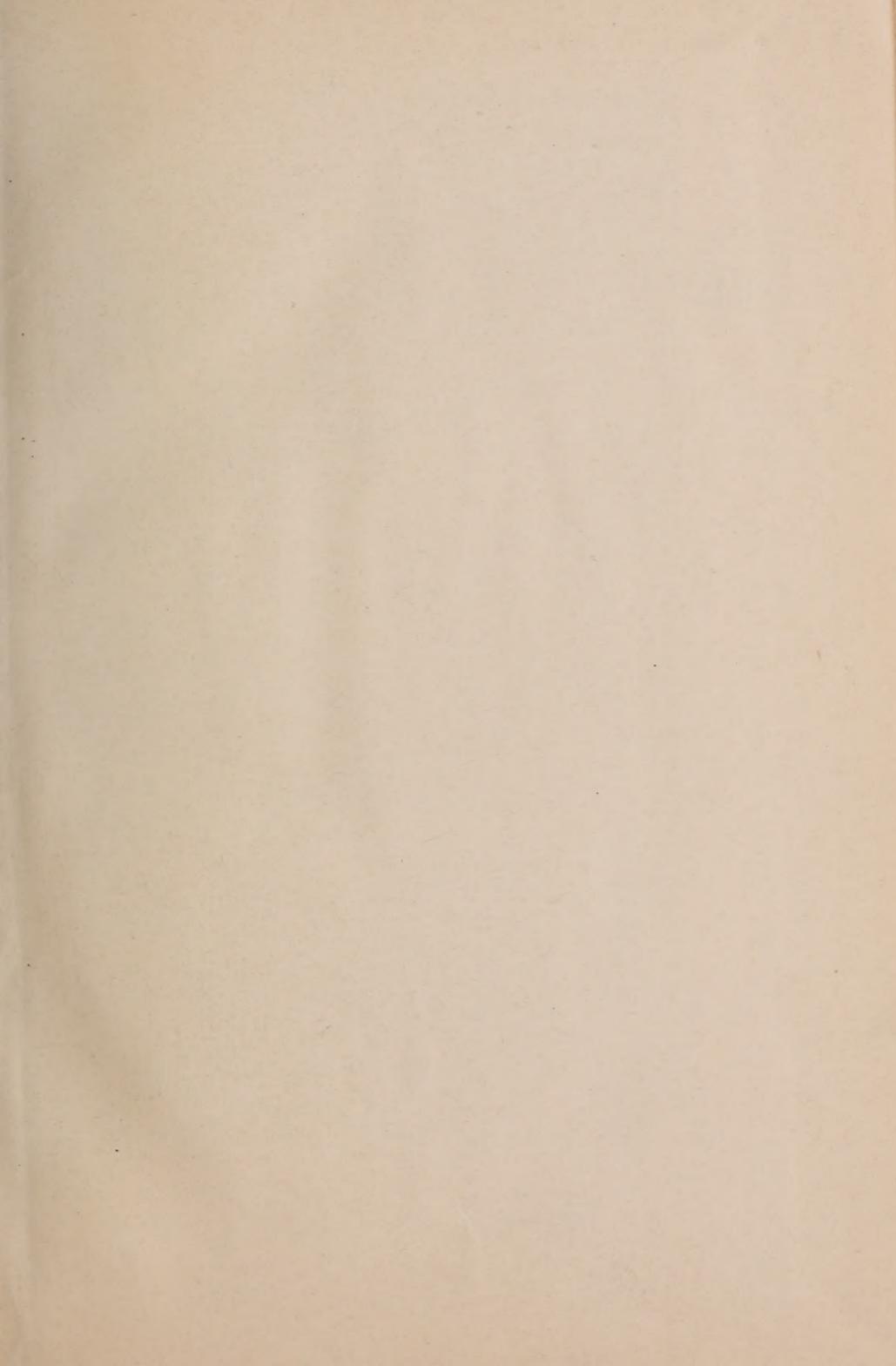
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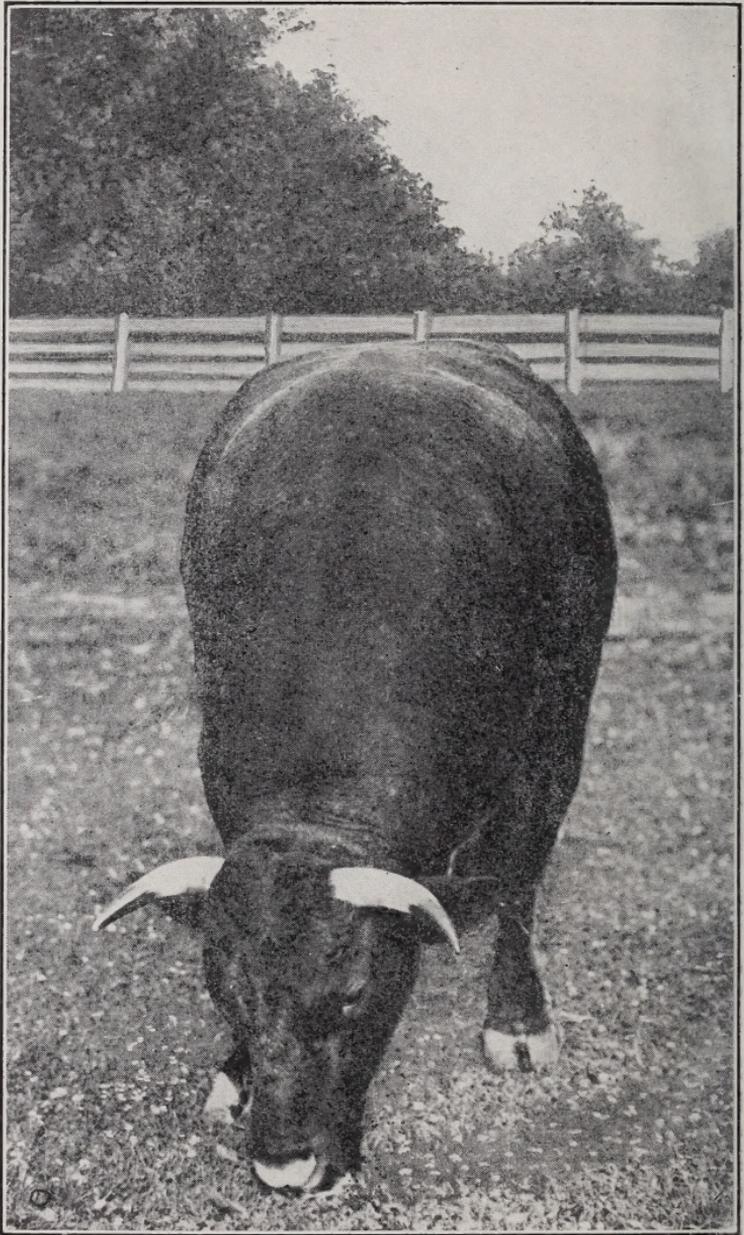




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THE DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT



ONE DEPARTMENT OF THE FARM-FACTORY

# FARM STOCK

**A Practical Treatise on Horses, Cattle, Sheep  
and Swine, including their breeding, feeding  
care and management in health and disease**

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*By*

**CHARLES WILLIAM BURKETT**

*Editor of American Agriculturist*

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## PREFACE

Farm stock have played an important role in American farming. An immense quantity of roughage material unavailable as food for man, each year by means of live stock is converted into appetizing and nutritious food; protection and clothing are secured from their hair and wool; shoes are made from their hides; labor is done by their employment; and assistance in a thousand and one directions is rendered—all coming as a direct result of the breeding, feeding and raising of farm stock on the farms of the country.

The volume herewith presented abounds in helpful suggestions and valuable information for the most successful production of farm stock in all the phases of the subject. It is an every-day hand book of live stock and contains the best ideas gathered from the various authorities and the experience of a score of practical men in all departments of live stock production.

C. W. BURKETT.

New York City, October, 1908.



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## INTRODUCTION

### FARM STOCK

The progress that a nation is making can, with reasonable accuracy, be measured by the kind of live stock it raises. Poor people and poor stock usually go together. The most prosperous nations of the earth get a large share of their wealth by raising improved stock. This is the story the world over. Wherever agriculture is really successful and the people prosperous, the raising of live stock is a fixed feature of that agriculture. While it is true that many special lines of agriculture are extremely prosperous with no live stock connected with them, still, as a general rule, live stock are necessary to use up the roughage materials of the farm, thus bringing into profit a vast amount of food material that otherwise would be lost.

The history of farming tells in no uncertain terms that where live stock have not been appreciated, fertile lands cannot be maintained. Its admonition is to get live stock; to get all kinds of farm stock; to sell your crops through them. Its mark is against any single line of farming, because such means inefficiency, soil depletion and worn-out land. The cotton farmer needs cattle, sheep and hogs to consume his cowpea forage, his clover forage, and the corn forage that were produced as a part of the crop system to maintain the cotton lands. The wheat farmer needs live stock for a proper utilization of straw and clover and alfalfa that are a part of good wheat farming. The corn

farmer needs hogs and cattle to consume the grain and stover and the rotation crops, that his lands may remain fertile and his farming plant be made better.

Humus and manure must be had. They may come from green crops or from city stables, but their use must never be ignored, else the time



#### GOOD FEED—THEN GOOD CATTLE

You can stock your farm with good cattle, but if good feed is not provided you will not get very far in the business.

will come suddenly when neither fertilizers nor tillage will avail and when the land will be thrown back on nature for restoration and the renewal of life. When correct farming is practiced, crop rotation is renewed, diversified farming follows, live stock are restored to the farm and the land becomes fertile and the farm productive.

The old saying that runs:

“No grass, no cattle;  
No cattle, no manure;  
No manure, no grass,”

applies to every American farm today. The cry on the great majority of farms is for more manure and for better preserved manure that shall be applied to the soil more intelligently and more thoughtfully than is now the case.

Just go into any old section of the country—into New England if you please. There you will find many deserted homes and abandoned farms. Why? Because the fertility was sold and not replaced. It was sent away from the farms in bushel baskets, in baled bundles, in cotton sacks—by the pound, by the bushel and by the ton. Go into the South—into the land blessed in every way beyond measure. You find impoverished soils; you see worn-out fields, gullied and wrinkled and cast aside. The fat of the land was gathered up and shipped away in cotton, in tobacco, in corn, and none was returned to take its place. The humus of the soil was used up and burned by one-horse plows and shallow working tools and the land was bereft of its powers of high production.

Go into any of the older parts of the country—go even into the West, into the newest settlements. You find depleted soils, farms rendering their owners a bare subsistence. Why is this all so true? Because the soil robber in every instance has been present, the farm stock have been shunned, the fertility has been taken away and the lands have been reduced to the lowest point of production.

All of the trouble has been due to a disregard of the place and importance of live stock. Farm

stock will remake old lands and maintain good lands. Let your farm be a factory—a farm factory—where most of the crops raised shall be consumed as food for live stock, that finished products may be made and as such be sold rather than as raw materials, in which form they were secured. These things it means: That there shall be diversity in crops; that more live stock shall be bred



#### DAIRY CATTLE AT PASTURE

As the country grows older and more thickly populated the number of dairy cows will increase, for the reason that a larger quantity of human food is secured than through an equal expenditure of raw materials fed to any other class of farm animals.

and fed on the factory farm; that the entire plant shall be managed as a business enterprise of the largest magnitude.

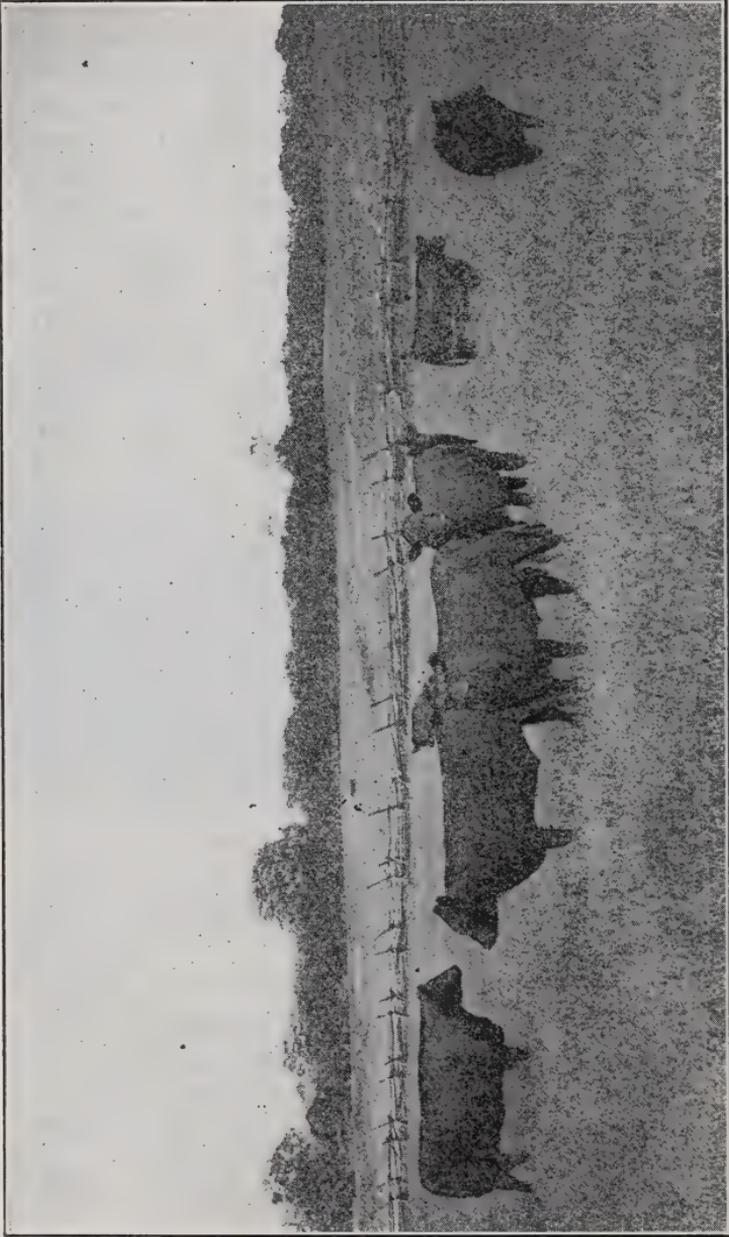
Farm stock, then, have an essential bearing on the profits of the farm. They stand for increased fertility of the land. They call for the constant rotation of crops, not only better to feed the stock, but better to help the land.

Farm stock consume many kinds of cheap feeds that are raised on the farm. If sold on the open market, these would seldom bring in enough to cover the cost of transportation to market. Therefore, farm animals are profitable machines for using inferior cheap products and converting them into wholesome, nutritious, animal food. They materially minimize, also, the cost of marketing from farm to city or other place of consumption. A ton of corn stover, wheat straw, or corn, is marketed far more cheaply in the form of meat, butter or cheese than if transported by wagon to the place of sale. Not only is the cost of transportation by means of live stock reduced to a minimum, but a market is thus secured for even the bulkiest of foods.

Farm stock have an important bearing on the management of farm labor. They call for a high type of labor, give this labor regular employment and keep farm help interested in all that is to be done.

Farm stock have a marked influence in the promotion of industry in all rural communities. The most settled people in farming, the most educated class of farmers, the most prosperous people engaged in agriculture, are those engaged in some one or more lines of live stock.

Finally, farm stock greatly influence the mental capacity, caliber and character of the men dealing with them, not only because a balanced sort of food supply is provided, but the close, intimate touch that farm stock invite, secures the highest mark in character, industry and intelligence. It is on the farm, in touch with farm stock and in contact with farm animals, that are fashioned vigorous bodies, clear brains, steady nerves, self-reliance, character and sympathy.



A BUNCH OF ANGUS CATTLE

Good breeding, good feeding and good care are the trinity of successful cattle growing.

## CHAPTER I.

### **The Breeding of Farm Stock**

The average value of farm animals in the United States is not high; while individual animals noted for their superior work and performance command immense prices, the vast majority of farm stock is not particularly good. How to raise the yearly performance of the dairy cow, the regular efficiency of a farm horse, a larger quantity of beef in the beef cow and quicker maturity and higher quality in the hog are all pertinent questions with us now, as they have been in the past. These are the problems that American farmers will need to solve in future years. Of course feeding will do much in improving the quantity and quality of the animal products, but the underlying principle in efficiency, the fundamental factor in animal production, is good stock. Blood pays in animals as it shows itself in men. There has been a constant improvement from the original low strains to the modern individuals.

### **MAN HAS DONE MUCH**

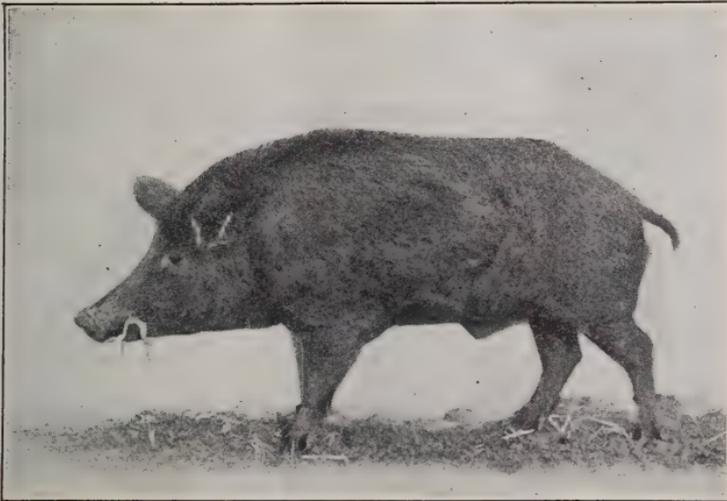
During hundreds of years farm animals have been adapting themselves to the various environments in which they have been placed. By man's help in selecting out those best fitted, results constantly better have been secured. Consequently farm animals today are of a much higher grade than they were a century ago. Way back ten centuries ago or twenty-five centuries ago there

was no great demand made upon farm animals. The cow had no master. All she was interested in was the getting just enough of food for herself and to provide enough milk for her offspring. If her hair was long and shaggy, it better protected her body from cold and inclement weather. If her horns were sharp, they gave her better protection and more certain defense. She had no need of a large udder; that need came only after man had found it to be useful, satisfying and nourishing. The primitive hog was naturally coarse and ferocious and easily angered, because his protection lay in those directions. He needed a long limb, because he could more easily escape when the foe was stronger than himself. The longer his snout the better he could root for roots, and worms were good to his palate, and wholesome medicine. If his hide was tough and thick, he could the better stand the cold, the thorns or the enemy's tooth; and the stronger his tusk, the better able he was to win the fight.

After man took a hand in the rearing of farm animals these things quickly underwent a change. Man brought better food; he gave better shelter; he looked after their pains and troubles; and they responded by growing more rapidly. Less effort was required to care for themselves; so they just naturally put on more flesh or produced more milk. Our fathers who had charge of this breeding and improvement had learned early of some fundamental principles of breeding and improvement that they used to good advantage. They made the best of them; they studied all the processes involved and joined their practices with what suggested better results.

## THE PRINCIPLES THAT GOVERN BREEDING

Now the fundamental principles that govern feeding and improvement are: First, heredity; and second, variation. Upon these two you must build your structure; but you must furnish it and beautify it by selection. Heredity is the law that like produces like. Variation is the law that works



A REAL RAZOR-BACK

There is not much profit in this kind of hog. His place is in the museum alongside of the cradle, the flail and the spinning-wheel.

to produce new things. Heredity is the law of uniformity. Variation is the law of change. Heredity is satisfied with what now exists. Variation goes out to explore—to seek new paths and new fields. The animal breeder builds upon the present heredity, but he courts variation and urges it to seek new findings. If these are to his liking,

he seizes them as his own, attaches them to the old heredity and builds the new structure higher and better. The work is now to fix the new acquisition and to make it a part of the building material. Variation all the while is allowed free range that it may gather in new discoveries for further improvement and use. We let heredity hold, keep and guard the values of the best fitted animals, but we call in variation to improve them.

### WHERE SELECTION COMES IN

But where is selection? If its role is so important, why don't we see it on the stage? We do, if nothing in the play is struck out. Selection is man's part of the drama. It is his work to decide what new things that variation has found shall be held, what new ones shall be cast aside, and at what point a new acquisition shall be fixed as a part of the old stock. In beginning his breeding operations, it was the breeder's duty to ascertain what classes and individuals already had progressed furthest in the line in which he was interested. Every breeder has been seeking some special end. By looking over the field he was able, if he was on to his job, to get some individuals peculiarly adapted already in the direction he was going.

### HOW SELECTION IS WORKED

So if it was milk, the wise breeder sought the breed and type that had longest been trained and bred and had become most efficient in the production of milk. When beef was wanted, he sought out those breeds that had been bred most wisely and

trained most carefully to deposit meat upon the back. When he was after pork, he chose those breeds longest selected to produce a large quantity of meat and fat at the least expenditure of effort and food. In every case he rejected the little-doeer and the scrub. Just as he did not expect to do good tillage on his soils by means of a wooden plow nor to travel fast when an old-time engine



GRADE MERINOS ON THE RANGE

The Grade Merino has for a long time been popular on the sheep ranges of the West.

was used, so he did not expect to profit from live stock grown from scrubs. All these are equally out of date.

You are familiar with the highly specialized breeding operations with dogs; some have been bred and developed and trained as watch dogs, others as hunters, others as pointers and setters, and others in a score of other directions, peculiarly and specially, adapted for some particular work.

Now that same force and power applies to hogs and cattle.

### GET RID OF SCRUBS

The thing to do is to rid yourself of the scrubs and poor producing individuals, because these bring you only meager profits. I know that occasionally an exceptional scrub cow pays in a dairy, but somewhere back in her breeding is improved blood; something responsible for the result.

### WHEN LIVE STOCK PAYS

Live stock pays only where you find well-bred animals; this is the fundamental idea of live stock management. If your beef business or dairy business does not pay today, you are making a mistake by condemning feed stuffs, lands, markets or sections before you have carefully considered the animal that works for you. Choose first the line, then the breed, and to these other things will be added.

But high-class, special bred animals are expensive; and I am not going to suggest that you start with pure-bred animals. If you have money, and are acquainted with the principles of breeding, it will pay you to do this. But if you know little about the care and attention required for pure-bred, highly trained farm animals, your first need will be to know how to care and tend such individuals before you become their owner.

### HOW TO START YOUR HERD

I suggest, therefore, that you select for your breeding herd or flock, the better grade of individuals that possess fairly good breeding, and such

as possess those qualities as you desire when your flock or herd shall be highly improved. You are to use, however, for the purpose of improvement, the best pure-bred males that can be obtained. For the male is half or more. There must be no mongrel or questionable blood in his veins. He must be no cross-bred individual. He must come from no two breeds, even though both are pure breeds with long lines of ancestors back of them. Real success comes only from sticking fast to one line of blood. Like begets like, you know. To trifle with this principle is to end in your destruction. You may have the best motives, but you will lose. Nature works without sentiment, is heartless, and her only reason for doing things is law; and from this law she deviates not, nor does she ever stop. Like the brook that goes on forever or until the waters are no more, so does the fundamental law of breeding govern and control both the improvement and deterioration without hindrance or variation.

### NEVER USE A GRADE SIRE

If you are a young breeder, do not make this mistake of choosing a grade sire or an inferior pure-bred, because such an animal may cost less than a pure-bred one. If you do, instead of breeding up to improvement, you will breed down to inferiority and regret. Use a male of strong prepotency—one that possesses rich quality, high character, and then your herd or flock can be brought to quick productiveness in a short time. But your herd or flock can be maintained at that point only by the continued use of males of superior breeding. Use for a single generation an inferior sire and a backward turn will be made.



THE SIRE IS HALF THE HERD

## MORE BREEDING TERMS

*Prepotency*—We are now confronted with some new terms in breeding. The term prepotency refers simply to that quality of an individual that enables his characters to be transmitted to his offspring. In one sense it stands for lineage and purity. If performance and production be back of lineage and purity—performance and production of the right kind—then that prepotent individual can never be measured by words or money. His worth transcends down into ten thousand individuals giving for all time the sort of character you are seeking; and admitting of the results that have been your aim.

Cross-breeding has its part to play, but within prescribed limits. For breeding purposes—that is to secure breeding animals—cross-breeding should scarcely or never enter unless some master mind is at hand to direct and control.

*Cross-Breeding*—Cross-breeding is commonly employed in the production of meat. A cross between two beef breeds or two meat classes of hogs seems to increase the total quantity of meat and also to hasten maturity. But in this case only should the average breeder call this practice into use.

*Inbreeding*—Inbreeding has been employed from the very beginning of time. It is a delicate method of transmitting characters. Unless you are proficient in the art and clearly see the good points and the bad points in the two individuals to be mated, unless you are able to look ahead and picture in your mind the result of this commingling of blood, you had better leave it alone. Just as cross-breeding induces coarseness, increases the



OF GOOD TYPE AND OF RICH QUALITY

size and vigor, so does inbreeding act; but, however, in the opposite way. Inbreeding practiced to any extent tends to decrease the size of the individual, leads to refinement and quality, but tends to lessen the vigor. In fixing a type or breed this method can be employed with good results. The early founders of each breed employed it to its fullest extent. You should remember that in-and-inbreeding makes heredity more powerful; and inasmuch as heredity is just as much interested in transmitting undesirable qualities as desirable qualities, to intensify by an inbreeding is to affect the undesirable qualities as well as the desirable qualities. Consequently, you must expect when in-and-inbreeding is practiced, to see each and every character duly weighted in the progeny.

Your safety lies in mating only such individuals as possess the undesirable qualities in a very minor way. Let them be conspicuous and you are lost. For the average breeder the use of breeding stock of individuals not closely related is the safest plan to follow. Leave this delicate art, in this treacherous course, to those who have superior knowledge and unlimited means. Be content with the ordinary methods until you have learned some of the secrets of an intricate breeding business.

### A WISE PLAN FOR BUILDING UP

The matter of greatest importance to you is this: You can increase the efficiency, the worth and the production of your flock or herd. To do this, rid yourself of those animals that are not very productive. You have them in your dairy herd—the scales and the Babcock test will point them out; you have them in your swine herd—the number of offspring

to each litter, their size and vigor are all that you need for your information; you have them in your flock of sheep—the fleece, the individuals that tend to sickness and the slow maturity condemn themselves in your sight.

After you have discarded these undesirable individuals, be they 10 or 50 per cent, concentrate your energy upon the remaining ones, giving them more abundantly of food and care; and what is saved turn in the direction of superior males to head the flock or herd. It will now be but a short time until your discarded numbers will have been replaced by individuals of superior breed, better adapted to your special line, more able to bring remunerative returns and more fitted for your environments and conditions. Employ these few principles in your breeding operations in the future and the richest sort of reward you have a full right to expect.

## CHAPTER II.

### **The Feeding of Animals**

It has been since the study of feeding principles has come into use and favor that the greatest success has been reached in the feeding of the various classes of farm animals. Our fathers thought it enough to supply food freely and abundantly; they did not know that there were well-defined principles upon which successful feeding rests. In fact, it has only been in recent years that any careful study has been made of the composition of plants and animals, and an attempt to correlate one with the other. Thanks to our scientists and experiment stations, we now have the mist cleared away and we can feed our various animals feeds that serve the purpose best and at a time when most needed.

#### **THE PRINCIPLES OF FEEDING**

As a result of this investigation there are certain well-defined principles that must always be considered if the most effective methods are to be put in operation in order that the best results may be secured. The first thing that we are to bear in mind is that plants contain many classes of ingredients. In the same sense that a piece of meat contains blood, fat, lean flesh, bone and other products, so plants are found to contain several kinds of materials.

Roughly speaking, we can divide a plant, or in other words a feeding stuff, into five groups of



WELL-BRED, WELL-FED AND WELL-MANAGED

constituents or ingredients. The first group we call the ash or the mineral elements. You know that plants contain mineral materials; the ashes themselves are the evidence of that fact. A stalk of corn or a tree develops until it reaches its maturity; then decay sets in, and back to earth and air go the elements, or man gathers in the product, uses it as fuel or for consumption in some other way. If burnt, the ash material is left behind and this is gathered up and returned to the fields, thereby supplying the needed fertilizing element that originally came out of the soil brought up by plant or tree.

Now animals require mineral materials. Bones are largely made of them—all of which come out of the soil. First the mineral compounds are dissolved in the soil and carried into the plant by the sap and distributed where needed most. It now enters into the work of plant building. Animals can usually get along without ash or mineral materials. Our plants ordinarily contain enough to supply all the needs of the body, exceptions, perhaps, being the two elements—sodium and chlorine, which we know as common salt.

As our foods are commonly prepared for the table, mineral elements are frequently lacking in them. We take the bran of the wheat giving the ash material largely (because deposited in the bran) to our pigs and calves. We take the flour, largely deficient in mineral materials, make it into bread, feed it to our children and wonder why their bones are not strong and their teeth not good. There has been a deficiency of ash material and this supply could be furnished only by means of the food set on the table.

*Water*—You know how important water is to a plant or an animal. Neither would survive very long without this wholesome, life-giving influence and agent. The water is sucked in by means of the tiny, fibrous roots of the plant. It goes up through cell by cell, carrying with it the mineral elements in solution. As it passes along it gives over to the plant the soil foods and passes out into the air as vapor. For the time being its mission



#### ROUGH FEEDERS

Poor stock and poor feed, without exception, mean **poor** farming.

is finished. There is, therefore, a constant current of water passing through the plant.

When plants are young, green and tender they contain a great quantity of water, but when harvested or when old, the water content becomes materially decreased, in some cases being very small indeed. Consequently, when animals are given dry food or dry forage they get an insufficient quantity of water; unless supplied in some other way they would perish. So long as on green pastures, gathering much of their food in the night time when

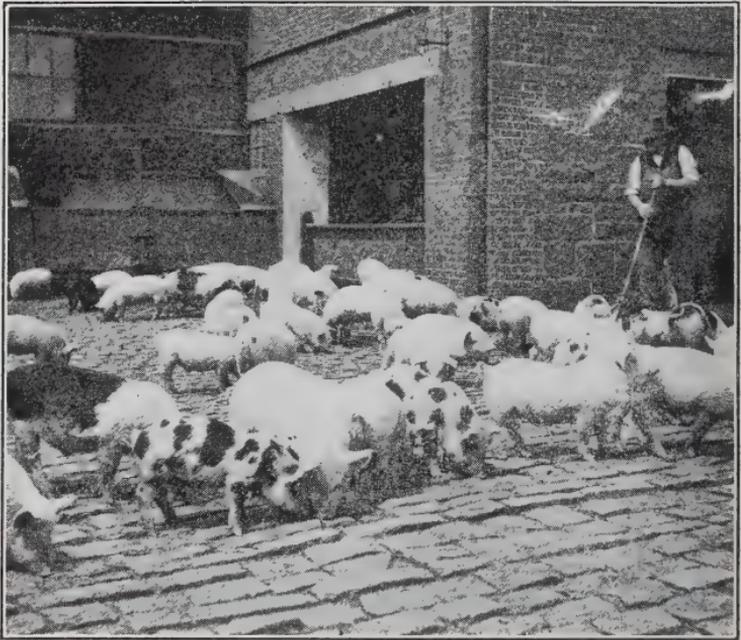
the dew is on the leaf and grass blade, they can about supply their needs; but otherwise the watering trough is essential to supply this need.

*Carbohydrates*—But ash and water little concern the feeder. It is three other groups that cause the trouble and are conducive to loss or gain. These groups are carbohydrates, fat and protein. The carbohydrates compose the larger part of the rough and coarse materials. This group is known as the heat and fat formers. When taken into the body they supply the materials that keep up the heat of the body, furnish the energy to keep motion and activity going; and, if there is a surplus, it is stored in the body as fatty tissue.

This important group is composed of three elements, carbon, hydrogen and oxygen. The oxygen and hydrogen come out of the ground as water. The carbon comes out of the air, combined with oxygen, known in this form as carbonic acid gas. It is exactly the same material that you and I and all animals breathe off with every passing breath. It is a broken-down tissue, the basis of which is carbon.

Now what is waste for the animal is food for the plant, so that the carbon moving about freely in the atmosphere, although in a combined form with oxygen, enters through the little mouths on the under sides of the leaves into the cells and joins the tiny molecules of oxygen and hydrogen, and becomes a grain of starch. This starch is now manufactured. Unless used in the making of some other organic compound, it will be available for the plant itself or the animal. The starch is very easily changed into sugar; in this way it is easily carried to all parts of the plant.

*Fat*—The processes of plant growth are still shrouded in mystery and always will be until the secrets underlying life itself are learned, if they ever are; hence, a complete statement of these chemical changes will not be attempted here. We



#### WEANING-TIME

When the pigs are weaned, either let them have the run of good pasture or plenty of slop. Weaning pigs ought not to be an abrupt affair either.

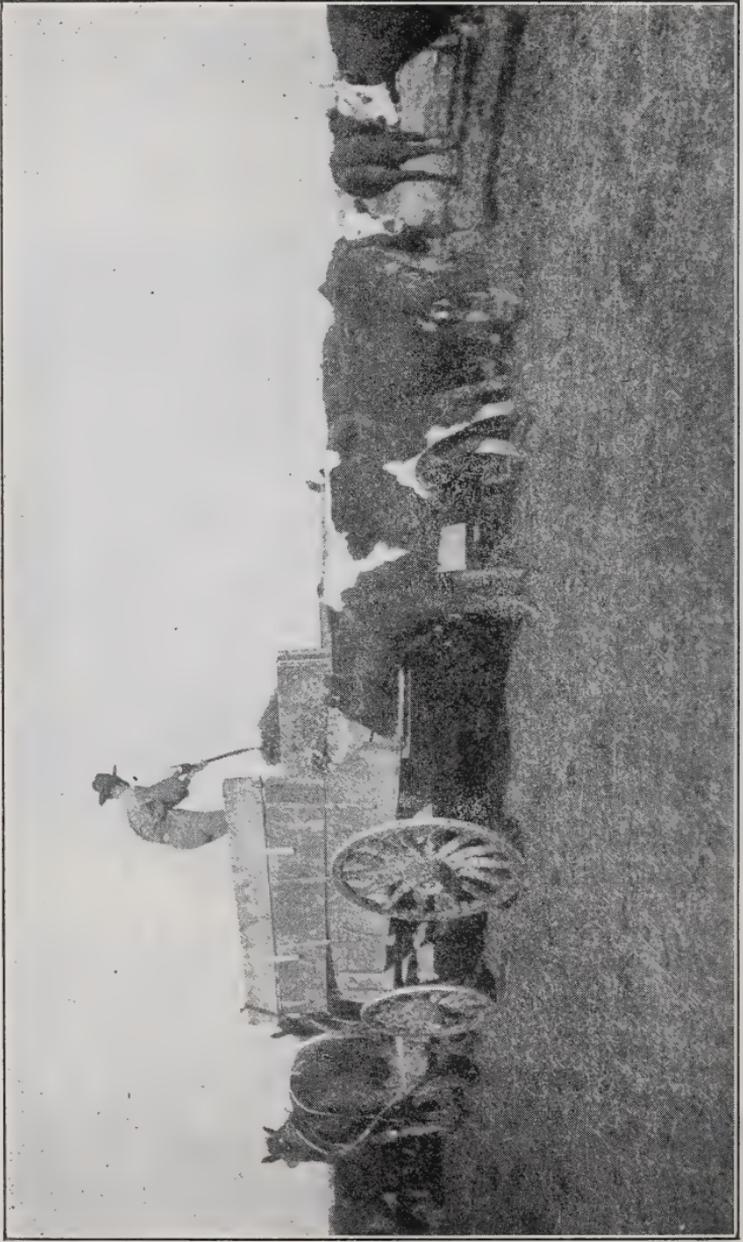
know, however, that fat, called the oil of plants, or the fat of the animal, is composed of the same three elements that compose the carbohydrates—carbon, hydrogen and oxygen. The only difference lies in the fact that a great deal more is stored in the fat compounds than those of the carbohydrates. This explains why fat is more effective in the production

of heat and energy than are the carbohydrates. It is more concentrated in fact. Our scientific men tell us that a pound of fat contains 2.5 times as much heat and fat-making ability as a pound of carbohydrates. For practical purposes both groups can be used together, but for purposes of lubrication and insistent demands both fat and carbohydrates are essential to the life of the animal.

*Protein*—The last group that concerns the feeder is the protein of the feeding stuff. In addition to the carbon, oxygen and hydrogen found in fats and carbohydrates, nitrogen and sulphur are found also in protein; the contribution changing the character entirely. This protein is the basis of protoplasm. Around it is centered the life of the plant and animal. The term is used simply to describe the materials that, when taken into the body, repair the wears and tears. It supplies and keeps up the blood, the brain, the tendons, the flesh, the internal organs, the skin, etc. In fact, it is found in all parts of plants or animals; for this reason protein has been called the most important constituent of a feeding stuff.

### NUTRITIVE RATIO

With this classification we are now able properly to combine feeds so as to get just what is necessary to supply the daily needs of any special class of animal fed for distinct purposes. In compounding rations the ash and water can be left out of consideration of ration making. The three groups then to consider are protein, the fats and the carbohydrates. If we know just how much protein ought to be given daily, it is not a difficult matter, providing the feeds available are of the right kind. Thanks again to our scientific men these facts have



SLOPPY WAY OF FEEDING—AND THE CATTLE SHOW IT

been determined. Take pasture grass for instance, the great universal farm animal food in America. It has been analyzed and we know just how many pounds of protein, of carbohydrates and of fat are digested in each 100 pounds.

Let me add here that the digestibility is important also because not all of the food taken into the body is digestible—just a part of it; sometimes 90 per cent, sometimes 75 per cent, sometimes 50 per cent, and with some feeds as little as 25 per cent is digestible. Hence, with every feeding stuff a part is lost and wasted, therefore serves no contribution to the nutriment of the body. In the case of pasture grass, you know by experience that animals are healthy and perform their best service when feeding freely on it. It is a balanced food in itself. In other words, it contains protein, carbohydrates and fat in sufficient quantities and in just the right proportion to meet the needs of the animal.

In 100 pounds of pasture grass there are  $2\frac{1}{2}$  pounds of digestible protein, 10.2 pounds of digestible carbohydrates and .5 of a pound of digestible fat. In other words, for each pound of digestible protein we have about five pounds of digestible carbohydrates and fat. For every time one pound of protein is supplied to furnish flesh and muscles, about five pounds of carbohydrates and fat are supplied to furnish heat, energy and fat. This gives rise, therefore, to the term nutritive ratio. It indicates the relative proportion of the muscle makers to the fat and heat makers.

### FEEDING STANDARDS

The attempt has been made to determine the amount of each constituent that ought to be given

to an animal each day. For instance, a dairy cow giving a certain quantity of milk requires in her food each day a certain amount of protein, carbohydrates and fat. For a horse doing heavy farm work a different ration would be required and the constituents in different proportions. If maximum results are to be secured, a different standard for young calves is necessary than for fattening steers; and a different ration for young pigs than for mature hogs ready for the block. Of course, feeding standards are to be taken only as guides to point out the way. They are not specifics nor receipts.

Corn, for instance, is the great stock feed in America. It is known as a starch or carbohydrate food. It produces fat, but not muscle, hence it is not a good feed for young stock or for milk cows, because these animals require feeds rich in protein for the muscle-making materials. It is always well to feed a fattening hog an abundance of corn, but there is so little protein in corn that even when fat is the end sought, the best results are not always obtained. The mixing of corn with other feeds often brings better results. Our most progressive hog growers now combine green alfalfa and clover with the grain from the cornfield. If succulent pastures are not available, the hay is hauled out that protein may be given in addition to the starch of the corn. And if hay be not available, a slaughtering-house product, like tankage, or oil meal, or some other carrier extremely and exceedingly rich in nitrogen and protein is mixed with the corn.

In just the same way cottonseed meal is an illy-balanced food. It contains too much protein. It lacks the carbohydrates. When fed abundantly to cattle, protein is wasted. Consequently, for the grain part of a ration corn and cottonseed meal

blend well together. One is rich in starch, the other in protein. The two meet on middle ground and supply both materials without waste of one or the other and both are supplied with neglect for neither.

### THE BALANCED RATION

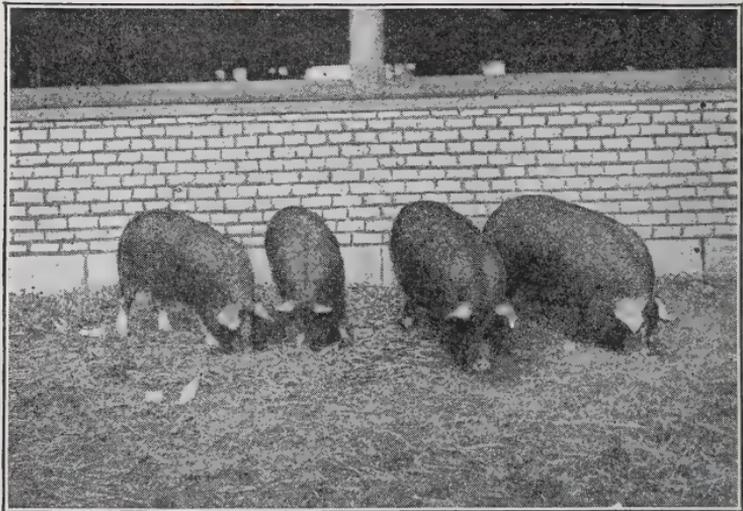
These differences existing among the different feeds give rise to the balanced ration. No single food suffices unless it be pasture grass. Consequently, the farmer knows that when he feeds a variety of food he gets the best results. He does not need to weigh each pound of food given after he has become schooled in the practice of feeding farm animals. For all practical purposes, with a little thinking and figuring, he can approximately estimate the kinds and amounts of the different grains and roughage materials that he ought to feed each day so as to give his stock the right nutrients in the proper proportions.

He would do wrong to feed corn and corn stover and timothy hay. This mixture is bad for the reason that it carries but one line of food constituents. It runs to the carbohydrate class. Likewise cottonseed meal, linseed meal and gluten meal combined and fed in conjunction with clover and alfalfa would be undesirable, because they run in the other direction and supply an overabundance of protein, with too little, in fact with very little, of the carbohydrates and fats. Every mixture must include both classes. Alfalfa and corn, cottonseed meal and corn stover, timothy and gluten or linseed meal, are all good mixtures for the reason that both the "muscle makers" and "fat formers" are included. Each of these mixtures can be improved

by enlarging on the number of feeds, for a variety is always to be preferred to a few feeds.

Plan to have hay and grain, more than a single kind of each is better; and in addition give some succulent food like roots or ensilage. This secures health, much milk and quick gains.

The chief value of cottonseed meal, for instance,



#### MEMBERS OF A FEEDING SQUAD

The two larger pigs on the right have been fed corn and tankage, while the two smaller ones on the left have received corn only.

rests with protein and fat. Compared with other concentrated feeding stuffs cottonseed meal is rich in both of these nutrients. But it is low in carbohydrates. Linseed meal is rich also in protein, moderate in quantity of carbohydrates and compared with cottonseed meal is low in fat. Corn meal, while very high in starch, is much lower in protein than cottonseed meal or linseed meal. It is higher in fat than linseed meal, but considerably lower than cottonseed meal.

## MAKING THE RATION

Cowpea hay, alfalfa hay, clover hay and other legumes are also rich in protein when compared with other roughage materials. They are moderate in carbohydrates, and, compared with corn or cottonseed meal or linseed meal, are low in fat. Timothy hay, while low in fat and protein, is relatively high in the carbohydrates. The table following shows the digestible nutrients of the feeds mentioned:

DIGESTIBLE NUTRIENTS IN 100 POUNDS.

	Protein	Carbohydrates	Fat
Cottonseed meal -----	37.0	16.5	12.6
Linseed oil meal -----	30.6	38.7	2.9
Corn meal -----	7.1	66.1	4.8
Cowpea hay -----	10.8	38.4	1.5
Alfalfa hay -----	10.6	37.3	1.4
Clover hay -----		38.1	1.8
Timothy hay -----	2.9	43.7	1.4
Corn stover -----	2.0	33.2	0.6

*Great Variation in Feeding Stuffs*—From this table may be seen the variation of the various nutrients. If one were to feed cottonseed meal, for instance, he ought not to feed linseed meal also, but seek some other feed that is higher in the nutrient that is low in cottonseed meal. He might use any of the legume hays, but these legume hays are also rich in protein and but moderate in the carbohydrates. Where a reasonable amount of cottonseed meal is fed, it would be better to use some other hay not so rich in protein and higher, if possible, in the carbohydrates. Timothy hay and corn stover are two such feeds and either is excellent to be used with the meal.

When corn meal can be obtained at a reasonable cost per nutrient, corn meal and cottonseed meal can be economically used together, the cottonseed meal being rich in protein and low in carbohydrates, while the corn meal is high in carbohydrates, but low in protein. From this standpoint these two feeds make an excellent combination as the grain portion of a ration. The objection to using them exclusively is in the fact that they are too con-



#### IN NEED OF A SQUARE MEAL

When farm stock are improperly fed, they are unable to do efficient work. Wise feeding is an art that every good farmer must acquire.

centrated. Some bulk feed ought to go with this combination and, therefore, any of the hays like cowpea, alfalfa, clover, timothy or corn stover can always be used satisfactorily.

If the legume hays are fed, less of the cottonseed meal and more of the corn meal should be admitted to the ration; and if timothy hay or corn stover is used, then more of the cottonseed meal and less of the corn meal.

Since protein contains nitrogen and sulphur, and the carbohydrates and fat do not, then it is evident that the carbohydrates cannot be used as a substitute for the protein. Just as nitrogen in a fertilizer cannot take the place of phosphorus or potassium, so the carbohydrates and fats cannot take the place of the protein. While protein can be supplied as a provider of carbohydrates and fat, it is neither wise nor economical, for the reason that protein is an expensive nutrient to obtain.

The farmer can produce always in abundance his carbohydrates. The most common plants grown on the farm are, as a rule, rich in the carbohydrates, and this class can be supplied at low cost. Unless the farmer grows an abundance of legumes, his supply of protein is short, and hence his animals are supplied with too little of this element and they suffer. To overcome this shortage he is forced to purchase costly meals or grain materials in order to overcome the deficiency in common forage crops grown over the greater part of the country.

### **EACH FEED CARRIES ITS OWN VALUE**

Wise feeding recognizes these facts, and aims to supply for each class of animals various kinds of feeding stuffs so as to furnish the different constituents in the proportions in which they are needed.

The following feeds may be mentioned:

As types of the chief classes furnishing protein: Cottonseed meal, linseed meal, wheat bran among the grain, and cowpea hay, alfalfa hay, and clover hay among the hay crops.

As furnishing carbohydrates: Timothy hay, crab grass, corn stover, corn ensilage, cottonseed hulls, orchard grass and wheat straw.

As furnishing fat: Cottonseed meal, goose oil meal, corn meal and oats.

*Consider One Feed in Connection with Others—* But you cannot simply select a feed and use it to the best advantage without considering it in connection with other feeds that you want to use. Take cottonseed meal: Suppose you were to select it as desirable for dairy or beef cattle. Aside from the dietary effect of a single feed, you would soon observe that cottonseed meal contains too much protein and too much fat, and that the animals would soon be in need of carbohydrates. Hence, cottonseed meal as the sole feed would be unsatisfactory. With the addition of cottonseed hulls for the southern feeder, or of corn stover or timothy hay for the northern feeder, the ration would be materially improved, since you have now added carbohydrates. If you use a good deal of cottonseed meal, and your supply of corn stover or timothy hay is limited, you can further improve the ration by adding corn meal or some other hay. If you have hulls or timothy hay in abundance and a small amount of meal, you will improve it very greatly by using alfalfa hay, cowpea hay or clover hay in addition to the other feeds.

*A Proverbial Ration—*Here is the proverbial ration for work horses: Timothy hay and corn. To a certain extent the ration furnishes all of the constituents, but it does so in a badly balanced form, for the reason that you feed too much of the carbohydrates and not enough of the protein. Consequently, just as soon as you put your work horses on heavy work, they lose in flesh, grow laggy, and crave for more corn or feed of some kind. They are getting too little protein. You can correct this

trouble by feeding a couple pounds daily of cottonseed meal, three or four pounds of wheat bran, or six or eight pounds of oats. You will understand that the aim is to furnish protein, carbohydrates and fat in the right proportions in order to get enough of each constituent to supply the needs of the body.

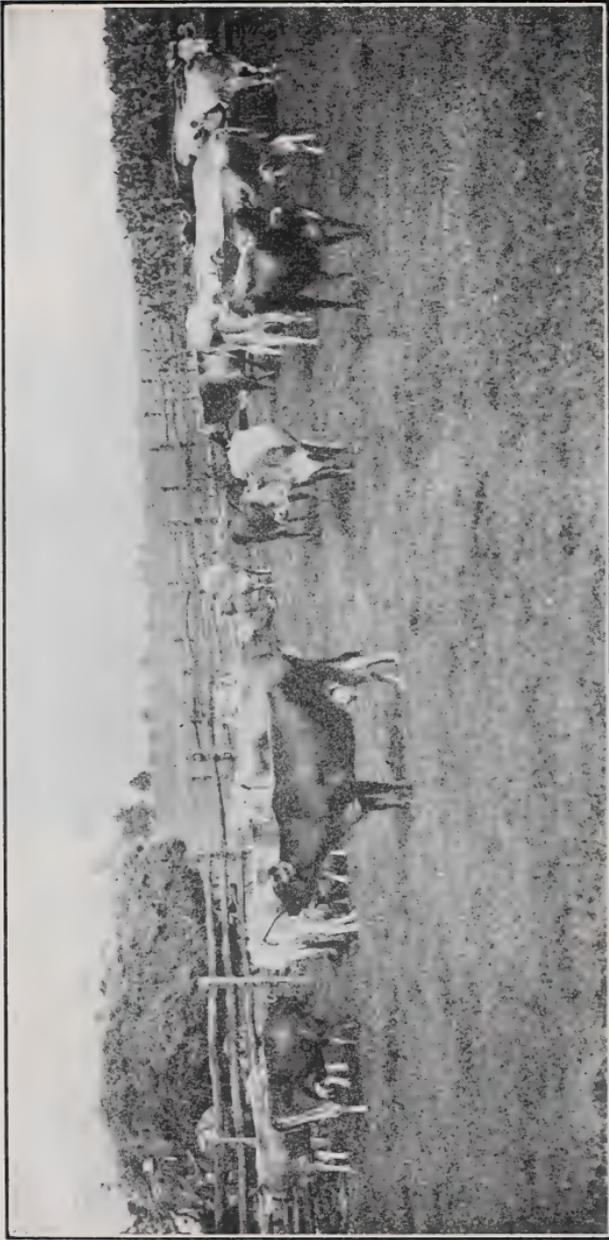


#### NO WASTE ON THE STOCK FARM

The hay press has become a necessary affair where hay or straw are shipped from the farm.

#### THE IDEA IS TO SUPPLY WHAT IS NEEDED

The whole problem of feeding is concerned with this delicate art of planning the constituents that each animal may get daily what its body requires. To do this you must consider the work that each animal has to do. A work horse demands a different ration from one doing very light work. A young dairy cow producing two gallons of milk



#### A HERD OF BROWN SWISS CATTLE

Although brought from the mountains and highlands of Switzerland, these cattle have made themselves at home and have proved their worth in our country. As a breed, they are neither an extreme dairy type nor an extreme beef type.

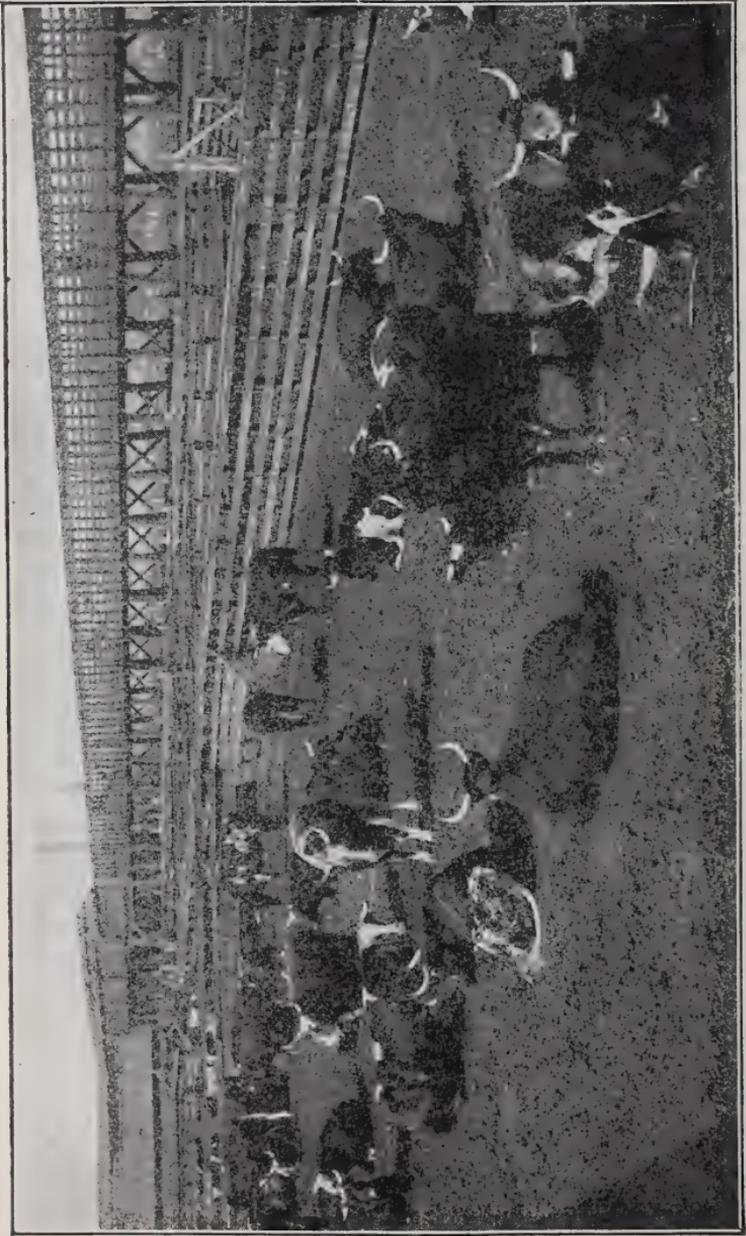
daily, requires a ration different from one that gives four gallons of milk daily. A fat hog weighing 250 pounds requires a ration very much different from that for a young beef steer weighing 600 pounds.

*Every Section Has Good Feeds*—It is a significant fact that each section of the country has abundance of feeding stuffs more or less adapted to its need. No section has a monopoly of any class. There is a range of forage and grain crops in each section sufficiently extensive to admit a moderately careful balancing of rations.

In the South there is an abundance of cottonseed meal and cowpea hay. This section has, in fact, more protein than it can use; and there are also other feeds, as corn stover, cottonseed hulls and cereal hays. The New England farmer is well supplied with carbohydrates, but he is short in protein, for he neither grows cotton nor flax, and, to his misfortune, he never grows a maximum quantity of clover and alfalfa. He looks to the South for meal or to the starch factories of the West for the by-products to help him out with protein. The western farmer gets this protein by means of alfalfa and by-products of the starch factories, and at the same time he has an abundance of carbohydrates even more than he can use. The waste that takes place in the cornfields each year is indicative of this fact.

### EASY TO SWAP FEEDS

Since transportation is now so easy, an exchange of one class for another is easily made, furnishing no reason why each section should not have such nutrients as it needs to balance properly its standard feeding rations. The farmer who has an



TEXAS BRED AND TEXAS FED

abundance of timothy and corn, which he is now feeding his work horses, can well afford to dispose of a part of either or both and expend the entire receipts for bran or oats. By so doing he need not increase his outlay at all; but he will supply his work horses with a more satisfactory ration.

But there are large quantities of food each year going to waste in every section. In this you will not disagree with me if you will but consider the thousands and thousands of tons of corn stover and cottonseed meal, and the by-products of the slaughtering houses that rot and decay each year in American farm fields, a quantity of rich animal food and of real wealth so vast as to be almost beyond estimation. And all this is wasted and unutilized each year. Of course, these materials help the soil, but they could help the animal first, and to the land might go the resulting manure, doing the land as much good as the raw animal food.

How long shall we allow this state of affairs to exist? Why not stop at this point? Why not begin a readjustment of your business so that these products now wasted may be utilized?

### USE JUDGMENT IN PURCHASING FEEDS

There is often very poor judgment shown in the purchase of feeds. Just think of the great quantities of timothy and other hays that are each year sent into some section to be fed to live stock! It is not wise farm management to buy timothy hay, and yet this practice prevails in many parts of the country, particularly in the South. It is not economical feeding. There is no special virtue in timothy hay, for a feeding stuff is valuable only in

proportion to its ability to furnish protein, carbohydrates and fat. Why buy timothy hay when it is little better than corn stover as a feed. Grow plenty of corn and the legumes and you need not bother about timothy hay.

The good farmer and the wise feeder aims to have some legume crop at all times. The western farmer can readily grow clover or alfalfa; the southern farmer cowpeas, clover or alfalfa; the New England farmer clover, and as soon as he learns how, he will grow alfalfa and cowpeas.

*Grow the Legumes*—Cowpeas and clovers and alfalfa are needed not only to catch nitrogen out of the air and store it in the soil so as to maintain the fertility of the land and add humus thereto, but they are needed for feeding cattle and sheep and hogs and horses. Feeding experiments have shown that, in feeding value, these three feeds are not much less than the feeding value of wheat bran.

Many farmers who do not grow wheat, yet buy wheat bran for the protein, because they look upon wheat bran as a valuable feeding stuff. And it is, but as well as being good, it is also costly. It takes money from your pocket. Still if a man could sow ten acres or more each year to a crop of wheat bran, and if he could sow the wheat bran just as he can now sow cowpeas or alfalfa or clover, and if he could get two tons or more of bran per acre, I am confident the practice would become general throughout the country. And why? Because every farmer has learned of the value of wheat bran as a feed. But if alfalfa and cowpeas and clover are almost equally as good as wheat bran for all feeding purposes, why will you refrain from growing alfalfa, cowpeas and clover when you can get from four to six tons of the former and a ton

and a half to three tons per acre of the latter two crops?

### THE FOLLY OF BURYING FEED IN THE GROUND

There are lots of follies committed in agriculture, but there is none greater than that annually made when millions and millions of dollars of feed products are buried in the soil each year as fertilizer, examples being cottonseed meal, tankage and dried blood. We should aim to get the total profits that these feeds possess. They ought to be fed first to live stock so as to get the wealth penned up in them in way of milk and meat. And then there is almost a similar value in using the resulting manure upon the land. It seems to me wise farm management to take a dollar and buy first the material for a feeding stuff, and afterwards to utilize it as a manure. When feeds are buried in the soil year after year, no profit is secured at all from the potential feeding values stored in them.

Here is one of the great opportunities of southern agriculture, and if grasped by the southern farmer, millions of dollars could be added to the wealth of that great section. To a great extent cottonseed meal goes into the soil unutilized year after year. It ought to go to cattle first, bring a profit by them, then be sent to the soil for a second profit that will come from the increased yield from crops.

In the great pork-making sections of the country tankage now largely goes unused, yet it has been definitely shown that not only is tankage a valuable feed product, but when combined with corn greatly increases the potential value of that

feeding stuff. How long, oh, how long, shall these wasteful methods be practiced? Enough has now been said about the feeding proposition—about its principles, methods and practices. If you would secure the reward, adopt them. And all the while remember these facts: Wise feeding is not only profitable, but it leads to land improvement; not only does it secure meat and milk economically, but it increases the efficiency of farm stock; not only does it bring immediate, profitable returns, but it adds to the potential fertility of the farm. Right, wise, skillful feeding makes farming profitable.

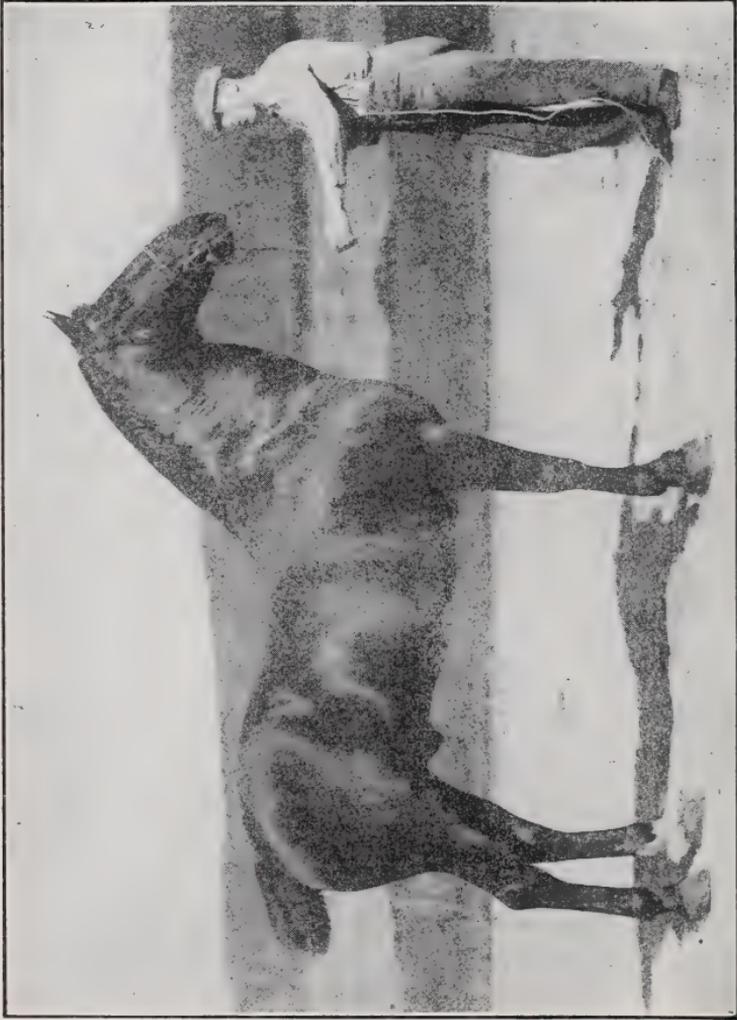
## CHAPTER III.

### Horses

When America was discovered there was **not** a horse to be found. Hence, the Red-man, in his meager attempts to bring agriculture into his service, lacked a beast of burden to assist him. Although recent investigations indicate that the original horse stock had at one time a home on this continent, the horse as we know him came into our country from across the waters. To find his original home we shall need to go into southern Asia where the tempests rage and man lives only with difficulty.

The horse comes to us not of his own choosing. He left his cold and stormy home, not because he preferred some place else, but because man claimed him, domesticated him, put him into service and rode him away. Why the horse preferred these vast steppes to warm climates and more luxurious vegetation, I do not know. It may be that he felt safer there. He could for one thing see his natural enemies, the wild beasts, at a greater distance, so that escape was more easily accomplished. Nor have we any record of the early domestication of horses. The time is too far back in history; before words were written or paper made or printing discovered. Tradition, however, indicates that far back in the past the horse was used for purposes of war, service and pleasure.

It is certain, too, that the horse in the early days found man, as well as the wild beasts, his natural enemy, for his flesh was not bad at all, and even



#### TYPICAL HACKNEY STALLION

The hackney is always seen at horse shows. His high-stepping qualities, neat form and easy and graceful action have secured for him a warm place in the hearts of all horse lovers.

today in Paris and other large European cities not a little meat that is consumed is horse flesh. We know nothing about the early handling of the horse when first subdued; but we can be reasonably sure that it was not by gentleness, but by force, that he submitted to the demands of man.

Wild horses are still to be found; but their domesticated kin are now our friend and helper, and generously and willingly assist in every work and duty which he is called upon to perform. The horse has always retained the principal and best qualities of his ancestors — speed and strength. These are the qualities, which served him once for flight, that are now employed in the service of man. It is not out of place to honor and caress this noble beast, which, sturdier, stronger and fleetier than ourselves, is, nevertheless, one of the most serviceable and devoted of all domesticated animals.

## CHAPTER IV.

### **Breeds of Horses**

It is quite impossible to make a ranking list of breeds. Even in the same community, under the same conditions and environments, many breeds of horses are observed, showing that men honestly differ in opinion as to the merits and values and varieties of horses, as they do in other matters in life. It follows, then, in breeding or working, that taste, fancy and individual choice will govern in the selection of the breed. Following is a brief discussion of the breeds common in America, giving their chief characteristics and qualities:

*The Thoroughbred* was the first breed of horses to be definitely established. It comes from England, where it was produced by mingling many different strains of oriental blood. The modern Thoroughbred is thus the oriental horse, developed and improved by centuries of breeding and selection.

Three oriental horses are mentioned by all authorities as having contributed most to the formation of the modern Thoroughbred; viz., Darley Arabian, Byerly Turk and Godolphin Arabian, the only existing male line from these horses tracing their ancestry to Eclipse, Herod and Matchem, respectively, all from the middle of the eighteenth century. As stated by Sanders, however, while the oriental horse furnished good material as basis for the breeder, the skill of the English and American breeder has done more than the blood of Arabian and Barb horses. The Arabian is docile and

possesses great beauty of form, but he is inferior to our Thoroughbred in size, height, speed and endurance. Our Thoroughbreds are imported from England or are descendants of horses thus imported, with an occasional mixture of the Arab or Barb, which is not considered as vitiating the pedigree.

The Thoroughbred has been bred for the race course and similar purposes for centuries. In this



THREE GOOD FARM-BRED PERCHERONS

Percheron horses have always been popular in America ever since their introduction. They are good walkers, quiet and heavy enough to perform all operations on the farm that call for weight and pulling power.

long course of breeding, certain defects have crept into his make-up which unfit him for farm uses. He has become tall, lithe, light and too nervous for everyday use. Nevertheless, the Thoroughbred has been used in the improvement of all kinds of horses. The favorable influence of a cross with a Thoroughbred is recognized on every hand. Trotters have been built largely on Thoroughbred blood and this same blood is at the foundation of nearly every fine roadster and driving horse in America.

A heavy Thoroughbred makes an excellent cavalry horse, general saddle horse or carriage horse.

*The Trotter*—There were trotting or ambling horses in England 600 years ago, but it was not until 1818 that an authentic record of a mile in three minutes was made. In 1806 a horse named Yankee is said to have trotted in 2.59, but the record is doubtful. The aim of the breeder of trotters is to secure a fast trotting gait and the speed of these horses has been gradually increased during the past century.

Naturally this reduction of the time is partly due to the use of a lighter vehicle, ball bearings, pneumatic tires, improvement of the track, etc., but a steady increase of speed has been brought about by breeding. The Trotter is essentially an offshoot or variety of the Thoroughbred, produced from the latter by breeding and selection for the possession of a trotting gait. The first known or definitely recorded sire of a winner in a trotting race was Coriander, son of imported Messenger. Several other distinguished sires of trotters descended from the same Messenger. In fact, not until 1837 did a noted trotter appear which did not come from Messenger. The Morgan family came into existence in 1840, the Clay family in 1850 and Rysdyk's Hambletonian in 1860.

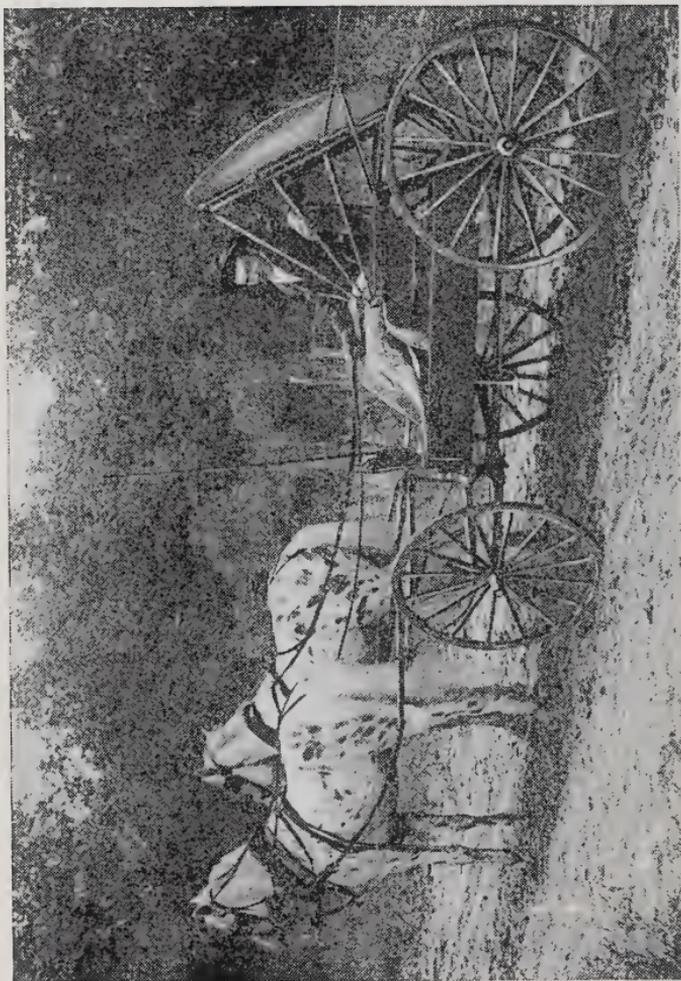
*Pacers* do not constitute as yet a recognized breed. Many standard-bred trotters number pacers among their progeny. In early days in this country, pacers were used largely as saddle horses. Later they were put on the track. On the race track the pace seems to be a somewhat faster gait than the trot. For general driving purposes, however, the pacer is inferior to the trotter. The hips

slope, the shoulders are high and the form is otherwise less perfect. Within the past 25 years the speed of the pacer has been greatly increased until Dan Patch made a mile in 1.55 $\frac{1}{4}$ .

*The American Saddle Horse*—The foundation stock of this breed was Denmark (a Thoroughbred), John Dillard and Tom Hal (Canadian horses), and a number of other Thoroughbred and Morgan horses.

*Saddle Gaits*—To entitle him to registry the saddle horse must possess five gaits—walk, trot, rack and canter, and either the running walk, slow pace or fast trot. The rack is also known as the single-foot gait. Style is an important feature. Many of these horses are good for saddle or driving and a few of them have trotted faster than 2.30. The hair is silky, mane of medium length, head small, ears erect, neck arched, withers narrow, barrel round, legs hard and flat with rather small joints. The fox trot can be maintained all day and carries a horse at the rate of four to six miles an hour.

*The Morgan Horse* originated with Justin Morgan, owned by a man of the same name from West Springfield, Mass. The foundation horse of the breed was foaled about 1793 and was claimed to be of Thoroughbred descent. A thorough investigation by Wallace and others shows pretty clearly that the ancestry of the original Morgan horse is unknown. Sherman Morgan was among the progeny of this horse, his dam being a Narragansett pacing mare. He is noted as the sire of Black Hawk, the most famous of all the Morgans. The Morgan horse is essentially a trotter of small size, but active and speedy. Fifty years ago they were much more in favor than at present, and were widely known from Maine to Iowa.



A SPAN OF FARM ROADSTERS

The light roadster has a place on the farm as well as the heavy draft horses. Neither can take the other's place.

*The Hackney* originated in northeastern England more than 100 years ago by the careful selection of carriage mares and the use of Thoroughbred sires. The breed was first called Norfolk trotters or cobs. The action of the Hackney is very high and showy, the leg and feet somewhat larger than trotters, the general form rounder and less angular, back short and stout, height 14.2 to 15.3 hands, hindquarters rounded, shoulders sloping, color chestnut or brown or bay. The knee action is high and the hind legs are always kept under the body. The Hackney is essentially a heavy harness horse. He is too small for the farmer and too slow for racing. His endurance is also not great. He is merely a park horse and high stepper. Hackneys are bred extensively in Canada and in recent years many have been imported into this country, especially in New York, to satisfy a fad among fashionable society.

*The French Coach Horse* was at first called Demi-Sang on account of the fact that it was originated by crossing the English Thoroughbred on native French mares, the latter carrying considerable oriental blood. Toward the end of the eighteenth century the French government undertook this work in order to obtain better cavalry remounts. After the type was fairly well established, breeding was continued in the government studs and by farmers, under government supervision. Thoroughbred stallions are still used occasionally, so that some French coachers may be self-breeds.

The French coacher stands higher than the Hackney, the knee action is not so high and the general form more rangy. The weight is 1050 to 1400 pounds and the color bay, brown or black. The type is poorly fixed and it does not breed true.

Some are much coarser than others, which may show their Thoroughbred ancestry. In the hands of skilled breeders, the French coach horse may be used in the production of heavy harness horses and for this purpose they have been imported in small numbers. It is probable, however, that a much better type of this sort can be obtained from the American Trotter by selecting the heaviest animals.

*The German Coach Horse* is a name used to cover several breeds of coach horses bred in the northern German provinces. The most important breeds are the Oldenburg, Hanoverian, East Friesland and East Prussian, the first named being the most promising. According to some authorities, this type was known in Oldenburg as early as 1608. The breed was greatly improved by crossing Thoroughbred stallions on the Oldenburg mares under government supervision. This horse is black, brown, bay or chestnut in color, 15 to 16 $\frac{3}{4}$  hands in height, 1200 to 1500 pounds in weight. The legs are strong, but smooth and the carriage of the head, neck and tail is graceful. The gait is much like that of the French coacher. On the western range, German coach horses have produced fine grades from native mares, and the breed seems to be on the increase in this country.

*The Cleveland Bay* is a coach breed which originated in England by crossing the Thoroughbred upon native mares of the Cleveland district. It is noted for coaching and long distance work. The color is bay, weight 1,200 to 1,500 pounds, height 16 to 16.2 hands. The croup is straight, back short, thighs strong. The Cleveland bay is adapted for pulling heavy loads at considerable speed. He has much to recommend him to the farmer. Since the

establishment of the stud book in 1884, additional speed has been secured by the further admixture of Thoroughbred blood. The Yorkshire coach horse is very similar to the Cleveland bay and is considered by some as a family of the latter. It shows more of the Thoroughbred, occasional white



#### PLOW HORSES

In the conquest of American lands, the farm horse has been the most conspicuous of all farm animals

spots and does not breed as true as the Cleveland bay.

*Influence of Thoroughbred*—From the above discussion of light breeds of horses, the immense influence of the blood of the Thoroughbred is apparent. The Thoroughbred has furnished the foundation of the Trotter, Saddle Horse, Pacer,

Orlov Trotter, Morgan, Hackney, French, German and Yorkshire coach, and Cleveland bay. The oriental blood is "hot blood." The Thoroughbred and its modifications in various modern breeds are known as "hot blooded" as contrasted with the "cold blooded" draft horses which originated in continental Europe. The blood of the Thoroughbred is everywhere present in horses which are distinguished for speed, courage and endurance. Even the Welsh pony carries some oriental blood.

*Draft Type*—As the light or "hot blooded" horses are all descended, with modification, from the Thoroughbred, so the draft or "cold blooded" horses are descended from the old black horse of Flanders. At the dawn of history this wild black horse was found throughout continental Europe. In northern Europe the conditions seemed to be favorable to the development of large men and large horses. By skillful breeding and an occasional mixture with oriental or native blood, several heavy breeds have been produced from the black horse of Europe. Thus from England we have obtained the Clydesdale, Shire Horse and Suffolk Punch; from France the Percheron and French draft horse; and from Belgium the Belgian draft horse or Flemish horse.

Before the days of railroads much freighting was done by horses through Pennsylvania from the seaboard to the Ohio river. For this heavy work the Conestoga horse was produced and was at one time famous as a draft horse in Pennsylvania. This horse was a product of local breeders, based on imported heavy horses of unknown blood. The Conestoga horse stood 16 to 18½ hands high and weighed 1,600 to 1,900 pounds. With the advent of railroads the breed was allowed to become extinct.

*The Clydesdale* originated in Scotland, being first referred to in 1715. The Black Flemish horse and other heavy horses were crossed with the early form of the type. At present the type is well fixed and the breed is very true and prepotent. The color is bay or brown with white markings on the face and legs. Other colors, such as gray, black and chestnut, sometimes appear. The flanks are lighter in color, fading to a dun on the belly. Mares weigh 1,500 to 2,000, stallions 1,800 to 2,200 and the height is 16 to 17 hands. The head is long, neck medium, leg broad and fine, silky feathering below the knee and hock, shoulders sloping. The Clydesdale shows a fast, elastic walk and a fairly good trot. The waist is sometimes too small, the back too long and the feet too flat. In these points much improvement has been made of late. The forehead is broad, hindquarters well developed, leg joints strong, tail well carried. The special merits of the Clydesdale are the smooth, clean legs, and the long graceful strides.

*The Shire Horse*—The black horse of Flanders, imported to England and crossed on native heavy mares, gave rise to the old war horse or "great horse," which was much in favor as a charger in the days of knight-errantry.

The Shire horse resembles the Clydesdale, but is heavier and coarser. The color is black, bay, brown or gray; height 16 to 17.2 hands, weight 1,600 to 2,300 pounds, neck short, nose Roman, shoulder straight, body short, deep and round, back broad, legs strong with heavy bone and "feather" extending around on the sides. The gait is slower and less stylish than in the Clydesdale, but the animal is stronger and less likely to be "weedy." The

shoulders and pasterns are more erect than in the Clydesdale and the hair is coarser.

*The Percheron* is the national horse of France and originated in the district of La Perche. Until 1883 all draft horses in France were referred to indifferently as Norman, Norman-Percheron, Per-



A TYPICAL PERCHERON STALLION

This prize-winning Percheron represents the grace, quality and high breeding of the draft horse. The Percheron is known in every state and county in the country.

cheron or French Draft. In that year the name Percheron was adopted. At first two types, the light and the heavy, were recognized. The light Percheron was most in favor and was used as a coach horse. He weighed 1,400 to 1,600 pounds, stood about 15.2 hands high and had considerable speed as well as strength. The neck was trim, the

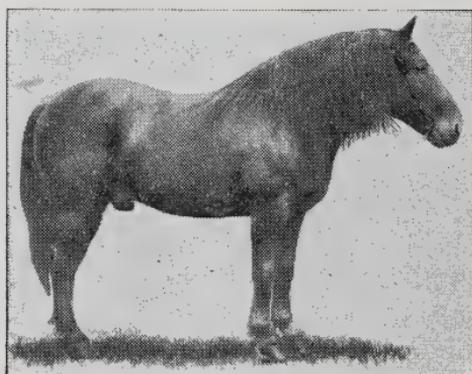
feet well formed and the legs only slightly feathered. In 1732, many of the oriental horses were captured in France from the invading Saracens, and this blood, mixed with that of the European black horse, yielded the Percheron. Shire horses were also imported from England and their blood added to the existing mixture. Du Hays in his treatise on the Percheron claims an Arabian ancestry for this horse.

The color of the modern Percheron is black, gray, or white. He stands 16 to 17.2 hands high, and weighs 1,600 to 2,200 pounds. The legs are short, blocky and without feather, the hoof is good, head small, face straight, neck arched, shoulders and hips sloping, body deep, round and broad. The Percheron is powerful, but his legs and feet are his strong points. He shows his heel in walking, and his action is good, but not quite so swinging as that of the Clydesdale. The percentage of blacks has been increased by the Americans. Roans, bays, browns and chestnuts are occasionally observed, but probably indicate impure breeding. The weak points in the Percheron are lightness of leg below the knee and hock, rolling gait in front and wide straddling behind. These defects, however, are only seen in a certain percentage. For breeding, stallions with oblique pasterns should be selected.

Alexander rightly calls attention to the beneficial effects which the Percheron has exercised upon our native horses. This horse is by far the most popular of all the draft horses, and breeds fairly true to type. He is docile, easily kept in condition, of good constitution and well adapted to all sorts of draft purposes. When crossed on native mares, the Percheron produces excellent express, farm,

draft and general purpose horses, according to the size of the mare. "Where the blood of this breed predominates in a district, no other breed should be used. Continued breeding in the right line is highly advisable and will result in the production of practically pure bred horses of great usefulness and value."

*The French Draft* has the same ancestry as the Percheron and was once included with the latter.



#### CHILDREN'S HORSES

Thousands of ponies are to be found on American farms. While intended for the enjoyment of children, they may be made to do much useful work.

In fact, the breed is now in process of differentiation from the Percheron and can scarcely be distinguished from it. The prevailing colors are gray, bay and black. The French Draft is slightly heavier than the Percheron and useful for fewer purposes, being purely a heavy draft horse.

*The Belgian Draft Horse*, or Flemish horse, stands nearer than any other breed to the old black horse of Flanders. His ancestors were first used as war chargers and later for draft purposes. Until recently the Belgian Draft horses imported

into the United States have lacked quality. The Percheron and Clydesdale possess more style and better action than the Belgian, and are therefore more in favor in this country. The Belgian has less feather on the legs than the Clydesdale, shorter neck, wider breast and larger body.

The Belgian Draft is the largest of all horses, weighing 1,700 to 2,500 pounds. The preferred colors are brown, bay and black, with an occasional roan or chestnut. They are closer to the ground than the Percheron and less trim in appearance. The head is large, ears sometimes lopped, neck thick, shoulders straight, back short and broad, chest deep, legs short and flat, feet large, heel low. The defects of the Belgian are clumsy gait, coarse neck, sloping croup and too erect pasterns. Attention is being given to the correction of these points. Belgians are slowly gaining in favor among American breeders on account of their great power and easy keeping qualities.

## CHAPTER V.

### Horse Breeding

While we have many races and breeds of horses, we may with all correctness classify them into three groups. By continually selecting the heaviest animals of a heavy race and giving them such food as their needs require, our heavy breeds of draft horses have been obtained—horses that rear themselves like giants of fairy tales to the eyes of those who see them for the first time. In using for propagation the fleetest animals of a fleet and noble race and giving to their product an education that develops muscles and tendons, and by carefully repressing all tendency to lay on fat, breeders are obtaining more and more animals of incredible speed which on the American race track are taking less and less time to cover a certain distance. By using the smallest specimens of a race of small ponies, breeders have succeeded in producing horses no larger than mastiffs. I saw a dwarf horse not long ago exhibited at one of our passing shows that was slightly less than two feet in height. Breeders have also seized and reproduced the freaks of nature, such as the albino horses (born white).

When the horse was wild he looked after his own food, his own protection and his own shelter. He naturally made little progress, and what progress he did make was of a nature to fit him to his conditions and environments of life, rather than

to fit him to do useful work, or otherwise to contribute to the pleasure and happiness of his goodly friend, man.

## SELECTING TO GET HEAVY HORSES

With the coming of civilization, however, man took the horse in hand and helped him. Inasmuch as the horse could more rapidly till the soil, he was used for this purpose. An early observation was that the heavier the horse the harder work he could do and the heavier the load he could draw; hence there was an unconscious selection in developing animals to do the heavy draft work of the world.

As we have the draft horse today, he possesses striking characteristics. By looking at him from the front you see that he is wide between the eyes, moderately long in face and rather wide between the shoulders. If he stands correctly there is between his feet the measured distance of another hoof.

A plumb line dropped from the point of his shoulder divides the forearm, knee, canon and hoof in equal parts, thus insuring an even, regular movement of the leg. Stepping around to the side, the first observation will be that the neck is relatively short, but it is heavy and muscular. It blends evenly and smoothly into the shoulders, the breast at the bottom, and the withers at the top. The shoulder slopes gently upward and, compared with the race horse, is rather straight. The back is well covered with muscle, is broad and well fleshed, with well-covered hips, presenting a view that would indicate the back not to be long. The general slope over the hips becomes rather abrupt, for

the hips are well muscled, thus giving force and power; for it is from the rear that ability to draw comes. The same well-muscled form continues about the buttocks and the thighs. Here are shown short muscles, but muscles that are large and strong. The knees and the hocks should be deep and broad and rather large. The usual trouble in the hocks, known as curb, is due often to bad conformation. The hock is not wide and deep enough; leverage of muscles to stand the strain and to do the hard work demanded of this region of the body is not sufficient.

Special attention should be paid to the feet, for unless a horse has strong, well-made feet, he is poor material for either field or road work.

A further observation from the side shows the horse to be square or of a rectangular appearance. The height from the ground to the withers is about the same as the height from the ground to the croup. These measurements, in turn, are practically the same as the distance from the point of the shoulder to the quarter or buttock. Carrying these measurements still further, either of them is just about two and one-half times the length of the head, which in no case should be more than three times the width between the eyes.

These measurements have been rather carefully worked out and much of the beauty and ease of action and grace and efficiency of this noble animal is due to these proportions along the line of law and order, rather than of casual chance.

An awkward, ungainly horse is, as a rule, an inefficient, little-doing horse. He is awkward and ungainly, because his proportions are bad, and as a result the work he accomplishes represents the minimum quantity.

But there is a radical difference in the type between draft and speed horses. While the trotting horse requires great width between the eyes (and it might be added that width between the eyes is an absolute beauty in any animal), he is longer in face, longer in neck and leaner in appearance. In fact, the neck is thin, the chest is very deep, but perhaps not so wide as in the case of the draft horse. The shoulder is more sloping and longer, and there is less muscle at the meeting place of the



FARM TEAM AT WORK

Quietly and calmly they stand; but whenever needed, the farm horse responds willingly and faithfully

two shoulders. The back is long, but thin and narrow, and slightly fleshed; the hips are prominent, the croup quite horizontal, and attached to thin, long muscles that speed may be accelerated. The buttocks and thighs are slightly covered with flesh, but the hock is wide, deep and thick and the feet are hard and strong—just as they are with the draft horse. The leg and canon bones of the speed horse are longer than those of the draft horse. Now, why these differences? Each type represents a specialty. The speed horse is a poor

working horse, because he lacks conformation; and the draft horse will never win a race on the track if competing with special-bred race horses because he possesses no qualities of speed. The leg of the draft horse is too short, the forearm is too short, the shoulders are too upright and the muscles are too thick and too slow-acting. The speed horse possesses the opposite characteristics, which are basal features of speed.

Take a long, thin rubber. You can extend it a long way and when released it passes through the extended distance quite rapidly. Take this same piece of rubber and lap it over itself a few times so as to shorten it into one-fourth its original length and you get greater power when the rubber contracts; but it acts more slowly and extends itself less. That is the way it is with horses. The long-legged, long-muscled race horse can reach out and cover greater distances than the draft horse because of these special features. But these differences in type go deeper than mere skin and flesh. The skeleton presents these differences even more prominently than the living flesh. You have but to study the skeleton to see the reason and the proof of the foregoing explanation of differences between the two types.

Function is based on conformation. You must have type and conformation. It is useless to attempt to press one into the service of the other. Farmers too often make the mistake of interchanging type along with other breeding operations. The mating of draft with speed types for a generation or two and then changing to the carriage type and then back again to either the speed or draft type, causes an intermixture of

blood and function that makes a good-for-nothing individual.

*Select Your Line of Animals*—If it is a large draft type, then breed straight to that line. If you want lighter horses, do not make the mistake of breeding down in size. Rather take individuals of



A FOUR-YEAR-OLD SHIRE STALLION

The Shire horse is not so well known as the Percheron, but the breed is gaining friends very rapidly.

some breed that possess already the characteristics you want, and improve these by careful selection and mating. By so doing you will then get quality, an important character for any breed.

The carriage or coach horse comes in between the two extremes of draft and speed. These horses

supply the demand of the general purpose horse, although they are not just that, but horses of this class are able to do considerable work, and at the same time have greater speed characteristics than the heavy draft horse. But they are neither speed nor draft horses and would be outclassed in either case. They do light road work or heavy harness work and do it well. They have their work to do just as the speed or draft horse has its work to do.

### CONFORMATION OF THE DRAFT HORSE

Many farmers have attended our state fairs and seen modern draft horses on exhibition. The up-to-date draft horse is one that stands close to the ground, with short legs and broad base. The feet are well apart, with space enough for another foot of the same size to be placed between them. The back of this animal will be somewhat shorter than that of the speed horse. It is with the hind legs that he propels himself, and thus it can be easily seen that, since the collar is on the shoulder, the whole weight of the load is drawn by the back. Therefore it must be short, broad and well muscled.

The shoulder of this horse is long and well shaped, so as to give a good base to the collar. It should be more nearly perpendicular than that of the speed animal. However, sloping shoulders are often found in our best draft horses. The hocks of this horse will show rather a narrow angle, because it is by this that a great leverage is given and he is able to move heavy loads. The body is massive, low set, ample, very muscular and cylindrical. The horse should have solid, large, broad bones and limbs; the latter are well formed and properly placed under his body.

He should have large, healthy, well-formed hoofs, heels well separated, frog strong, healthy and quite hard; good physiognomy, plenty of style and action, ardor and endurance. He must have a short, rather straight pastern in order to do the heavy work required of him. His weight should be in the neighborhood of a ton. If he weighs a little more or a little less, but is good otherwise, he will not be long without a purchaser. The animal can be of any draft breed. All have special characteristics which commend them to their admirers. It is not necessary at this time to favor one and condemn the others, for all breeds sell alike when the animals are of the right kind. We say that it is quite easy to describe the animal we would like to produce, but to produce him is another thing.

*Breed for the Market*—A short time ago any horse that would weigh 1,400 or 1,500 pounds, was awkward, big-headed, lazy and good for no particular work, was classed as a draft horse by the layman. Today in many places this same notion prevails. If we will become acquainted with the animal many farmers raise and force upon the market, we will find that they are not draft horses, neither are they road or coach horses, but quite likely a lot of misfits that belong to no particular class, and for which there is no market. The farmer should learn to produce that which the people want and the market demands.

## CHAPTER VI.

### **Feeding the Horse**

The entire anatomy and physiology of its digestive apparatus show that the food of the horse should be nutritious in quality, supplied frequently, and in comparatively small quantities. The food, of whatever variety, must, of course, be of good quality, sound and wholesome; but beyond this, no specific rules can be laid down for general application. The amount and character of the food must vary with the size and constitution of the horse, the climate and season, the amount of work required, and the country it lives in.

The horse is an inhabitant of nearly all parts of the earth, and exhibits a wonderful adaptability to various situations. In Arabia its principal food is barley, varied by scant herbage, and even dates; in Iceland and some of the Shetland Islands it subsists mainly on dried fish. On the western plains, great herds of horses retain splendid health and vigor through the rigid, stormy winters upon the dried bunch grass, often having to paw away the snow to reach it. In England the food of the horse is mainly hay, oats and beans. while in various parts of the Continent horses are fed on rye, barley and inferior qualities of wheat. In India the common food of horses is a plant of the pea family. In some parts of the United States and the southern regions of Europe, Indian corn forms an important element in horse food, but not to such an extent that "American horses rarely taste oats," as is asserted by an eminent

English author. Good, well-made hay, free from dust and dirt, and sound, well-seasoned oats may in a general way be regarded as the staple food for horses. But no animal can do as well on a monotonous diet, even if of good quality, as it will with a judicious variety.

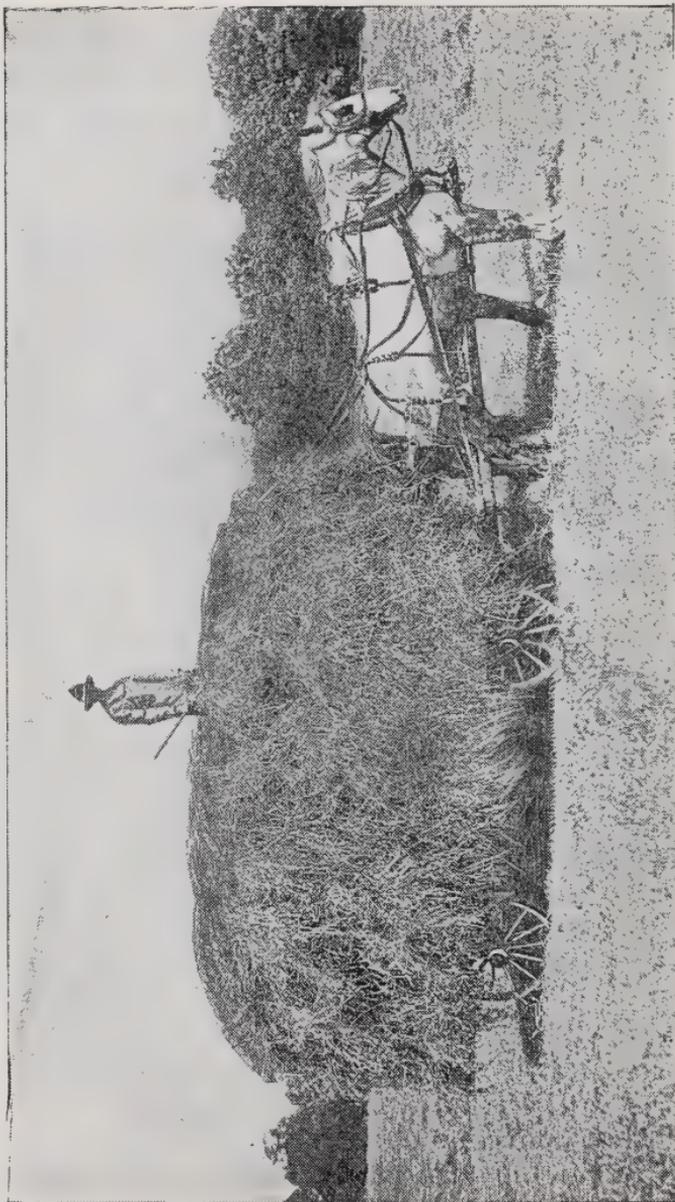
### MIX THE FEEDS TO FIT THE NEEDS

With the results of skillful chemical analysis before him, the feeder need no longer proceed in a haphazard manner, or follow blindly in old ruts, often buying at heavy cost certain standard kinds of food, when equally valuable material of other kinds is cheap and plentiful. He has only to adjust the rations in such a manner that they will contain about the correct proportions of the various elements. Those proportions should be varied according to the season, the amount of work required, and the constitution of the horse.

*Roughage Feeds for Horses*—Timothy hay with oats may well be regarded in this country as the standard article for feeding horses. But there are many other grasses equally available. In the prairie regions and farther west, there are several species of blue-joint and other wild grasses scarcely inferior to timothy. Some of these attain immense growth in rich bottoms, and if cut at the right time, and properly made into hay, are both palatable and wholesome for horses.

Hungarian grass and German millet, if cut and cured just as the first blossoms appear, make a hay scarcely inferior to timothy.

Clover and alfalfa are rich in albuminoids. Either one makes a well-balanced ration with corn meal, corn fodder, straw or other material containing an excess of carbohydrates.



A SPLENDID FARM-TEAM AT WORK

Well-bred farm horses are far more desirable than scrubby unimproved ones. It takes just as much feed for the scrub as for the well bred.

Corn fodder is a better feed for horses than is generally supposed. But it must be bright and well cured. If allowed to stand for months in small stooks, with the butts on the soft ground, and the tops and leaves exposed to the weather, it is unfit for fodder. On the other hand, if stored away in a barn while damp, and allowed to mold and rot, it is not only unpalatable, but actually pernicious to the health of animals which are compelled to eat it. Corn fodder contains an excess of carbohydrates for a well-balanced food, and when fed either green or dry, should be mixed with clover, bran or any other nitrogenous food material. It is eaten with a better relish if cut up, crushed, moistened and fed in connection with bran, oil meal, or cottonseed meal.

*Grain Feeds for Horses*—Oats are pre-eminently the grain for horses, if only one kind of grain is fed. They contain a large per cent of nutrients in almost the correct ratio for the horse's requirements. The fibrous husk in which the grain is inclosed serves a valuable purpose in dividing the mass in the horse's stomach, and exposing it to the action of the digestive fluids. Oats should be at least three months old before they are fed. When new, they are difficult to digest, and liable to give a horse the colic. They should be plump and of full weight. The husk on light, inferior oats is as heavy as those which are sound and heavy, the deficiency in weight coming wholly out of the grain. Thirty-two pounds constitute a legal bushel, but good samples weigh more, running as high as 44 pounds to the measured bushel. Six quarts of the latter weigh nearly as much as a peck of the former, and contain far more nutriment. This fact should be taken into considera-

tion in buying and feeding. If fed whole, even to young horses with good teeth, oats are more or less imperfectly masticated and a part passes through undigested. Many judicious feeders have them crushed, to secure more complete mastication.

Indian corn is the great food grain of America, and of the immense annual crops, aggregating more than two billion bushels, the greater part is fed to domestic animals. Corn is largely used as an article of horse food, either unground or in the form of meal. Corn is a highly concentrated food, heating and deficient in muscle-forming elements. When fed to horses, it should, therefore, be combined with nitrogenous foods in such proportions as are best adapted to the season, amount of work required and other conditions. It is quite a usual practice with many horse owners to feed their horses corn in the ear, under the idea of saving the expense of grinding. But this is very questionable economy, for a considerable part of the grain must go through undigested. On the other hand, if fed in the form of fine meal, it should be mixed with several times its own bulk of cut hay or other coarse feed to separate the particles and expose them to the action of the digestive fluids of the stomach. If fed alone, corn meal becomes impacted in the stomach, forming a plastic, adhesive mass nearly impenetrable to the gastric juice. Severe, and in some cases, fatal colic is the frequent result. Even if the meal is mixed with oats, the mass is too dense to form a safe and desirable food, unless fed in combination with a coarser material.

Barley is the principal grain food of horses in many parts of the world. The Arabs feed their

famous horses largely on barley; the French in Algeria have adopted the same practice. In some of the great breeding stables of Illinois barley and oats are ground together in proportions varying with the season, and are fed to stallions and mares. The introduction of a black, hull-less barley into cultivation is likely to lead to still more extensive use of this grain as food for horses. The black, hull-less variety is not used in malting; it yields large crops in many parts of the Northwest beyond the "corn belt" and is as easily raised as oats. This new variety seems likely to become an important item in the general grain crops of the country. Barley contains a larger proportion of the elements which produce heat and fat than any other grain, except Indian corn. Moreover, it weighs one-half more per bushel than oats, and the hull-less variety is still heavier. When either barley or corn and oats are ground and fed together, they should be mixed according to weight, not bulk.

Wheat bran is a valuable article for horse feed, both for its peculiar action on the digestive organs, and as a balance to richer foods. When fed alone, it is generally in the form of warm mash. To make this, take four quarts of pure wheat bran, add two tablespoons of salt, pour over it boiling water, and stir quickly until all is wet, but not too thin; cover closely to confine the steam, let it stand until cool and give it in place of the regular feed. Such a mash once a week, while the horse is kept in stables, will gently open the bowels and promote digestion. It should be given at night, and preferably before a day of rest, as the immediate effect is somewhat weakening. Bran may also be mixed with ground oats, corn or barley.

Linseed cake is largely employed as animal food in England, the greater part of that made in this country being exported there. But Americans are learning its value, and are feeding more of it than formerly. It acts both as a medicine and as a food. It is mildly laxative to the bowels, soothing to the air passages, and gives gloss to the coat. The "new process" meal contains much less oil than that made by the old process, and is therefore less relaxing and fattening, while the proportion of albuminoids is greater. As a feed substance oil meal is useful mainly to mix in small quantities with other materials. A ration containing six parts of oats, four of corn, and two of linseed meal, would be very nearly equivalent to the oats and beans which form the grain staple of food given to horses in England.

Cottonseed meal is similar in its chemical composition to linseed meal, but is more highly concentrated, and contains a larger proportion of nitrogenous elements. It should be fed with caution, in small quantities of two to four pounds.

Carrots have a food value greater than their composition would indicate. Eighty-five per cent of their bulk is water, and of the solids which remain, nearly one-tenth is fiber. Yet they serve to cool the system, and assist in the digestion of other food. They should be fed a few at a time, two or three times a week. Parsnips have nearly the same composition as carrots, except that they contain even a larger per cent of water. In England and France they are fed in the same way as carrots.

In making up a feeding ration for a horse, the first point is to find out how much the horse will eat; the next is to regulate the ration according to the weather, and the amount and character of

the work the horse is expected to perform. The harder the work and the colder the weather, the greater the proportion of carbohydrates required in the food.

Salt is doubtless wholesome and beneficial for horses, notwithstanding the contrary opinion of some people who have given attention to the matter. But horses are fond of salt, and thrive better with it than if deprived of it. The best method of supplying this article is to keep a lump of rock salt at all times where the horse can lick it. Receptacles are made of wire for this purpose, but a small wooden or iron box, fastened near the manger or rack, will serve nearly as well.

### WATERING THE HORSE

The horse in a state of nature feeds upon juicy, succulent herbage, and drinks at pleasure from pure water. When these conditions are changed for confinement in the stable or work on the dusty road, with a diet consisting mainly, if not exclusively, of dry hay and grain, the health and well-being of the horse, as well as common humanity, demand careful and judicious attention to the matter of water supply. The water must always be pure and fresh. No animal is more delicate and fastidious about its drink than a horse, and one of them will suffer agonies of thirst rather than quench it with impure, tepid or stale water. It should be given in small quantities and frequently, and never in large draughts, when the horse comes in heated, or immediately before being put to work.

Some horses require more water than others, the quantity varying with the amount of hay they will eat, propensity to sweat, etc. The water should

not be excessively cold. Copious draughts of cold water, when the horse is heated, produce colic, or founder is likely to ensue. If pumped from a cold well, it may stand until the chill is taken off. Hard water is much decried as causing harshness in the coat, and soft water is doubtless better. Yet no part of the country produces finer horses than the limestone states of Vermont and Kentucky. If a change is made from soft to hard water it should be done gradually, as the horse becomes accustomed to it. Where rain water is given it should be kept clean and aerated. Stale, foul water from a neglected cistern is unfit for a horse, and will be refused except in case of extreme thirst.

*Water When at Work in Fields*—Horses when working in the field are subjected to great suffering from thirst. From morning till noon, and again from noon until the hour of quitting for the night, the horses are kept in the dusty field, often under a burning sun, without a drink. The driver makes frequent visits to the water jug in the shade, without giving a thought to his thirsty horses. If there is no brook or other water supply within convenient distance, a keg of it, with a pail, may be carried along and kept in the shade.

When a horse comes in heated and tired from hard driving, nothing is more grateful and soothing than a few quarts of gruel made by throwing a handful of oatmeal or linseed meal in a gallon of boiling water. If none of this is prepared, a handful of oatmeal in half a bucket of cold water may be given.

*Watering at the Barn*—Many good horsemen prefer watering before feeding, which, I think, is a good practice, especially in summer, as the horse requires a large amount of water to supply the

needs of the body. After perspiring almost all day, the horse comes in pretty much exhausted in the evening, due to the loss of water and energy. Before being fed his grain, he should be given water and allowed to cool. If he is very warm, only a limited amount should be given at one time, but he must be watered frequently until he gets all that he wants as soon as he is cool enough to take it.

It is a good plan to allow a little time for the horses to cool off before giving them the evening grain ration. Some men allow them to stand and eat hay while they themselves are at supper and then feed the grain ration later. After standing all night, the horse will be thirsty and will appreciate a drink the first thing in the morning. If water is given before feeding instead of after feeding, there will be no tendency to wash the food out of the stomach into the intestines.

Large quantities of cold water taken into the stomach immediately after a meal tend to arrest digestion by cooling the stomach and diluting the digestive fluids, which may cause colic.

## CHAPTER VII.

### **The Care and Management of Horses**

It is no small matter to give farm horses just the sort of care necessary and to manage them in the most satisfactory way, unless very thoughtful study be given that feed, work, stabling and rest be all properly adjusted. It is a very easy thing to overfeed, or to feed materials not just ideally adapted to the purpose. Just how much work a horse ought to be expected to do in summer or winter must always be considered by the man who has the team in charge; likewise, when to pasture and the sort of pasture, and both in relation to other feed, are problems not yet solved, but yet very important ones to both the owner and to the animals.

The winter period usually calls for no great amount of work on the part of horses; and on many farms little care and attention are paid to farm horses. As a rule, all of the feed that is needed is supplied; at least enough to induce fattening, although the stock may be dirty and somewhat unthrifty. How often it is that we see horses which are fat and in good condition put to hard spring and summer work and abruptly or gradually decrease in substance and weight! Either the horse is worked too hard or he is not receiving the food and kind of food and care in other directions that he should have.

During the winter season good water is a first essential, as in the summer; and the daily ration should contain bright, clear, roughage material

with some grain to furnish the necessary nutrients for the maintenance of the animal in good form and condition.

The winter ration for the average work horse does not need to be expensive. Some alfalfa, fed two or three times a week (and if alfalfa is not available, then clover or cowpea hay) should be supplied for the protein or muscle-making ingredients. In addition you can feed oats straw, bright, clear, corn stover or any ordinary hay. But corn and corn stover, a common winter ration for work horses, is not the best sort of feed, because it is lacking in protein, and contains an over-supply of carbohydrates.

Whether horses during the winter are to be sheltered in stalls or allowed to run in the open will depend upon circumstances. Where many horses are kept together during the winter and are not subjected to work, the open field with good protection from wind, storm and rain by means of sheds, covered straw-piles and the like, is very satisfactory.

While daily grooming is desirable, it is not essential for common stock if good shelter and good feed of the right quality and quantity are otherwise provided. Feed should contain considerable variety, for horses like a change just as other animals, or people.

The substance of winter treatment can be boiled down to good food, plenty of fresh air, constant exercise and shelter. During the summer and work season, of course, the closest attention must be paid to feed, daily grooming must be done, fresh water must be provided, the most nutritious, appetizing and refreshing grain and fodder furnished, and the general health of the animal maintained.

## THE MANAGEMENT OF STALLIONS

The stable for stallions must be arranged so that they can have plenty of fresh air and sunshine. The stalls must be roomy and smooth so that they can have perfect freedom to move about in them without injury to themselves. Everything about the stable must be kept thoroughly clean and fresh bedding must be supplied each day in abundance. In feeding, care must be taken not to overdo it. Their appetites must be kept sharp. The best results are obtained by frequent feeding. Small proportions can be given at first and then gradually increased until a full portion is given, which varies according to the size and condition of the horse.

*A Good Ration*—For a growing three-year-old stallion, a fair feed upon which he would do well would be, in the morning, five quarts oats and four fair-sized carrots; at noon, eight to ten quarts mixed feed, consisting of two-thirds bran and one-third oats and a small quantity of chopped hay, all mixed together and dampened with water. They do well on this mixture and relish it. At night, have the same as at noon. After the horse has finished his grain ration, he should be given a small ration of mixed hay, timothy and clover. The same rule applies to feeding hay as grain, namely, a horse should not be given more than he eats up clean.

*Groom Daily*—It must not be forgotten that a horse must be well groomed each day, that is, well brushed and rubbed, in order to keep him in good condition. It puts a finish and gloss on his coat, gives him a fresh appearance and makes him more choice in every way. The tail and mane should

have every care, for they add greatly to the appearance of a fine horse. The stallion should always be kept shod and the shoes should be reset at frequent and regular intervals. This is especially true with heavy draft stallions, otherwise the feet are in danger of being broken when the horse is exercised or worked.

*Never Slight Exercise*—Exercise should be given a horse moderately. Under all circumstances he should have a large box stall, wherein he will have freedom to move around, and he should be exercised out in the open air a half hour each day. To walk out in the open air a half hour each day is sufficient to keep a stallion in perfect health. Where a large number of stallions are kept in one place, it is necessary to avoid excitement as much as possible. Kind treatment and quietness go together. A horse that is treated kindly will always walk up and take his feed and is never in fear of the man who cares for and feeds him. Horses that are treated in a kindly, quiet manner are always much easier handled. They grow and thrive much better.

## BREAKING THE COLT ON THE FARM

The first step in training a colt is to make friends with it. Gain its confidence by dividing your apple with it, petting it and currying it. A colt is practically half broken when you catch it anywhere. This is brought about gradually in the ways stated above, or by giving a little choice feed or some salt. Do not permit any abuse or teasing, as such treatment is often responsible for a great many of the vicious horses. Slip on the halter, or preferably the bridle, and, with the assistance of a

driver, lead it about. Repeat this frequently. Dis-  
pense with the driver as soon as possible.

*How to Halter-Break*—A very good way to halter-break a colt is alongside a horse. The rider then acts both as a leader and driver. Some tie the colt to the harness of the work horse or trotter. This is a good way, as it not only teaches it to lead; it teaches also its place. Put on the harness very gently and let the colt get used to it. Then drive it, using two short lines.

### WINTER CARE OF FARM HORSES

The feed and care of farm horses during the winter months should be governed somewhat by the condition of the animals and the amount of work and exercise they are getting. Under no conditions is it advisable to cut off the grain ration entirely or turn the animals out to a straw stack to get a scant living as best they can, or in other words barely to exist until springtime and hard work comes again. Individual horses require different feeds and in varying quantities during the winter months. Some animals when not at work will winter nicely on silage as a principal feed with some hay, but I prefer to add some bran and ground oats to the ration. I would not advise the feeding of silage to any horse that is being worked or driven, or one that is at all subject to colic. A horse that goes in the winter in fair flesh should be fed a moderate amount of hay twice a day. Many farmers feed too much hay. What a horse will eat in an hour is a great plenty. This eating period will include also enough bran and middlings or ground oats to keep him in good condition.

*Salt Always Wanted*—A little salt once a week, or better, if you can get it, a good sized lump of

rock salt in the manger all the time. Occasionally a hot bran mash with a little oil meal added is a good thing. Heavy or excessive feeding is not necessary if the horse is in fair condition. Let a horse get poor, hair rough and dull, and it is more expensive to get him in condition again than to keep him in good shape all the time.

Horses should have all the water they want. They should be watered often enough so that they will not get chilled by drinking too much cold water at one time. I have noticed that the better horses a farmer owns the more pride both he and his help take in keeping them in good shape and caring for them well.

I would advise every farmer to breed the best horses he can. If buying a team, get as good a pair as you can afford. A really good team will usually do better service; besides, it is a pleasure and satisfaction to own such animals. They sell quicker and for more money when you wish to dispose of them.

A word about young horses and colts, which every farmer should depend on for his working and driving animals. Remember that feeding, as well as breeding, governs the value of your colt when old enough for business.

Keep him thrifty and growing nicely from a weanling to maturity. The lack of a little feed while young has reduced the value one-half on many farm and market horses. Watch the colt's feet, keep them straight and not too long. Examine the teeth. If any sharp corners are found near the cheek, take them off with a file or float. Bad digestion and unpleasant drivers have been cured in this way. Should you have a sick horse or colt use some standard remedies, or employ a

good veterinarian. Too many kinds of harmful doses advised by friends and too much activity in giving them by anxious owners has helped to shorten the life of many a farm horse.

### PREPARING TEAMS FOR WORK

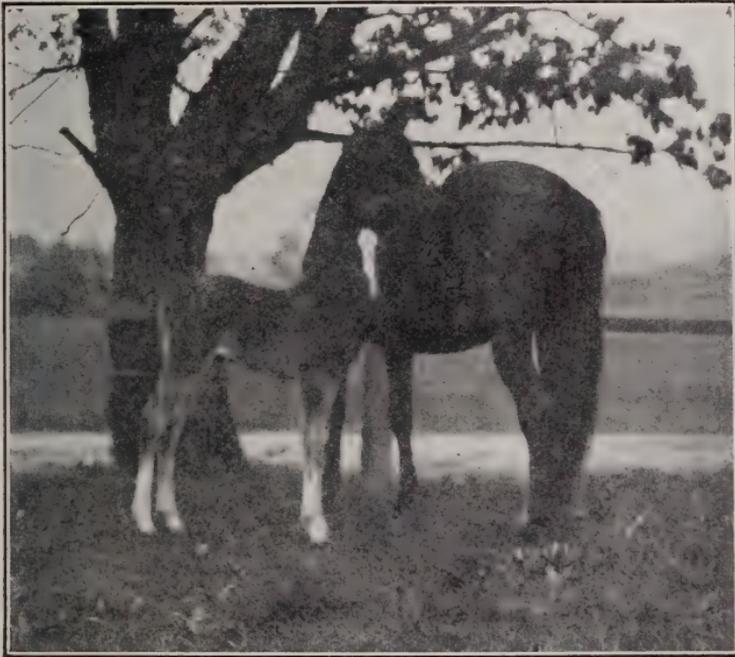
Horses just taken up after a long rest do not need much grain at first, but the quantity should be increased, little by little, as the time advances, and amount of labor increases. You should remember that the system is not in a condition to digest and assimilate much food at first, but that the capabilities will increase gradually as the system requires, to maintain it under the increased effort required to perform the extra amount of labor. Increase in capabilities in feeding and capabilities for labor can be developed slowly at the same time, under judicious management; but a horse that has been idle for any great length of time cannot be transformed suddenly from the soft, flabby condition to a hardened condition capable of sustained effort and endurance.

*Know the Team*—The man who really has a love for his horses and seeks to give them a chance to perform their part without injury to themselves, as well as in a manner that will be a profit to himself, will study their needs under varying conditions, as well as the character of each individual horse so as to be able to meet the different requirements as they present themselves. Such a man is alert, never allowing the harness to gall for lack of proper adjustment. He will not worry one horse or put him to a disadvantage beside the other. It is too often the case that the owner and driver of

the horses need educating and training first. When failures and losses are met with, many find the man behind the team responsible.

### THE MARE AND HER FOAL

Until the foal is a month old, it ought not to get wet nor have a damp bed. After that time, if well



HACKNEY MARE AND FOAL

The colt here is sired by a thoroughbred. It is to be used as a roadster by a Maryland farmer.

cared for from the first, it can stand as much exposure, if well, as the dam should be allowed to be put in.

If the mother is put to work, it is much better to leave the colt at the barn from morning until noon,

cooling the mare if warm before allowing the foal to suck. The annoyance of having the colt following the dam will be avoided and it really is much safer in a stall by itself. The mother is more quiet than if her young is following and getting around other stock and running the risk of entanglement with machinery and harness. If the foal has a stall of its own and is with the dam only at nursing time, the process of weaning is much easier. As the feed is increased and the time approaches the hours without milk can be made to include the entire day. When entire separation takes place the tantrums are avoided.

At all times when the dam is not worked, the foal should be allowed to run with her in a paddock away from other stock. Grass is an ideal feed supplemented with oats for the first few months. If the mother and colt are kept from fright and excitement and accustomed to the groom, the breaking of the colt to harness will be a comparatively small job. Halter breaking should be done while the colt follows the dam. This is quite another process when cows and other horses run in the same pasture and the mother is in a panic of fear lest the foal be hurt, and perhaps the dogs join in a barnyard melee now and then. The colt then may be as hard to manage as the mustang, who finds an enemy in every man.

## CHAPTER VIII.

### **The Diseases of the Horse**

Health is the prime requisite in the successful management of live stock. A herd or flock more or less indisposed or sick is a rather sure indication that either the stock itself is not of a healthy strain or else that the conditions under which the animals are cared for, managed and fed, are not right. Some really good farmers are frequently troubled with disease in their stock, but the great majority of the best live-stock men have the least trouble of all. This is due for one reason to the fact that the stock owner has qualified himself to take proper care of the animals he possesses. He has learned how to feed, care for and manage, and, therefore, he is little concerned with treatment and medicine. In fact, the secret of successful treatment of diseases is to begin that treatment before the disease has taken hold. That means "prevention is better than cure." Have good ventilation in the stables, thorough sanitary conditions in all of the quarters, well-balanced food, so that all requisites of nutrition may be secured, with plenty of salt and water, and the common ailments will not come to your herds or flocks.

#### **RECOGNIZING AND DISTINGUISHING DISEASES**

To become expert in recognizing disease you must study carefully the horse in health. This means that the practice of feeling the pulse and

heart, listening to the sounds of the lungs in breathing, feeling the skin, and generally observing the features will come in good use when the animal is sick. Become acquainted with the healthy and the sickly eye, tongue and posture; and fix in your mind the nature of the appetite and the discharge of the bowels and bladder.

*Pulse*—In the full-grown horse, it beats 40 per minute; in the ox, from 50 to 55; in the sheep and pig, as man, from 70 to 80.

You can always find the pulse where an artery passes over a bone. The usual place it is sought in the horse is on the cord that runs across the bone of the lower jaw, just in front of the curved portion; in cattle it is conveniently found over the middle of the first rib, or beneath the tail.

In the horse the pulse is full and tense; in the ox, soft and rolling. Any variation is a sign of disorder. Fever is indicated by the pulse being rapid, small and weak for the low kind; and if fever is high it is rapid, full and hard. If very slow, you can expect brain disorder; and if fast, then slow and irregular, some trouble with the heart.

*Breathing*—The air passes through the windpipe with a regular, steady sound. Observe this by placing the ear near the throat. When any variation is observed you may know that all is not right. The rapidity with which breathing is performed indicates health or disease. Normal breathing in the horse varies from eight to 12 times a minute and in the cow a little faster. Any great increase may be taken as an indication of trouble.

*Body Heat*—Any deviation from 98 degrees is a certain sign of disease. When the thermometer rises above 104 degrees there is great danger. Each disease has its own temperature.

*Skin and Hair*—The normal skin is soft, mellow and pliable. If harsh and dry, it is abnormal. "Hide-bound" is a symptom of general disorder, due to poor nutrition, indigestion, worms or lack of exercise. When the skin becomes covered with a cold sweat, the life of the animal is in great danger.

*How the Animal Appears*—To lie constantly on one side or to assume one position indicates that the animal is in pain in the other. By acquainting yourself with the different postures, you can often quickly arrive at the trouble.

### SOME COMMON DISEASES

Of all domesticated animals, the horse is the one whose diseases have received the closest study. One reason for this has been that the horse is the most valuable of farm animals. Some specimens of horse flesh are very valuable indeed, commanding wonderful prices in the markets of the world. It follows that where such conditions as this prevail, the closest attention will be given to that animal's diseases and their treatment. A few of the common diseases only will be mentioned here.

*Cerebro-Spinal Meningitis*—This is a congestion that soon passes into inflammation of the brain and the spinal cord, accompanied by paralysis. The cause of this disease is believed to be improper food; food that is moldy, like moldy clover hay, alfalfa, grain stover, are always connected with this trouble. In its severe form the horse is attacked suddenly with inability to swallow and with spasms that frequently follow one another. The respiration is bad and the horse tends to move around in a circle. When the temperature rises to 103 to 104

degrees, death is imminent. In treating, it is best to call in a trained veterinarian.

*Tetanus or Lockjaw*—This is a germ disease that develops from a wound in the legs or feet, often in itself of a trifling character; the penetration of a small nail more frequently being the cause than all others combined. Tetanus is simply a long continued spasm of the muscles which contract rigidly, often keeping the jaws firmly closed or locked.

The first indication of this trouble is the stiffness of the muscles near the injury. The animal will move his limbs with difficulty. In a day or two the stiffness will be increased until it extends over the body. The champing of jaws and grinding of teeth will soon be noticed. Froth will show itself also on the lips, breathing becomes more rapid, the pulse quickens and the muscles dilate. Veterinarians always look for the unfailing sign of winking membrane of the eye and the protrusion of the haul together with a closing of the jaws. The best advice and treatment is to call a veterinarian.

*Pneumonia*—This is the inflammation of the lungs followed by the secretion of lymph which fills them up and solidifies them, later leading to death by suffocation or else to the gradual absorption and recovery.

The common cause of this disease is any sudden change in temperature, weakened condition of the body effected by getting chilled or wet, thereby giving the germ an opportunity to fix itself and develop rapidly. In other words, the cause is quite similar to what it is in the case of man. One of the early symptoms is the rapid increase of the

pulse, going up to 70 to 80 beats a minute; temperature rises to 103 or 104 and above. The animal appears cold; there is a dull, dry cough and a coldness about the legs and ears; sometimes a blood-stained mucus is discharged from the nose.

In treating the disease, put the animal in a warm place where there is plenty of fresh air and where it is not cold. Wrapping the body with cloths is also a good idea. Keep the bowels loose and open; feed cooling and nutritious and laxative, like bran and linseed meal; and then you had better call a veterinarian also.

*Heaves*—This is a chronic disease that affects the breathing organs. There is no inflammation at all. The peculiar breathing, especially if the horse is given active exercise, will tell you at once the nature of the trouble.

The immediate cause of heaves is the breaking of the cells in the lungs, consequently air is expelled only with extra effort, giving the two distinct noises by the effort. Animals that are unthrifty and generally not in good health are thus more predisposed to this trouble. There is no cure for the malady. You can help the animal by feeding only light, nutritious food in moderate quantities, by keeping the bowels regular and open. If the trouble is just noticed as beginning, it is wise to turn to pasture on green, short grass.

*Indigestion*—There are all sorts of causes of indigestion, but, of course, that most common is the improper use of food; overeating or the use of undesirable materials naturally causes trouble. Young horses passing through the stage of teething often get indigestion. Another cause is allowing the colt to suckle while the dam is hot and exhausted.

Indigestion is indicated by pawing of the forefeet, pains in the stomach, belching of wind and often a fullness in the abdomen.

In treating ordinary cases, to change the food so that some easily digested product can be taken into the body, giving the least possible amount, is a very satisfactory proceeding. It will be well to give the animal some sort of a tonic that can be obtained from your druggist or veterinarian.

*Colic*—One of the most common troubles of the horse is colic. This is nothing more than a spasmodic contraction of the muscular coats of the intestines; quite sudden severe pains spring up and oftentimes they run into inflammation. Improper food is the common cause; overworking, with sudden filling of the stomach with water or food, frequently brings on colic. Sudden change of diet, the animal greedily eating the changed food, and such other little incidents are often the cause of indigestion. You will always notice that pains accompanied by pawing, kicking at the abdomen, lying down, rolling, getting up again, lying down and stretching out, then quickly rising again, shaking of the body, etc., are certain indications of this trouble.

About the safest and wisest treatment of colic is to give some opiate to relieve the pain and then to secure a free action of the bowels by using some purgative, one not too violent in its action. A half to one ounce of laudanum in warm water will quickly allay the pain, and then follow this with some purgative.

An old reliable formula is to use one ounce each of chloroform, laudanum and sulphuric ether with eight ounces of linseed oil, giving all at one dose. Many colic preparations are now on the market that

can be readily purchased and are reliable and good and ought to be in every stable where horses are kept.

*Constipation*—This common trouble is caused by feeding heavily of grain and dry feeds with lack of exercise. When it becomes more or less acute, colicky pains are noticed, the skin becomes hide-bound and various indications of indigestion appear. The animal does not look well or thrive and it lacks spirit. The simple use of purgatives that are strong will not cure the trouble—it is more deeply seated than that. The best way to do is to change the feed, using such materials as are naturally laxative, like bran and linseed-oil meal. Then there is nothing better than good, fresh pasture grass; in the winter time carrots, which are liked by horses, will be worth more than any sort of medicine to relieve the difficulty and to put the animal well on its feet again.

*Worms*—The horse often is troubled with worms, which may arise from various sources. The symptoms are not always distinctly pronounced, but if the coat is rough, appetite peculiar, constant rubbing by the animal of the hind quarters, and general run-down condition, you may be reasonably certain that worms are behind the trouble.

Feeding sulphur, linseed oil, a little carbolic acid, oil of turpentine, are all good in relieving the trouble. Better, however, secure some preparation from your druggist for this ailment or get something from your local veterinarian.

*Glanders*—This is a contagious and fatal disease, due to poison in the system. There is a discharge from the nostrils and usually the animal loses in flesh and strength. The poison can be conveyed easily to man and for that reason the only

thing to do is to slaughter the animal as soon as glanders have been diagnosed.

Glanders is without doubt the most dreaded of all horse diseases and is always incurable. In most



#### BAD CASE OF GLANDERS

The farcy form is shown here. The animal has not long to live. Except for experimental purposes, every horse having glanders should be killed as soon as the disease is discovered.

states rigid laws are being enforced as to the elimination of this dreaded disease. It is usually extended by the change of horses from one stable to

another. If you suspect glanders, always call a reputable veterinarian. You cannot afford to have a glanders horse on your place, not only because all your other animals may become affected thereby, but your own health and that of your family are in danger.

Here are just a few indications of acute chronic glanders: The pulse usually is feeble; there is rapid breathing, together with poor appetite. The eye is weak and watery and the under jaw swollen. The lining membrane of the nostril is usually swollen, with a reddish color showing frequent ragged ulcers here and there from which a bloody and watery discharge drops. Abscesses form about the face and neck and these on ripening give forth their pus. Do not attempt to cure the animal at all.

*Lameness*—It is not always an easy matter to locate the cause of lameness in a horse. It may be due to corns or splints, or ring bones, or spavin, or side bones or to some injury, as a cut or nail insert. Of course, a cut can easily be located and readily seen, but many a nail has pricked or even entered the under side of a horse's foot and has been detected only with difficulty. In examining for lameness, observe when the animal is at rest and in motion; the favored foot will point out in what member you are to seek for the trouble.

A corn is due always to bad shoeing or to wearing a shoe for too long a time. Corns don't always cause lameness, but they cause suffering. When noted, have the shoe removed, and if the corn is festered, have an opening made to give vent to the pus.

The deposits of bony matter above and below the coronet are known as ring bones. In heavy horses,

excessive work is usually the cause, although rheumatism is sometimes back of it. Often the blacksmith who shoes the animal can relieve the trouble by adjusting the shoe.

Bone spavin is a bony growth on the inner and lower side of the hock. It is due to overwork or a hereditary predisposition to weakness there, due to bad conformation. Many treatments are suggested, such as blistering or firing. In the early stages of the trouble, have a veterinarian to treat the disease locally.

Side bones are due to the change of the cartilages of the forefeet into bony substance. They are more frequently found in draft horses and there is not much to do in the way of treating other than to remove the cartilages with a knife. This, however, has not proved very satisfactory. Get your veterinarian to examine; maybe he can relieve the difficulty

### THE BEST OF ALL TREATMENTS

But the best treatment that you can give your horse is good care, proper feed, clean, fresh water, good sanitation, plenty of ventilation and never excessive work unless the horse is used to it. There is in use an immense number of different methods and recipes for treating various kinds of diseases of the horse. Do not have anything to do with these. They are old-maidish, of little use and often impose great suffering. It is absurd and inhuman to treat horses in sickness in the way some of these old methods and recipes call for. Such methods ought to be prohibited by law; for instance, pouring medicines or water into the nostrils, forcing old dish cloths down the throat of the cow, etc.

This sort of treatment is not backed by good sense and you cannot afford to have it practiced on your animals. Do away with the quack in the treating of diseases. Unless you know a good deal about veterinary medicine yourself, call a veterinary surgeon in just as you would call your physician in to look after your family—not at every little indication of trouble, for the reason that ordinarily, nine times out of ten, the horse will recover of its own account. Familiarize yourself with a few of the common ailments and troubles so that when some trouble manifests itself you will have in mind some line of treatment to begin at once.

## CHAPTER IX.

### **The Mule**

The breeding of these animals goes away back into antiquity. It was forbidden among the Israelites by the laws of Moses, but in David's time they were certainly employing mules, probably imported. We know also that the Greeks and Romans raised them.

This hybrid is tall and is our strongest draft animal for the farm. In appearance, more of the qualities of the horse are inherited than those of the ass. In height, in shape of neck, shoulders and body, the maternal form is inherited, while the head, the long ears, the tufted tail, the thin, wiry legs and the hoofs are the inheritance from the father. The coat largely resembles the horse, but the bray has a certain resemblance to the paternal noise.

The most common character of the mule is his freedom from disease and his great vigor. When three years old, he is ready for work and will keep it up for two or three decades. I have known mules at 30 years of age to do their full day's labor with little fatigue and keep it up day after day in the hot summer months of North and South, without any observable bodily change. The animal may lose in weight, but not in grit.

The mule, as is commonly known, is a hybrid between the mare and the male ass or jack. The hybrid produced between the horse stallion and the female ass, or jennet, is known as a hinny.

## SELECTION OF A JACK

In raising mules, the selection of the jack is an important matter. We may, therefore, proceed to describe the various breeds of jacks, which may be used for the purpose. In general, the best grades of jacks of all breeds are used for raising jacks and are called jennet jacks, while the somewhat less valuable ones are bred to mares for the production of mules and are called mule jacks. In the following account of jack breeds, Goodpasture's descriptions, as modified by Knight, Smith and Wilcox, are largely utilized.

*Andalusian*—This breed comes from southern Spain, and was the first to be introduced into the United States. The King of Spain presented a jack and jennet of this breed to George Washington in 1787. Later Henry Clay introduced them into Kentucky. It is an old breed. The color is gray, frequently white, and rarely black or blue. The Andalusians stand 14 to 15 hands high and have fine legs with large bone and comparatively free from jack sores. The head and ears are fairly satisfactory in conformation, but the breed is unpopular on account of its color.

*Maltese*—This well-known breed came from the island of Malta, and the first to reach this country were given to General Washington by Lafayette. The Maltese is a small jack, seldom standing over 14 hands high. The color is black or brown. The head is well formed, with pointed upright ears, but the legs are rather small for sires of mules. The Maltese is quite satisfactory for saddle or driving purposes, but is too small as a mule-getter for our farm conditions.



BRED FOR WORK AND NOT FOR BEAUTY

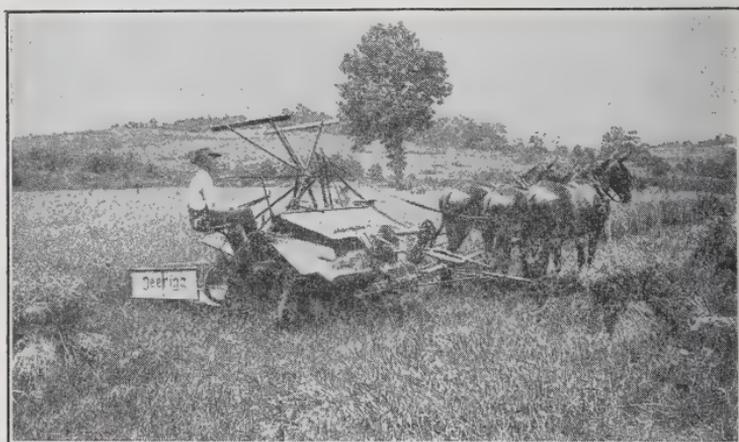
*Catalonian*—This is another Spanish breed of jack first introduced into the United States by Henry Clay. This is a good black, with white points, of fine style and action, and from 14½ to 15 hands, with a clean bone. The Catalonian is a popular jack on account of his desirable color, fine, short hair and unusual height. Rarely specimens of this breed are gray. In style and action the Catalonian is unsurpassed and he is, therefore, a desirable animal for crossing upon our native jennets. Some of the chief good points of our native jacks come from Catalonian crosses. Certain breeders claim that mules sired by Catalonian jacks mature earlier than those from other breeds.

*The Majorca Jack*—The Majorca jack comes from the island of the same name. It is the largest of all imported jacks, often standing 16 hands high, with the greatest weight and heaviest bone, head and ear of all jack breeds. No jennets of this breed have been imported into America.

*The Italian Jack*—The Italian jack is common in Italy and has been imported in considerable numbers into this country. It is the smallest of imported breeds and the price is correspondingly low. The color is black, with an occasional gray, and the height 13 to 14 hands. The bone is large, but the Italian jack is too small for producing mules. It seems to be related to the Maltese. Occasionally they are quite vicious.

*The Poitou*—The Poitou was the latest breed of jacks to be imported into this country. The Poitou jack has been greatly improved by systematic breeding, with the result that France leads Europe in quality and number of jacks and also of mules. According to Ayrault, the noted French authority on the subject, the head of this jack is large, the

mouth small, and the ears with long, curly hair. The tail is short, with long hair only at the tip. The chest is broad, and all the joints are large. The mane is long and the hair generally fine and silky. The color is black or dark brown, rarely gray. The price is high, ranging from \$1,000 to \$3,200. They are in such great demand in France, Spain and elsewhere that the trade can scarcely be supplied. The requirements for entry into the Poitou stud



#### MULES MAKE GOOD FARM WORKERS

For hard work and warm work the mule is unexcelled. He does his business well and never complains.

book are very strict. Mules from this jack, according to Allen, are unequaled, and sell for more than those from any other breed. Draft mares bred to this jack in the United States produce excellent mules.

*The Native Jack*—Notwithstanding the excellence of many imported jacks, especially the Poitou and the Catalonian, it is the opinion of experienced breeders like J. L. Jones, that “our native jacks

with good imported crosses behind them will sire the mules best suited to the wants of those who use them in this country, and will supply the market with what is wanted by the dealers." The native jack is of greater weight and larger bone than imported jacks, showing in this regard the effect of limestone soil and blue grass. He is a mixture of all breeds of imported jacks, and, therefore, shows all colors. Recently, however, breeders have selected them for black color with white points. Colts from native jacks are stronger, with better body and more length than those of imported jacks.

### BEST TIME FOR BREEDING

In breeding jacks to jennets, the spring is the best season. Jack colts are weaned at six months of age. They are fed on oats, bran, hay and plenty of green forage or pasture. Both jennet and mule jacks may begin service at two years of age. The jack gets only about 50 per cent of mule colts from his service, but the percentage of colts from stallions is usually no higher. About 40 mule colts per season is good work for a jack. Most consider it best that mule jacks should not be allowed to associate with their own species, but only with the horse. During the season of service they should be fed a nitrogenous ration and should have the freedom of a good pasture.

### THE BURRO

From the Rocky mountains to the Pacific coast a diminutive jack, known as the burro, is in common use. The burro is the descendant of jacks brought by the Spanish settlers of that region, but

it is not certain to what breed of jack it is most closely related. Its color varies from white to almost black, mouse color being very common. The size is about that of the Shetland pony. A peculiar feature frequently seen in the burro is its enormously thick neck. It is a slow, strong, patient and sure-footed animal, and is capable of carrying loads up to 250 pounds. It is, therefore, an excellent animal for mountain work. Burro mares crossed with the thoroughbred stallion produce hinnies of considerable speed, good temper, great endurance and more style than the ordinary mule shows. The best of hinnies for mining are obtained by putting burro mares to small, blocky stallions. If it is desirable in such cases, artificial insemination may be practiced by means of the syringe or capsule.

## MULE INDUSTRY

The following states are leaders in the mule industry: Texas, Missouri, Mississippi, Georgia, Kentucky, Tennessee, Alabama, Arkansas, North Carolina and Kansas. In recent years, the industry has become widely extended and there are at present large mule ranches in Iowa, Montana, Colorado and Utah. The number of jacks, including burros, in the United States is about 125,000, a large percentage of them being used in the production of mules.

Mules may be used for all purposes for which horses are adapted, except fast driving, and in addition are well suited to several lines of work where horses cannot be profitably employed. Thus, in mines, mules excel horses for several reasons, notably for the reason that horses when frightened

throw the head up, thus bruising it and causing poll evil. Mules, on the other hand, lower the head at such times and avoid danger in that way. Moreover, mules excel horses in their capacity for hard work, in endurance, in length of life, and in economy of feeding. It is often asserted that mules live twice as long as horses, but the truth is they live considerably longer than horses. Then, too, mules are not immune to ordinary horse diseases, as is sometimes asserted. On the contrary, they are just as susceptible to glanders, influenza, distemper, colic, etc., as are horses. The English government suffered great losses from glanders among mules in the Boer war

For military purposes, the mule has long been considered superior to the horse, and the army mule has been a conspicuous feature in all our Indian fighting and more serious wars. The mule is less easily frightened than the horse and withstands hardships better, such as going without water for 24 hours and without feed for two or three days.

The use of mules for draft purposes in cities is increasing from year to year, and for farm work they are also becoming more popular. A Virginia farmer writes: "For general purposes and lasting wear the well-bred mule outclasses and outlasts any horse." This statement is based on a long experience with mules bred from mares weighing 1,400 to 1,750 pounds, and a Kentucky jack for which \$1,000 was paid.

The opinion prevails quite widely that the mule is more stubborn, vicious and ill-tempered than the horse. The temper and behavior of the mule, however, depend largely on his breaking, training and method of handling. Mules endure abuse and rough handling with as much patience as the horse.

An Iowa breeder considers "no team more gentle, more safe or agreeable to handle than a pair of mules." In the South, the mule and the negro work together. Cotton and sugar plantations are inconceivable without mules. All these uses of a mule constitute a market which is not likely to be overstocked for some time to come. Since the mule inherits much of its form from the dam, it is necessary to exercise as much care in selecting mares as in horse breeding. The mare must be sound and well built, and color should be dark, preferably black, bay or brown. "The mare should have good length, large, well-rounded barrel, good head, long neck, good, broad, flat bone, broad chest and good style."

### BEST TIME TO BREED MARES

The right time for breeding is about April 1 in Tennessee and at corresponding times in other parts of the country. Before being served, mares should be hobbled or placed in pits or chutes. A suitable breeding chute may easily be constructed of plank, placed vertically and close enough together so that the jack's feet do not get caught. At the entrance to the chute, wings may be placed opening out at a slight angle. Poles passing through the chute in front and behind the mare, and also behind the forelegs and in front of hind legs just under the belly, will prevent any accident from kicking or squatting. Moreover, if several mares are ready for service at the same time, artificial insemination may be accomplished by means of the syringe or capsule method. The mare is returned to the jack on the eighteenth day after service.

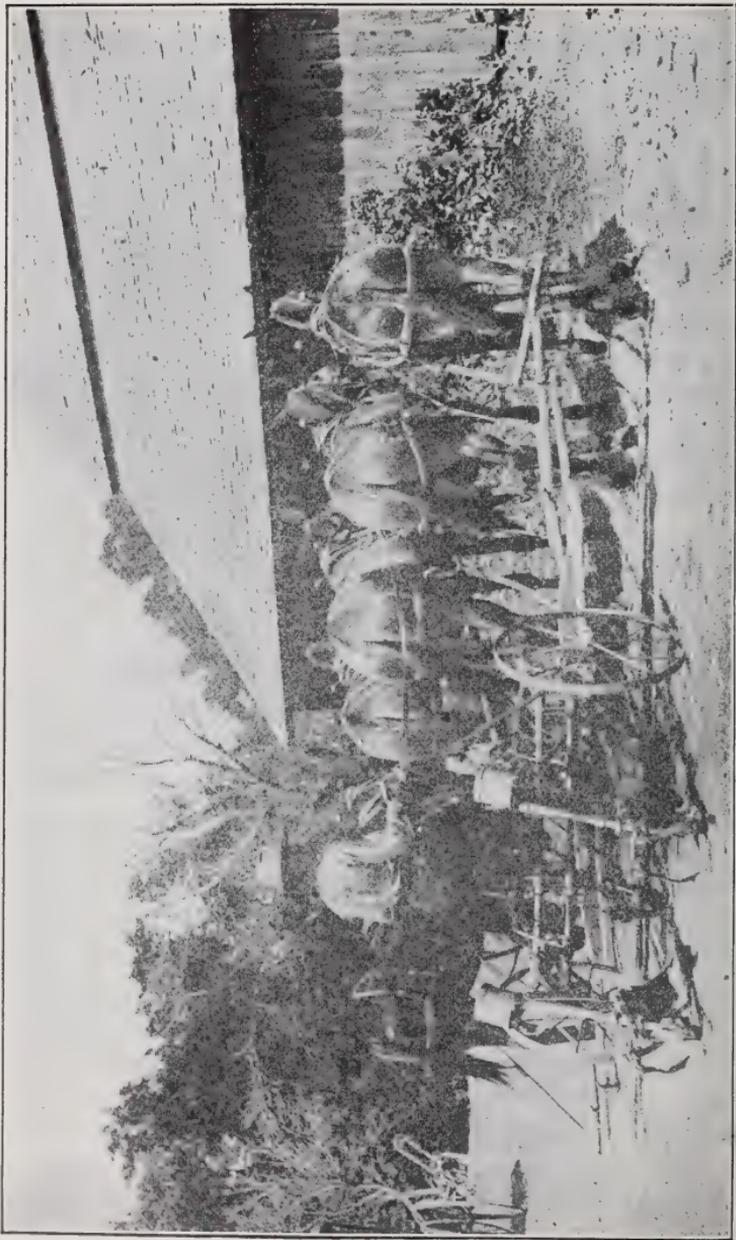
For farm work, a mule should stand 15 to 15.2 hands high and weigh 1,050 to 1,100 pounds. Some

users of mules prefer a heavier animal—up to 1,300 pounds. In order to get mules of this size, Percheron mares and a jack 15.2 hands high may be used. In all cases, both the mare and jack should be dark in color, for the market demands dark-colored mules. A mature jack is a more certain foal getter than a young one. While, therefore, jacks may be allowed to do service sparingly at two years of age, they should not be brought up to a maximum till the age of four or five years. Some breeders castrate male mules during the first summer, while they are still with the mares, but, as a rule, it is better to wait till they are one year old. In general, the market prefers female to male mules. The females mature a little earlier and are plumper and more squarely built. Then, gnats and screw worm flies often irritate the sheath of the male.

Warder recommends that mules be broken at two years of age, after which they are to be put at light work during the third year. It is believed that by this system they develop a quicker step than when broken after attaining full maturity and put at hard work immediately. The same methods are to be used in breaking mules as with horses. Abuse and barbarous treatment are quite uncalled for. "By kind treatment mules may be rendered the most docile and affectionate creatures among our domestic animals and will often show more intelligence than the horse."

### HINNIES

Hinnies, as already stated, are hybrids obtained by crossing the stallion upon the female ass or jennet. The hinny is usually smaller than the mule



“OUT THERE IN KANSAS,” WITH SIX MULES TO THE LISTER

and is commonly considered less desirable in every respect. One breeder states that hinnies are weak and stubborn and cannot be compared with mules. They resemble the horse rather than the jennet and have a neater head and heavier mane and tail than the mule. In Jamaica, the hinny is not considered so unimportant. One noted breeder says: "I can make bold to say that they are hardier than the mule out of mares, will grow to a serviceable size and are more cheaply bred." Another breeder in Jamaica states that hinnies "are larger, more docile, and in all respects better than the ordinary mule, and the saving in breeding is considerable, as the price of one mule mare equals that of three or four jennies, and the keep of a jenny one-fourth that of a mare." Small stallions are used in breeding hinnies. We have already mentioned the fact that good hinnies have been obtained by crossing thoroughbred or pony stallions on burro mares. Now and then, in farm papers, the question is raised concerning the value and usefulness of hinnies. It may be, therefore, that on account of the economy in raising them, more attention may be given to the hinnies in the future than has heretofore been the case.

### MARKET CLASSES

There are three general classes of mules, cotton mules, sugar mules and mine mules. The size of the colt at birth and the rapidity of growth determine whether it be a sugar or cotton mule. If the colt, when foaled, is 3 feet 5 inches and upward, and grows nicely, it will make a sugar mule; if under the above height it will be a cotton mule. The mature sugar mule stands 15.3 to 16.3 hands

or higher and is heavy, well boned and rather stylish. They are used on sugar plantations for dray purposes and for heavy farm work. The cotton mule is simply smaller than the sugar mule, but of the same conformation. The mine mule is the smallest of the three and must be dark brown or black in color.

### FEEDING MULES

The statement is frequently made that mules eat less than horses. Riley, however, on the basis of a long experience with thousands of army mules, formed a different opinion. He maintains that a mule "requires just as much as a horse of similar dimensions." In fact, at hard work, Riley states that "the mule will eat more than the horse will or can." At three years of age the mule is shedding his milk teeth and cannot eat much. He is, therefore, weak and particularly liable to contract distemper, sore eyes, skin sores, and other diseases. But the mature mule in health is a good feeder. In general, a poor feeder is a poor animal whether it be sheep, pig, dairy cow, beef steer or horse, and the mule is no exception to this rule. The mule will manage to get along on poor feed given at irregular intervals, but the sensible man does not attempt to determine just how much neglect in this respect the mule endures.

*The Mule Colt* is taught to eat grain before it is weaned, which takes place at the age of four months. At weaning time, the colts are put in a barn and fed bran, oats, cut grass and clean hay. After about two weeks, they may be turned on pasture, preferably alfalfa or clover, with some grain. Little variation is needed on this system till mules

are two years old. Then, if they are to be sold, they must be fattened; otherwise they bring but a small price. The following fattening regimen has been proposed by Jones: "The sugar mule should be placed in the barn with plenty of room and not much light about the first of November, before he is two years old, and fed about 12 ears of corn per day and all the nice well-cured clover hay he will eat, and there kept until about the first of April. Then, in the climate of middle Tennessee, the clover is good, and the mule may be turned out on it without fear of firing, that is, heating so as to cause scratches, as the green clover removes all danger from this source. During the time they run on clover they eat less hay, but this should be always kept by them." Later, they are put in barns or sheds and fed green clover and grain in the form of sheaf oats and bran. Ground barley may be fed in June *ad libitum*. Later they may be fed, in several separate grain rations, green roasting ears, shelled corn, bran and oats. Bran and oats are considered necessary for giving the proper finish to the coat. Mules fed in this way until September after they are two years old, should weigh 1,150 to 1,350 pounds. The sugar mule market opens in September.

*The Cotton Mule* is usually not put in the barn till August after it reaches two years of age. It should receive shelled corn, green corn, good hay and soiling crops until November, after which time oats and bran are added, so as to bring the mule to the right finish by January 1, when the market for the cotton mule opens. The central southern market for sugar mules is New Orleans, but large markets for both classes of mules are found in

Chicago, St. Paul, St. Louis, Kansas City, Louisville, Nashville, and many other cities of the Mississippi valley region. In feeding working mules, the same materials may be used and in the same rations as for horses.

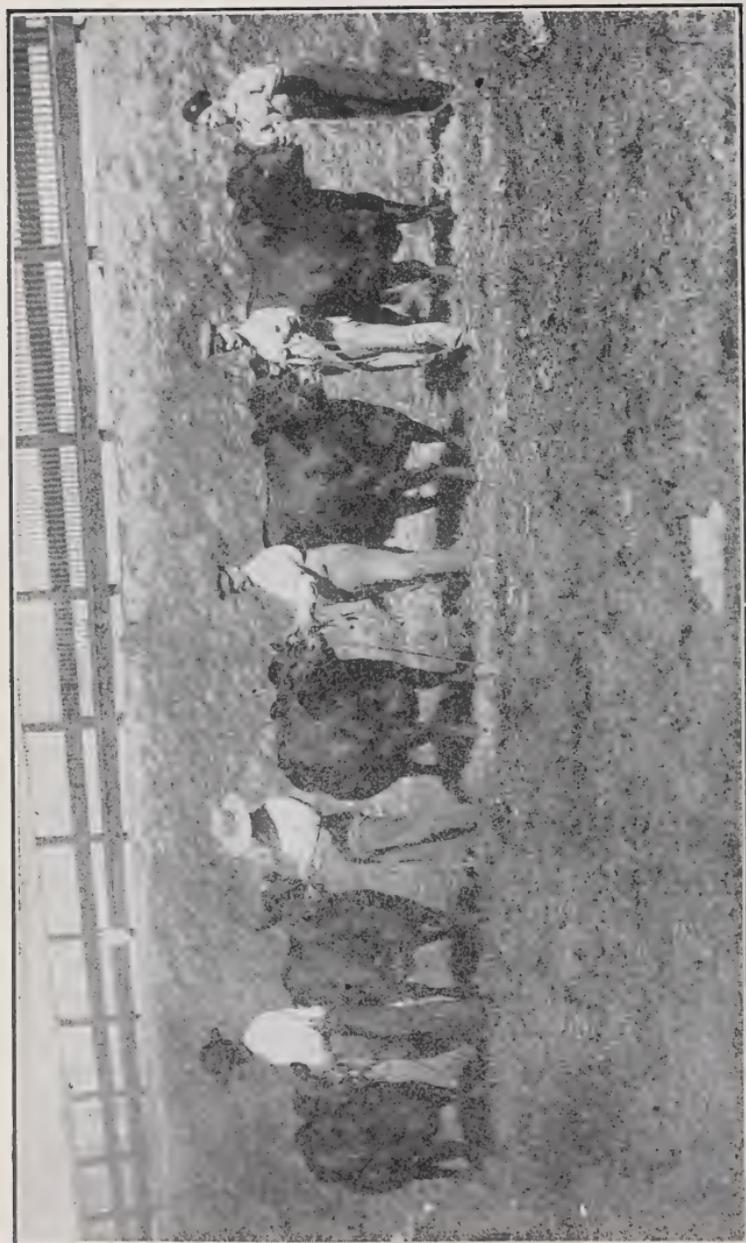
## CHAPTER X.

### **Cattle**

No domestic animal has in the past, or does now, contribute so much to man's welfare as the cow and her kind. She gives us milk, our most important food to drink; she supplies us with butter and cheese, both appetizing and nutritious and both important products on our tables; her flesh is daily used on all occasions for supplying our most popular food; from her back comes the hide to be made into leather that our feet may be kept covered, and that other necessities and luxuries may be provided us; and when she has ended her work and closed up her duties of life, her bones, blood and offal go back to our soils to maintain their freshness and fertility.

The cow is a ruminant; she belongs to the great class of cud-chewing animals. Her past is shrouded in mystery and we only surmise what her early history has been. When she was domesticated we do not know, but during all the years that she has been held captive by man, she has supplied him with food, performed many of his hard labors, and contributed to his comfort and welfare.

*Cattle Improvement a First Essential*—The fact that it is not possible for every farmer to possess pure-bred cattle is no reason why he should not improve the stock he has. He can do this by securing pure-bred sires that possess the characteristics desired. Scrub stock can be quickly improved by the continuous use of good sires. It is



PRIZE-WINNING ABERDEEN ANGUS CATTLE

This black breed from Scotland has gone to every state in the union. Their remarkable popularity is due to their superior qualities.

never wise to use grade or cross-bred sires, since they do not possess stable characteristics.

Moreover, it is possible for every farmer to determine exactly the producing power of his dairy cows. When cows are milked, the milk should be weighed and a record kept of it. If this is done, it will be found that some cows produce as much as 1,000 gallons or more, while others produce not more than one-half or even one-fourth of that quantity. If a farmer will kill or sell his poor cows and keep his best ones, he will, in a short while, have a herd of only heavy milkers.

Young calves that are not to be fattened should be fed only such food as will produce rapid, thrifty growth, so that they may be gotten in readiness for the market at as early an age as possible. Young dairy animals may be fed any food that insures thrifty growth, but foods of a coarse nature are particularly good, especially such kinds as clover, alfalfa and cowpea hay; pasture grasses, corn ensilage and roots, being succulent and juicy, are also excellent.

## CHAPTER XI.

### **Breeds of Cattle**

*Shorthorns*—We commence with this breed for the reason that, of all breeds of cattle, this is the most popular. Shorthorns are also commonly called Durhams, from the English county in which the breed originated. These animals were developed by improving the Teeswater and Holderness cattle with slight admixtures of Dutch bulls and Galloways. Shorthorns had already been introduced into this country about 1790, and importations have occurred with great frequency since 1815. Among prominent early breeders of Shorthorns in this country, we have Lewis F. Allen and William Warfield

At present, Shorthorns are found in every state and territory in the Union, and in every province of the Dominion of Canada. Their popularity is due largely to their fitness for the purpose for which they are raised; or, in other words, is based on a solid business foundation. Shorthorns are capable of readily adapting themselves to the different conditions under which they are found. In regard to size and weight, they are somewhat superior to other beef breeds. They mature as early as other breeds, and may be brought to a proper market ripeness at the age of two and one-half years. They become fully mature and attain their complete size at the age of four years.

The conditions under which they thrive best and yield the greatest profits are those which prevail in the central states, where good pastures are to be

obtained, and where suitable grains for fattening are abundant. Shorthorns are capable of making as good returns for their feed as any other breed. The meat is of good quality, the percentage of bone and offal is small, but the grain of meat is not quite so fine as is observed in other breeds.

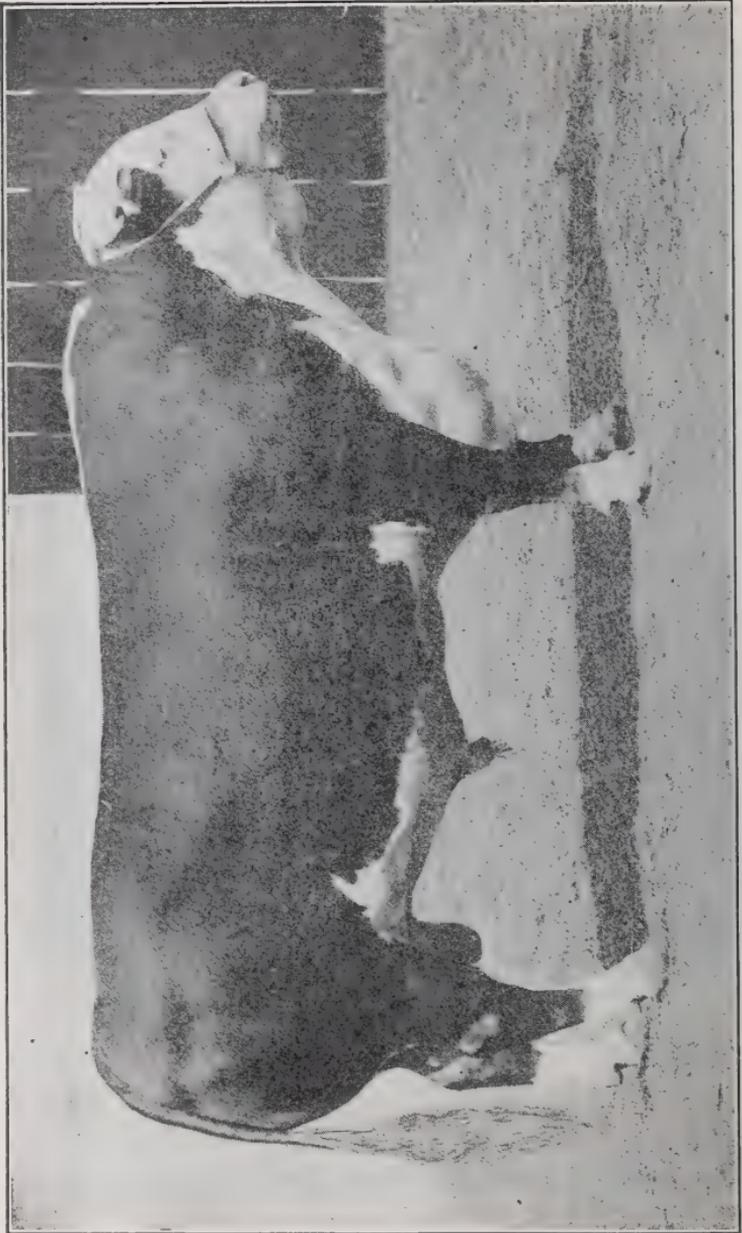
One of the strong points in favor of Shorthorns is their milk yield. In fact, the Shorthorn is often



A TYPICAL SHORTHORN

A representative of the beef type. Note the square and deep sides. He is all beef and he knows it.

referred to as a dual-purpose breed, yielding a good quality of beef, and at the same time giving a large quantity of milk. This quality has been considered of sufficient importance to perpetuate, and, as a result, we have a milking race of Shorthorns.



PRINCE BUBBO, A FAMOUS HEREFORD

More attention has been given to milking Shorthorns in England than in this country, and this fact is due, perhaps, to a tendency among our breeders to go into specialties. This requires that attention be given to securing one line of good qualities without regard to other matters, such as milk production. On account of the large amount of milk which Shorthorns yield, they are well adapted to localities where a combination of dairying and beef production can be operated most profitably.

Shorthorns are also of great value, like other pure beef breeds, in grading up native scrub cattle, so as to produce a good quality of grade animals for beef. The chief weaknesses of Shorthorns are lack of constitution and relative sterility as observed in certain families, especially where careless breeding or in-and-inbreeding have been practiced.

The standard colors of the Shorthorns are red, white and roan, with red most in favor, and all shades of roan well liked; but white is somewhat in disfavor. The general form is large, compact and rectangular, with a smoothness of outline such as is required by the standard adopted for beef form. The body is long and deep, with parallel upper and lower lines and side lines. The head is relatively small and considerably narrower in the female than in the male. The horns are short, but longer and smaller in the female.

*Hereford*—It is commonly considered that the Herefords are descended from some of the native cattle of Great Britain, and that they mixed, in their earlier history, with the Devon and the Sussex cow. Apparently all of these animals were at first nearly a solid red. A cross with white cattle gave a tendency to white markings, which has

persisted in the Herefords. In the early history of the breed, the face was not pure white as at present. This characteristic, however, has been definitely fixed by long continued breeding.

The Herefords were well known and had established a considerable reputation for themselves in many herds as early as 1835. They did not gain popularity, however, as fast as the Shorthorns, partly for the reason that their milking powers were somewhat inferior. Then, too, there was considerable controversy regarding the purity of white-faced and mottled faced animals, so that their distribution was strongly checked. Apparently the first importation of Herefords into the United States was made by Henry Clay in 1817.

The Herefords gain rapidly, adapt themselves to all soil, climatic and feed conditions which prevail in the United States and do exceedingly well in the corn belt and the agricultural part of Canada. They are also particularly noted for their grazing ability on the range. The average size of the Hereford is slightly under that of the Shorthorn, but they mature as early, being ready for beef at two and one-half years. In fact, recently, claim has been made that Herefords mature earlier than any other beef breed. The quality of the meat is good and the dressed weight satisfactory. In crossing the Herefords with other breeds, the best results have been obtained with Shorthorns and Galloways.

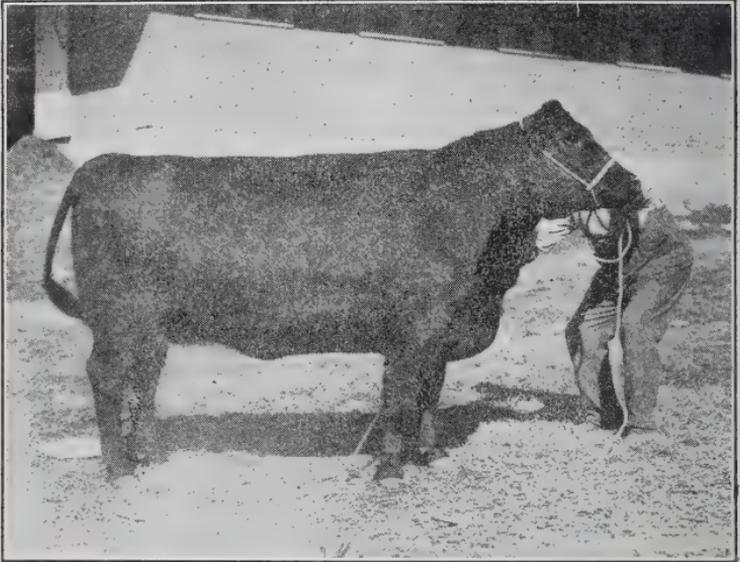
The face, throat, chest, lower part of the body, legs and tip of the tail are white, all other parts being red. The red should neither be too dark nor too light. The skin is slightly thicker than that of the Shorthorn, but the form of the body is essentially the same. The horns are longer and

more spreading, the position in which they are carried being a characteristic of the breed.

*Aberdeen Angus*—This breed is variously known as Polled Angus, Polled Aberdeen, or Aberdeen Angus. In the early history of Scotland there seems to have been a number of polled cattle referred to as Angus Doddies, Buchans or Aberdeen Humlies. In Scotland, the approved color is black, but occasionally some white markings appear; such animals, however, are not used for breeding purposes. In Scotland the Angus is considered as having a finer bone, softer and silkier hair and shorter legs than the Galloway. It has long occupied in that country a conspicuous place in the fat stock and beef markets, on account of its excellent meat. The chief difference between the Angus and Galloway is in the thicker skin and larger and more shaggy hair of the Galloway.

The Angus was first imported into the United States in 1873. The breed met with some prejudice, on account of the fact that the field was already occupied by Shorthorns and Herefords. It was necessary, therefore, for the champions of the Polled Angus to demonstrate the good points claimed for the Angus before this breed acquired any decided popularity. The Angus is, perhaps, best adapted to localities where moderate temperatures prevail and where comfortable quarters may be furnished for the winter. With regard to the value of the Angus on the western ranges, considerable difference of opinion prevails, and the statement has been frequently made that these cattle are too lazy to make a success under range conditions. It is impossible to give an authoritative opinion on this subject, since so much prejudice prevails in the matter; in fact, the champions of

almost every breed claim that their particular breed is superior to all others as a rustler on the range. It is sufficient to say that many cattle raisers, throughout the range, from the northern to the southern boundary of the United States, have reported excellent results from the use of pure-bred



AN ABERDEEN ANGUS HEIFER

The strong lines and beef form stand out conspicuously. Even the novice knows this individual likes to make meat.

and grade Angus on the range, and have found that Angus bulls are as capable of getting vigorous calves under range conditions as any other breed of bulls.

In size, the Angus is perhaps slightly inferior to the Shorthorn and Hereford, but on account of its short legs, it weighs more than its apparent size would indicate. The breeders in this country have

given much attention to the early maturing qualities of the Angus, with the result that this breed now matures as early as any other. In the economic use of food, the Angus is second to no other breed. The form is almost always symmetrical, and not patchy. In fact, the hair is so short that any irregularity of form would be apparent. During recent years, the Angus has carried away its share of prizes at fat stock shows, and in block contests. The quality of meat is usually recognized as superior to that of the Shorthorns and Herefords, and nearly or quite equal to that of the West Highland and Galloway cattle.

*Galloway*—This breed of cattle also comes from Scotland, and has occasionally been called Polled Scots. In Scotland the color is black with a brownish tinge. The head is short and wide, with a broad forehead and wide nostrils. The body must be deep, rounded and symmetrical, the skin mellow and thick, the hair soft, wavy, with a mossy undercoat; and wiry or curly hair is very objectionable. The Galloways are so called on account of their apparent origin in the province of Galloway and the breed is one of the oldest and purest of the beef type.

Biggar has justly called attention to the fact that Galloway cattle have qualities which particularly fit them for western ranges. In the first place, they are possessed of unusual hardness, whereby they are able to endure a severe climate. Absence of horns is also a desirable quality, and in type they are very uniform. Finally, they possess the power of transmitting their good qualities to their offspring in a marked degree. A Galloway bull of good breeding will transmit a black color to 90 per cent of his calves, and the hornless condition

to from 95 to 100 per cent without regard to the breed of the mother.

While at present the Galloways are, perhaps, not so popular as either the Shorthorns, Herefords or Angus, they are at least entitled to the fourth place among the beef breeds, as pointed out by Shaw, and they are rapidly gaining in popularity. They are the hardiest of all beef breeds except the



A PAIR OF GALLOWAYS

The Galloways are rugged, hardy and can stand much exposure. They have been much appreciated in improving the range cattle of the West.

West Highland cattle; their size is somewhat smaller than that of the breeds already considered, but their grazing qualities are of an exceedingly high order. They do not mature quite so early as the Shorthorns, Herefords or Angus, but they take on flesh smoothly and the meat has long been noted for its excellent quality; in fact, in this respect, they perhaps excel even the Angus. The

Galloways are excellent breeders and show an extremely small percentage of sterility. The only serious objection which can be raised against them is their small milk yield. One of the peculiarly valuable points of the Galloway, is their hide, which, when tanned, may be used for robes and fur coats. According to the most recent scale of points for the Galloway, this breed must be pure black, with a brownish tinge; white markings on the feet, ankles, legs or any part of the body above the under line are very objectionable.

*West Highland Cattle*—West Highland cattle, also known simply as Highland cattle, came originally from the western part of Scotland. The horns are large, sharp-pointed and upturned. The color is generally black, brindle or dun. The hide, as compared with the Angus and Galloways, is thick and covered with long, soft hair, considerably longer than that of the Galloways. There are several distinct varieties of West Highland cattle, the principal of which are the Kyloes, North Highlanders, and the West Highlanders. In Scotland, this breed is not considered of much value for its milk, and, therefore, the calves are usually allowed to suck the cows. In hardiness, however, it is superior to all other breeds, and is, therefore, best adapted to severe climates like those of Alaska and northwest Canada, and some of the colder parts of the Rocky mountain ranges. The West Highland cattle are capable of not only enduring the cold, but also damp weather, and can find a living for themselves on either grass or brush. They mature rather slowly, and the quantity of the milk is very small. The meat, however, is considered especially excellent, and in the English markets commands the very highest price.

The color may vary considerably, black being very common, with a tendency at present toward a yellow or light dun; brindle or red and black colors are also allowed. The form is that of the typical beef type, only smaller, and the body in proportion to its size is strong, deep, thick and exceedingly compact.

*Red Polled Cattle*—Red Polled cattle are commonly classified among the dual-purpose breeds and are sometimes called the Norfolk Polled breed or Norfolk Red Polls. According to the English standard, the color must be red, while the tip of the tail and under may be white. The head must be decidedly that of the beef type and absolutely hornless. The Red Polls are apparently the outcome of mixing both Suffolk and Norfolk Polled cattle. Improvement has been brought about by careful selection and good feeding. They were first imported into the United States in 1873. They stand between the Shorthorns and Devons in size, are excellent milkers, mature early and are noted for transforming their feed into milk during the period of lactation and into beef as soon as they are dry.

*Devon Cattle*—This breed of cattle is one of the oldest and purest breeds of dual-purpose cattle which originated in Great Britain. In their early history, they were closely connected with the Hereford and Sussex cattle. The breed is found in its purest and best form in North Devon. The English standard for the Devon requires a small, clean head, with deerlike expression; thin, fine horns of a cream color, tipped with black, growing with a regular curve upward. The skin is somewhat loose and covered with hair of a soft, furry nature, inclined to curl whenever the animal is in good

condition and full coat. The North Devon race of this breed is highly esteemed for beef and for draft purposes, but less for the dairy. Their milk has a high fat content, but the quantity is rather small.

Devons were first introduced into the United States in 1817, after which importations took place with considerable rapidity. This breed is now found in nearly every state in the Union, but is more numerous in Ohio, Pennsylvania, New York, Massachusetts and Wisconsin. Devons are not particularly popular in most parts of this country for dual-purpose cattle, for the reason that they are somewhat deficient in size for beef, and the milk yield is small. They are active grazers and the fat content of the milk is very high. They do not mature quite so early as the standard beef breeds. In crossing and grading up scrub stock, they are quite valuable. The bulls are able to transmit their rich, red color to a large percentage of offspring.

*Polled Durham*—Polled Durham originated in Ohio, from two sources; viz., a cross between Shorthorn bulls and muley cows and pure hornless Shorthorns, which occasionally are seen as freaks in this breed. The Polled Durhams are becoming popular throughout the United States and have been exported to some extent abroad, where they are also making a name for themselves. They are most numerous in Indiana, Illinois, Ohio, Texas and other central states. They were first exported to the Argentine Republic in 1894. The appearance and points of the Polled Durhams are essentially the same as those of Shorthorns, but more attention has been given to milking qualities, so



#### BROWN SWISS CALVES

While not so numerous as many other breeds of cattle, the Brown Swiss cow has attached herself very strongly to many people and is now quite generally known wherever well-bred cattle are in favor.

that this breed probably excels even the milking Shorthorns in the quantity of milk.

*Brown Swiss Cattle*—Brown Swiss cattle are one of the standard breeds from Switzerland, and have become generally distributed throughout Europe. They were first imported into the United States in 1869 by Mr Henry M. Clark of Belmont, Massachusetts, since which time many importations have been made. Brown Swiss cattle are well adapted to conditions where a combination of dairying and beef product is sought. The size is medium; cows weigh from 1,200 to 1,300 pounds. The quantity of milk is moderately large, and its fat content good. The Brown Swiss cattle are excellent grazers, fatten readily when dry and the calves develop rapidly. They are fertile and excellent breeders. According to the American standard, the color is dark brown to light brown, or at some seasons of the year gray. A few splashes of white near the udder are not objectionable and a light stripe is allowed along the back. The hair between the horns is light, but not reddish. The horns are rather short, flattish and with black tips.

*Jersey*—In point of numbers, the Jerseys are considerably in the lead of other dairy breeds in the United States. This breed originated in the Island of Jersey and has gradually spread throughout the dairy regions of Europe and America. A small number of Jerseys, then known as Alderneys, were introduced into the United States before 1840, but large importations did not take place until after 1850.

Jerseys are the smallest in size of all the noted dairy breeds, the cows ranging in weight from 700 to 1,000 pounds, and the bulls from 1,200 to 1,800 pounds. A deliberate attempt has been made to

increase the size of the Jerseys, so that in the United States they are somewhat larger than in their native island. The color of the Jerseys varies extremely, showing all shades of brown, even to



**A GREAT JERSEY COW**

Adelaide of St. Lambert is a typical specimen of her race. The fine head, thick neck, large udder and prominent milk veins are all indicative of dairy quality and temperament. In addition to this, the fine skin, silken hair and neat bone are all qualities of superior breeding.

black, and various shades of yellow, fawn, tan and cream; mouse color, light red and brindle are also observed. The head of the Jersey is small and usually dished, and the muzzle, including the upper lip, shows a black or dark red color. This at once

distinguishes the Jersey from the Guernsey, which has a tendency to show a buff color about the head.

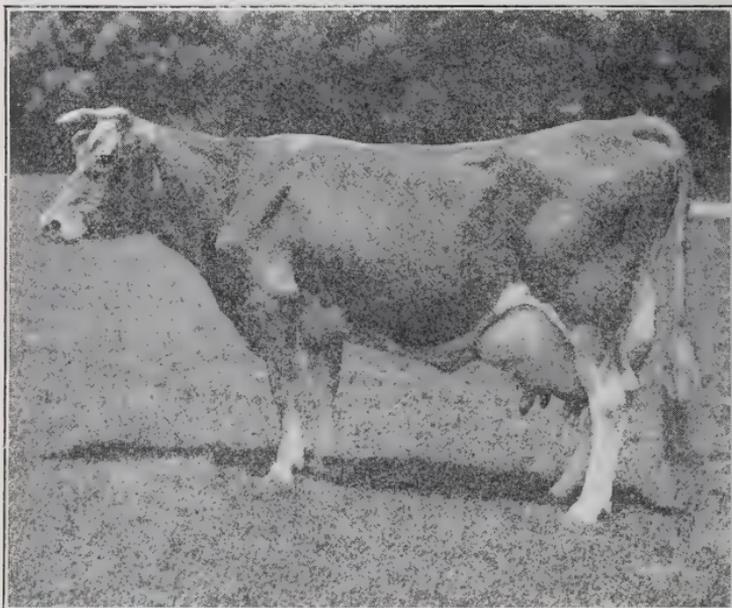
Many breeders prefer solid colors in Jerseys. The majority of this breed are variously marked. The udder is of good size and ordinarily hangs lower than in Ayrshires, while the milk veins are well developed. Jerseys are likely to be irregular and angular in outline, rather quick and graceful in movement and deerlike in appearance. They are nervous and excitable, but when carefully treated, are docile and easily managed. The matter of temperament in all dairy cows may be said to be largely a question of breeding and treatment.

Much effort has been made in America to increase the milk yield of Jerseys while maintaining its high fat content. Jersey cows frequently give three to four gallons a day, and many Jerseys produce 300 pounds or more of butter annually. A few animals under careful test have yielded from 9,000 to nearly 17,000 pounds of milk in a year. The amount of fat in the milk is usually from 4 to 5 per cent, and sometimes higher.

*Guernsey*—This breed originated in another of the Channel islands, known as the Island of Guernsey, and has practically the same origin and history as the Jersey. In the development of the Guernseys, however, more of the original characteristics of the parent stock from Normandy have been preserved. At present, however, the Guernseys closely resemble the Jerseys in their general conformation and appearance.

The Guernseys were first introduced into the United States, in numbers, in about 1850, being grouped together with the Jerseys at that time under the name of Alderneys. Between 1870 and 1875 the Guernsey was recognized as a distinct

breed in this country. The head of the Guernsey is long, the neck slender, the body large and deep and the flanks thin. The color is light yellow and orange or buff predominating, with considerable white in patches on the body and legs. Dark colors approaching brown are seen on some cows and



#### QUEEN OF THE BARNYARD

This Guernsey cow shows the dairy type very conspicuously.  
No one questions her rank.

more frequently on the bulls. The muzzle is almost buff or flesh color. The horns are small, curved and waxy, often showing a rich yellow at the base. One of the distinguishing characteristics of the Guernsey is the large secretion of yellow coloring matter throughout the skin, but especially where the hair is white around the ears, eyes and udder.

The udder and teats are well shaped. While the Guernsey is of nervous temperament, the cows are gentle under proper management, and the bulls are probably less likely to become vicious than Jersey bulls.

The Guernseys are economic feeders and excellent butter producers, the milk often showing from 5 to 6 per cent of fat. They are especially recommended by Alvord and others for butter cows and for the production of market milk, where quality secures a high price. They show great power of assimilating feed and converting it into milk, but do not endure excessive forcing. Guernsey cows average about 1,000 pounds or a little more in weight, and being slightly larger than the Jerseys, may be expected to give more milk than the latter. On the farm a good Guernsey may be expected to produce 5,000 pounds of milk, or 300 pounds of butter, without high feeding. In one case a herd of 104 cows averaged 318 pounds of butter each a year. Recently a Guernsey cow in Wisconsin made a new world's butter record of 1,000 pounds a year, under a carefully supervised test.

*Ayrshire*—This breed of dairy cows originated in the county of Ayrshire, in the southwestern part of Scotland, and was brought to its present fixed form by careful breeding in that country.

Ayrshires were first brought to New York in 1822, and began to be imported in considerable numbers about the middle of the nineteenth century. With the exception of the Kerry cow, no other breed of dairy cattle can excel the Ayrshire in obtaining a subsistence and thriving well on scant pasture and upon the coarsest of forage. "The natural hardihood of constitution renders these cattle admirably adapted to grazing on broken and



A PRIZE-WINNING AYRSHIRE

rugged pastures and in sterner weather than would be conducive to the well-being of cows of some other breed." The purpose of breeding in the Ayrshire has been to secure an animal which will give a large milk yield without extravagance of feeding, but this breed, while showing the greatest economy in the utilization of feed, responds promptly to liberal feeding.

The Ayrshire cow weighs from 900 to 1,100 pounds, and the bull from 1,400 to 1,800 pounds. They are short of leg, with small bone and active movement. The general form is good, without any weakness in the forequarters, but with an unusually strong development of the hindquarters. They do not carry any extra flesh during the period of lactation. The face is in most cases long and straight, and the horns curve outward, then inward and up, with the tips inclined backward. The muzzle is usually black, although white is permissible. The prevailing color is red and white in spots, not mixed, with a tendency at present toward more white. The red is bright and is frequently compared to that of the shell of a horse-chestnut. The udder of the Ayrshire is somewhat characteristic, being flattened from side to side and extending far forward and backward. The teats are small and tend rather to a cylindrical than a conical form. The Ayrshire is nervous and the cows sometimes show a tendency to be quarrelsome, but the bulls are not particularly vicious.

In good hands, a herd of Ayrshires should average 5,500 pounds of milk a head annually. In some noted herds, the average yield has reached nearly 7,000 pounds, and many cows have given from 10,000 to 12,000 pounds a year. The milk fat averages about 4 per cent, and the amount



A CHAMPION BUTTER COW

The Holstein cow is not only a wonderful producer of milk, but she produces also a large quantity of butter, ranking with the best butter breeds.

of butter in good herds should run from 300 to 320 pounds each a year. The milk of the Ayrshire is not especially rich in fat, but is above the average of all dairy cows.

With regard to distribution of the breeds thus far considered, Jerseys are found in all parts of the United States, but are kept most numerous in the eastern and middle states and less extensively in the West and South. The Guernseys, likewise, are most extensively maintained in New England, New York, Pennsylvania, New Jersey and Wisconsin, while the Ayrshires are most numerous in New York, Massachusetts, Vermont and New Hampshire, and less frequently observed in the central states and west of the Mississippi.

*Holstein*—The black and white cattle of Holland, or the Holsteins, are one of the very oldest of dairy breeds. According to some of the champions of the Holsteins, this breed can be traced back for 2,000 years in the territory where it originated. Holland has long been noted for its dairy industry, and the Holsteins and Dutch Belted are its two famous dairy breeds. Holsteins have also been referred to as Holland cattle, North Hollanders, Dutch cattle, Dutch Friesians, Holstein Friesians and by other names. The large frame, relatively heavy bone, silken coat, remarkable docility and enormous milk yield of the Holsteins are commonly referred to as due in part to their origin in the fertile plains of Holland. It appears that the early Dutch settlers in America brought their cattle with them, but no large, well-known importations took place until about 1850. The characteristics of the Holsteins are large size and contrasting colors, jet black and pure white.

The weight of the Holstein cows ranges from 1,200 to 1,500 pounds, and the bulls often weigh 2,500. The black predominates in some animals and the white in others. The color of the animal, as a whole, may, therefore, be either white spots on a black background or black spots on a white background. In America, breeders show a tendency to favor black rather than white. The arrangement of the spots varies in different animals, but the black and white are never mixed. As just indicated, the Holsteins are the largest of all dairy cattle. The neck is long and slender, the back line level, the hips broad and the legs relatively long. The udder is large and frequently of phenomenal size, with prominent milk veins and cone shape teats.

Both cows and bulls are exceptionally gentle and docile. This breed shows great constitutional vigor. The calves are large at birth and grow rapidly, maturing at an early age. Holsteins can utilize profitably more feed than any other breed of dairy cows and the milk yield corresponds to the abundance and quality of the feed. There are authentic instances of cows yielding 100 pounds of milk or more a day, and a yield of five to seven gallons a day is regarded as an average performance, the average annual yield being from 7,500 to 8,000 pounds. In a few instances, cows have given from 20,000 to 30,000 pounds in a year. The milk does not average as high in butter fat as that of most other breeds, but with exceptional cows the fat content is high. In point of numbers, the Holsteins are second only to the Jerseys in the United States and are kept in every state and territory in the Union. They are most numerous in New

York, Pennsylvania, Ohio, Wisconsin, Illinois and Iowa, about in the order named.

*Dutch Belted*—The Holsteins and Dutch Belted, as already indicated, both come from Holland and probably have a common origin, the colors being sharply contrasted black and white in both breeds. While, however, the black and white are irregularly arranged in patches on the Holsteins, these colors are placed with great regularity on the Dutch Belted cattle. The animals of this breed are jet black, with a broad belt of pure white encircling the central part of the body. This belt varies in width, but seldom reaches the shoulder blade or hip. According to modern standards, no white is permitted except in the belt.

In size, Dutch Belted cattle are about equal to the Ayrshires; occasionally individual animals are slightly larger. In Holland a deliberate attempt has been made to keep this breed almost entirely under the control of the nobility. Partly for this reason the breed is not numerous, either in Europe or in America. It was first introduced into New York about 1838, but may possibly have been brought over by the settlers somewhat earlier.

The average weight of cows is from 1,000 to 1,200 pounds and bulls weigh about 1,800. The milk production of Dutch Belted is nearly equal to that of Holsteins, and the quality is about the same. They are good feeders, maturing at a fairly early age, but are probably not quite so vigorous as Holsteins.



A SPLENDID LOT OF AYRSHIRE CATTLE

The hardy, rugged red and white cows of Scotland have established themselves firmly in dairy circles. They are gaining in numbers and popularity each year.

## CHAPTER XII.

### **The Business of Dairying**

There is a sentiment abroad that dairying is becoming unpopular with many, and there is less inclination among young men to engage in it. If this be so, it is time dairymen took hold of this matter to raise the standard of dairy intelligence and education up to a point where it will be popular. The door must be opened to the boys and girls of this country so invitingly, with so much of interest and profit in sight, that they will without question become our future citizen farmers. We cannot expect much change in those with settled opinions. While we may not change much, we have it in our power to promote and institute a change, an uplift, that shall be a power for good to those who come after us. The door must be opened wide, and the light made so clear, it will be recognized that getting a start and winning success in life does not imply that one must leave the farm. It must be shown that a man may by intelligent practice have a farm, high producing dairy stock, and may know about feeds and feeding and produce the best; but it implies study, comparison, and gathering the best information and applying it.

*Must Study Your Business*—The man who refuses to educate and broaden his mind along his business, who pins his faith to the reckon and guess, will always be found milking mixed-bred cows, in which the failures are the most prolific, will be feeding everything if it is cheap, and believing that all failures are due to the factory and market end

of his business. As one has expressed it, too many men go through life mistaking their gizzards for their heads. The moment a man sees and puts into practice the idea that he can cheapen the cost and increase the excellence of an article, that moment he has opened the door to enlarged opportunities.

### DAIRY FARMING

Dairying has long been assuming more and more importance as a line of animal industry, keeping pace in this respect with the growth of large cities and the consequent demand for great quantities of milk and other forms of dairy products. In the northern and western states, particularly, this development of dairying has been most pronounced. In the early history of the United States, dairying was of far less importance, relatively, than at present, largely for the reason that there was no steady market for large quantities of dairy products and consequently no inducement for farmers to keep a large number of cows for dairy purposes. The tendency then was for each farmer to milk as many cows as were required for the production of the milk, butter and cheese which he needed for his own family. Gradually, however, the concentration of population in large cities furnished the demand for more dairy products and this was the business reason for the extensive development which has taken place along this line.

*Dairy Industry is Large*—The importance of the dairy industry is seen not only from the number of dairy cows and their value, but from the extent of dairy products; thus, according to the most recent available statistics, farmers sell annually about 2,250,000,000 gallons of milk, and butter and cheese.

factories buy annually about 1,500,000,000 gallons of milk. Within recent years, the development of creameries on a co-operative or some other basis has been rapid and extensive. They have naturally used large quantities of milk, as just indicated, in the manufacture of butter. Contrary to the widespread notion, however, there is more than twice as much butter made on farms at the present time as in factories, the amounts being 1,072,000,000 pounds on the farms, annually, and 420,000,000 pounds in the factories. The opposite tendency is observed in cheese making. The process of cheese making is somewhat more elaborate than that of butter making and requires more skill and experience, as well as a more elaborate equipment in order to produce a first-class article.

*Cows for Human Food*—Good dairy cows produce human food in the form of milk much more economically than food products can be obtained in the form of beef, pork or mutton. Naturally, the cost of production of milk and butter varies greatly in different localities, according to the price of farm labor and feeding stuffs, but the relative economy of dairy and beef production varies in the same direction in nearly all localities. The only apparent exceptions to this rule are found in two extreme types of farming conditions found on the western ranges and in the neighborhood of large eastern cities. On the western ranges the distance from the market is so great that milk could not be delivered in a satisfactory condition and dairying is practically impossible. In the neighborhood of large eastern cities, on the other hand, the price of land and the cost of feeding stuffs are so high that the production of beef becomes altogether too expensive as compared with milk production. The

amount of feed required for the production of a pound of modern beef steers is nearly, if not quite, ten times as great as the amount of feed necessary for the production of a pound of milk by the modern dairy cow. This should indicate without argument the great difference in the relative economy of beef and milk production in localities where condi-



#### THE FOUNDATION OF SUCCESS

Behind dairy success is well-bred and well-raised young stock. These must be thrifty, healthy and good eaters.

tions are favorable for both beef and dairy industries.

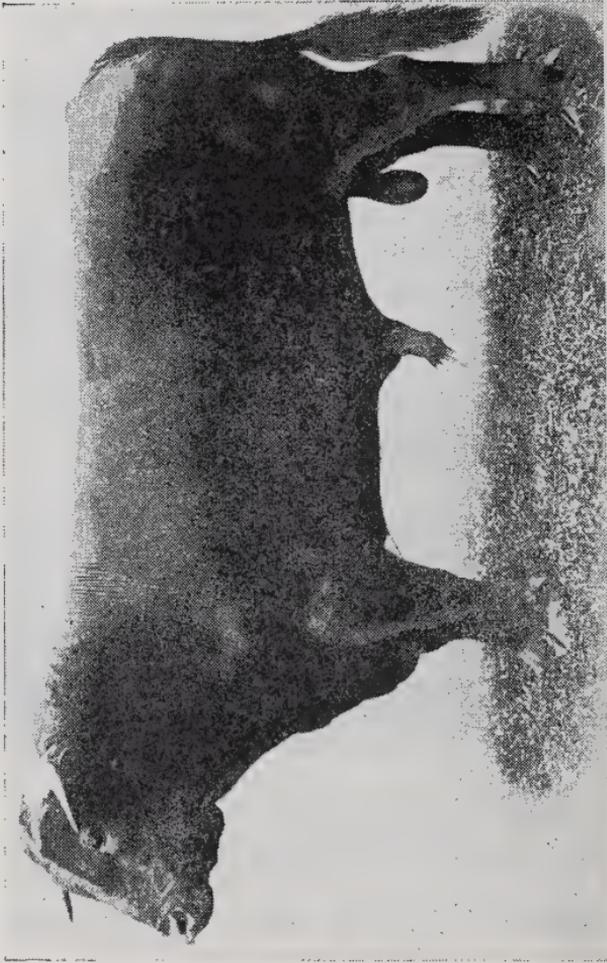
*Building the Dairy Herd*—In making a start in the dairy business, the first great problem is the formation of the dairy herd. In this operation the selection of the cows and the bull to head the herd is by no means an unimportant matter. It is ordinarily to be recommended that the herd should not

be composed of different breeds, but should contain only one pure breed or grade of animals based on that breed. In practice, however, dairy cows should be selected for their individual record rather than for their pedigree, color or form. For dairy purposes, dairy breeds should be chosen rather than beef breeds, for the reason that they produce milk fat rather than body fat from their food; while beef cattle, on the other hand, are likely to become fat under forced feeding without increasing to a corresponding degree their milk yield. No one, however, should allow either breed or type to determine entirely his choice of cows for his dairy herd. The prime requisite is that they shall give a large quantity and a good quality of milk.

### CO-OPERATIVE BREEDING

Co-operative breeding, or community breeding, gives promise of great achievements in the future. Our great dairy industry is carried on largely in the dark. Very few owners of dairy herds know with any certainty what their herds are doing, and whether they are kept at a profit or a loss few can tell. Sires of no particular breed, immature, and utterly worthless, are often used. If a community will form an association, study the breeds and carefully select the breed they like best and is best suited to their conditions and that they will be willing to stand by ever after, then they will have laid a sure foundation for future prosperity.

This much we know, that when an association is formed, interest is aroused, and a desire for better things is inspired. Pure-bred sires are bought, and if a man feels too poor to buy a good animal alone, two or three will go in together and



#### SHORTHORN BULL

The Shorthorn leads as to numbers and is still one of the most popular beef breeds in the country. While once prominent as a milk producer, the Shorthorn has largely been displaced by the strictly dairy breeds.

buy. As good sires are bought, exchanges are made, so a choice animal can be kept near the same locality during the entire period of his usefulness.

*A First Requisite is a Good Secretary*—The secretary should be a live business man, be in touch with every member; he should know what stock each one has, and what he desires to have. Through him, exchanges are made, buyer and seller brought together. When they have stock to sell he carries advertising for the whole association, thus lessening the expense. He should have the registry books of the breed, so a prospective animal can be traced and its worth determined.

When animals are for sale they are reported to the secretary, so a buyer can find out by him just what can be bought, and where it can be bought, and a buyer will go to such a place, when he would not go from house to house in the uncertainty of finding what he wanted. In shipping there is also an advantage, as animals can be shipped much cheaper in car lots than singly.

It opens the way for cow testing associations, and they begin to test and weigh each cow, and weed out the least profitable ones. It promotes friendliness, for when two members come together, the common interest will bring up the subject, and experiences and knowledge will be exchanged. Speakers of experience can be secured, and the best knowledge gained. The demand for good stock is stronger than ever before.

*A Noted Example*—Lake Mills, Wisconsin, is noted the world over for its cattle, because breeders have been working together raising one breed. A buyer has large numbers to pick from, he can buy in large lots, and he can get what he wants, and he is willing to pay the price. This is

business; straight, honest, legitimate business. It will give an uplift to the farmer himself, it will bring comforts to his family, and education to his children.

Seest thou a man diligent in his business,  
He shall stand before kings.

## FEEDING THE DAIRY COW

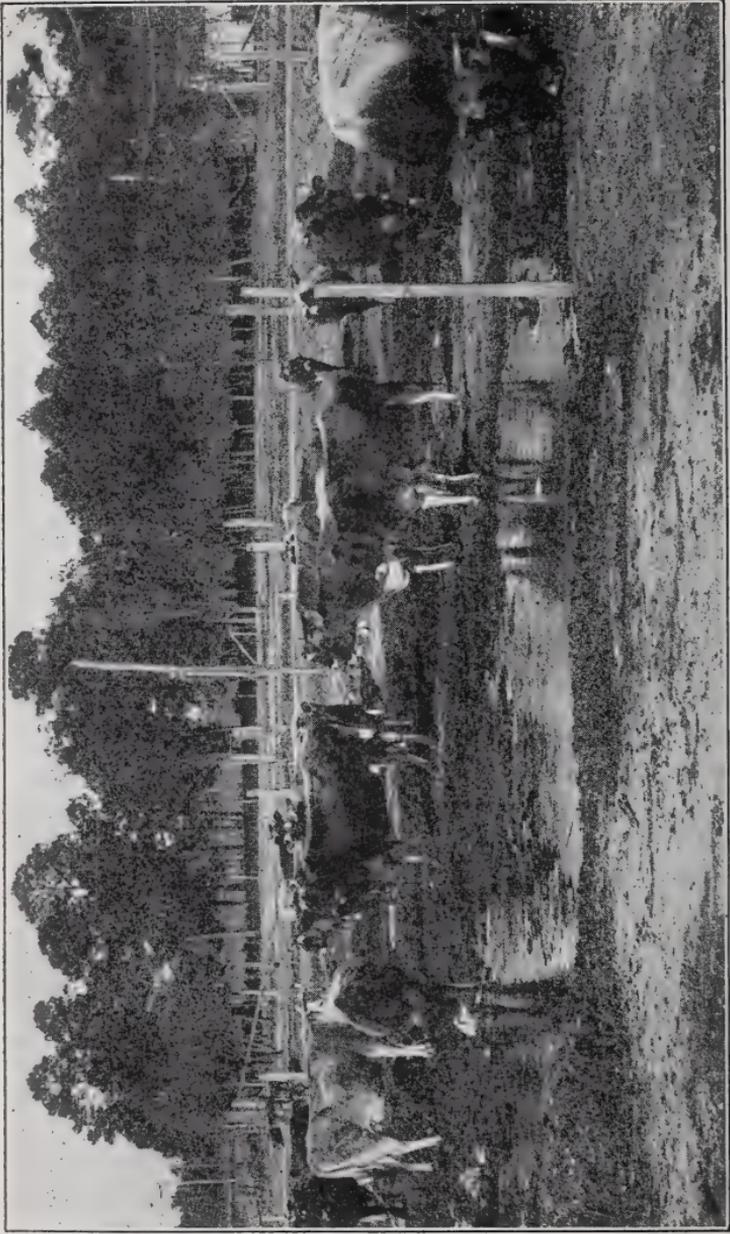
The dairy cow is fed primarily for one purpose: that milk may be produced. Since milk is so largely formed of the protein elements of the food, it follows that the dairyman must have the best that can be secured to supply this kind of ration. Consequently, the old-fashioned way of feeding any sort of feed will no longer prove profitable; especially since lands have increased in value, since labor has gone up higher, and more remunerative returns have become necessary to the farmer. It used to be the custom to turn the cow into the pasture in early spring, in a somewhat depleted condition. At this period she freshened and then for five or six months produced milk abundantly and satisfactorily. This was because pasture grass was a balanced feed and supplied her with the necessary constituents for the production of milk and butter food. Then in the fall, as the pasture began to dry up, her milk yield decreased and continued so throughout the winter. The winter feeds were largely corn fodder, straw and some ground feed, like wheat, bran or corn. Naturally, under these conditions she never did her best. With the development of the dairy industry there gradually spread over the country a better knowledge of the principles and methods of feeding, as they concern the dairy cow. As a result, corn has been relegated to

the background as unnecessary and even undesirable as feed for cows, except in its use as ensilage.

So the silo has come and is sure to stay. It offers the best means of corn consumption for dairy cows that we have. Corn ensilage possesses feeding value of much merit and it possesses at the same time the succulence and juices, two things very essential in maintaining the milk flow during the winter months. But corn ensilage in itself is not a balanced feed. While it is succulent, it is still lacking in nitrogenous constituents. It stimulates milk flow, but it does not provide the wherewith to make milk; hence they must be fed something that supplies this feeding constituent. Fortunately, the range is very wide.

In the southern states cottonseed meal is right at hand; in the West are the by-products of the cereal factories; and transportation is so rapid that the eastern dairyman can secure protein feeds from the North and West at no great cost. But in all sections corn ensilage may be balanced within reason by clover and alfalfa, and no dairy farm is complete in its plan, equipment and management if it does not include one or both of these great legume crops.

To supply the grain side of the ration you will need to go a long way in order to find any feed more satisfactory than the cottonseed meal. Compared to its commercial price, its value is exceedingly high, and of the various feeds on the market cottonseed meal invariably provides protein at a less cost per digestible pound than any other food. Cottonseed meal is generally available throughout the country. Large quantities of it, however, ought not to be fed. Three to five pounds for eight or nine months in a year should cover the ground.



GOOD DAIRY CATTLE BUT BAD SURROUNDINGS

The remaining part of the daily ration and the remaining months of the year should be supplied through the use of some other feed or feeds; linseed meal, wheat bran, and others of equal worth and value may be used for this purpose.

In producing dairy feeds you ought to make a practice of always considering the cost of the feed from the standpoint of its digestible nutrients. Too often feeding stuffs have been purchased by name rather than because of merit. The point to consider is, How many pounds of digestible nutrients do I get in a ton of this feed, and what does each pound of digestible protein cost me? Figured on that basis many dollars will be saved in the feed bill and more satisfactory results will be had when the profits are figured up at the end of the month or year.

### HANDLING A HERD FOR MARKET MILK

In making milk for the retail trade the producer must consider carefully the demands of the trade. The consumer is yearly becoming better educated as to what constitutes good milk and as to the dangers which are often found in milk when carelessly produced and handled. In general, the consumer is growing more critical in his demands for high-grade farm products and is willing to pay a fair price if he can have what he wants. The farmer must study the demands of the higher class of trade and strive to meet them, or else expect low prices for products of only ordinary to fair trade.

In buying for family consumption the purchaser wants milk of good flavor, of a fair degree of richness and of good color. Bad flavor is mainly the result of improper care in handling the milk during

and after milking, although it is not infrequently caused by improper feeding and stabling. It follows then that, whatever the breed, milk of good flavor cannot be produced except under cleanly and healthful conditions and under the exercise of good judgment as to the kinds and quantities of food to be used. Garlic in pastures will surely produce garlic flavors, and so will turnips or turnip leaves produce a turnip-like flavor. Silage when fed in large amounts will produce a fermentive flavor, just as it will produce a musty flavor if fed when in a state of partial decay.

*The Reason of Bad Silage*—The objection offered to the use of silage by some milk shippers is based on its excessive use, or on the use of poor silage, coupled with the difficulty of controlling these points. While it is true that flavor depends mainly on the care used in producing and handling the milk, it is also true that milk to be of rich flavor must contain a fairly high percentage of fat. Milk which has a creamy flavor and consistency is highly prized by many people as a healthful drink. There are sanitariums where the chief food for nerve and brain-worn people is good, rich milk.

In judging the richness of the milk in fats, the consumer is guided by the bulk of cream it will produce. The milk from some breeds does not give a large bulk of cream nor a well-defined cream line after being bottled for several hours.

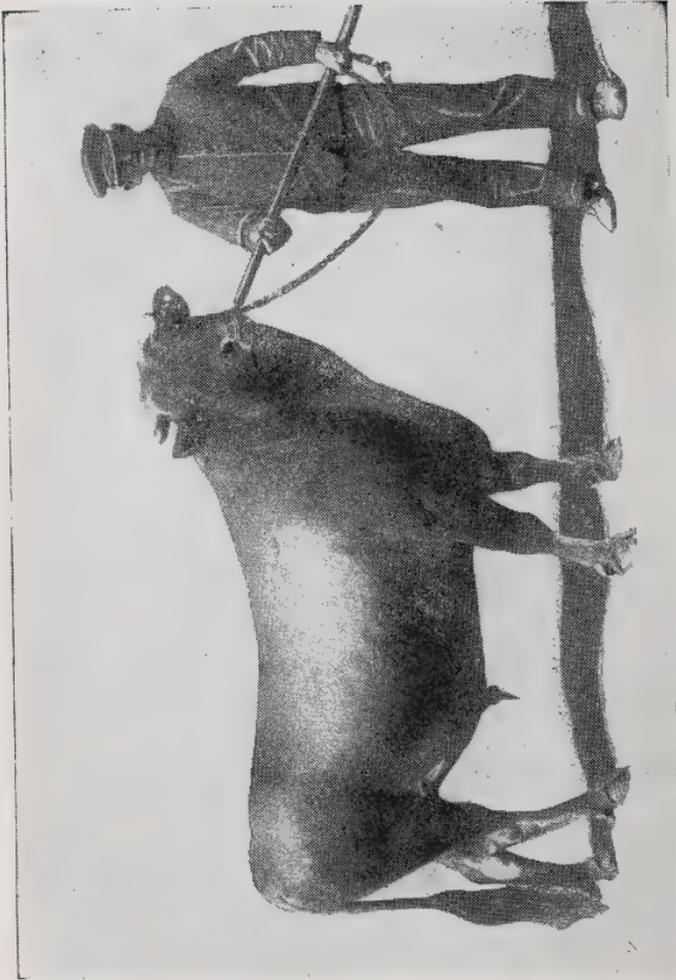
*Color Important in Milk*—But one point looked for in a good grade of milk is color. Usually there is a close relation in milk between color and richness in fats. As a rule, a yellow color means milk rich in fats. I have seen striking instances where this was not the case, but so usually does the belief prevail that a yellow color in milk denotes richness.

that it is wise to take notice of. Lack of color and lack of creaminess are firmly associated in nearly everyone's mind with poor quality, and it is a good business point for the farmer who retails milk to be guided by it in selecting his cows. It must be admitted, too, that a decidedly yellow color in the milk does give it a more pleasing appearance than when such color is lacking.

*Get a Good Bull*—In selecting the foundation for a herd, the dairyman should not hesitate to pay well for a bull that will stamp upon his female progeny the power to give quantity, color and richness in the product. In selecting females only the best should be used for building up the herd. It seems to be a rule in breeding that the more mixed the blood of the female the greater will be the influence of the male. In selecting the females, care should be taken to get those which have no tendency to beefiness. By selecting foundation stock in this way, and by rearing the best of the offspring, a valuable herd for producing high-grade market milk may be built up in a comparatively short time.

## PROTECT DAIRY COWS FROM FLIES

The season of midsummer is one of the most trying times for the dairy farmer and then more than at any time of the year is it necessary to use special care with the dairy herd. During the time of harvest, when flies, heat and mosquitoes make life a burden for the old cow, she also has to cope with dry, short pasture and a very busy keeper. I not only sympathize with the old cow, but also have some feeling left for her keeper; for who can forget the milking during the fly season, when the temperature is very high and one is tired out



### TYPICAL JERSEY BULL

The Jersey continues to hold its great popularity, being the strongest rival of the Holstein at the present time. The Jersey has gone to every part of the country.

after a hard day's work? Certainly this is not an easy task, but the remedy we are anxious to hear, and I do not know as I can give a sure cure for this complaint. In many ways life can be made easier for both man and beast if a few things are complied with.

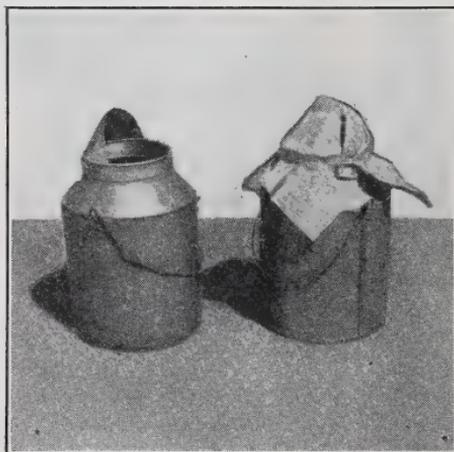
In the first place, you should bear in mind that cows freshening in the spring will have to be milked during the winter if they are to be made profitable, and if they are neglected during the fly season and their milk flow cut down, the chances are they will be strippers the balance of the lactation period. Therefore, it is very important from an economical standpoint to use special care during the hot summer months. If the cow switches our face instead of her side, and kicks over a pail occasionally, it should remind us that it is better often to practice winter dairying and see to it that the bulk of our cows freshen in the fall and early winter.

It is true also that a darkened stable is a more convenient place in which to milk than in the cow-yard or the open shed. You might also bear in mind that there are on the market many kinds of fly removers, which can be sprayed on at little cost at milking time. If this expense is considered too high, a light burlap cow blanket will greatly help matters; this may be thrown over the cow at milking time. I have found that by darkening the barn the flies give me little trouble during milking time. This can be greatly improved by first using a strong disinfective spray, or some material that will repel flies. Use this freely about the stalls, gutters and windows, and upon everything, so that the flies that are in the barn may go out; then darken the barn and little trouble will be experienced. Cows can stand the attacks of flies much

better if they have in the pasture some place where they can feed among the underbrush. This is their natural way of fighting flies; and they will take very kindly to the hazel brush patch if it is in their pasture.

## CLASSIFYING MILK FOR MARKET PURPOSES

Pasteurization has not solved the problem of clean milk commercially, for the reason that it is



SANITARY MILK

Care at milking time is essential if a clean, sanitary product is to be obtained.

expensive, requiring apparatus and labor; it is rarely done with sufficient care to render the milk safe; it does not take the filth out of the milk, and it tends to promote carelessness all along the line. Modern methods call for the exclusion of bacteria by cleanliness rather than by destruction by heat, and show that dirty milk is

death to babies and dangerous to man. Pasteurized milk is a fairly satisfactory substitute where clean milk cannot be obtained, and where the process is carried on under the direction of boards of health it is reasonably safe. The milk committee in Washington, appointed by the district commissioners to report on the milk supply of that city, recommended that there be recognized by law three grades of milk, as follows:

Class 1. Certified milk to be produced under all conditions necessary to avoid infection. I will not attempt to outline these conditions here, further than to say that the cows must be tuberculin tested and free from disease; that the temperature of the milk must not exceed 50 degrees, when delivered, by chemical and bacteriological analysis; that the milk must not contain more than 10,000 bacteria to the cubic centimeter, and must not be more than 12 hours old when delivered. This class of milk to be certified by the health office of the District of Columbia.

Class 2. Inspected milk. To be limited to clean, raw milk from healthy cows as determined by the tuberculin test and physical examination. The cows to be fed, watered, housed and milked under good conditions, but not necessarily equal to the conditions provided in class 1. The milk to be kept at a temperature not exceeding 50 degrees until delivered to the consumer, and to contain not more than 100,000 bacteria to the cubic centimeter.

Class 3. Pasteurized milk. To include all milk from dairies not able to comply with the requirements of classes 1 and 2 to be pasteurized under the supervision of the board of health. This milk to be kept at all times at a temperature not

exceeding 60 degrees while in transit to the pasteurizing plant and at a temperature not exceeding 50 degrees when delivered to the consumer. The cows must not show physical signs of tuberculosis or any disease.

We may have gone too far or been too radical on some points in this milk question, but when it comes to preserving the lives of infants, it is a question whether we have gone far enough. It is a crusade for the children, and if by any means we can lower the fearful death rate, who will refuse to lend his aid and give all possible assistance? The basis upon which this question rests is hygienic economics. This lesson is being learned very rapidly at the present time. We are learning that bad air, bad water, bad sewerage, bad housing, bad streets, bad milk or bad food of any kind are not cheap in the long run and that in the end they prove a heavy expense to the individual or community.

### CARE OF MILK ON THE FARM

Whether milk is delivered promptly or held some time before delivery, it needs particular care. The best dairymen provide for this purpose a room near the stable, but separated from it so as to exclude dust and unpleasant odors. As soon as a pailful of milk has been drawn from the cows, it is carried to the milk room, poured through a fine strainer, and cooled with an apparatus made of thin meal and containing cold water. The milk flows over the outside of it in a thin sheet. After 20 or 40 quarts have been thus treated a shipping can is filled and set in cold water, or the milk is bottled and kept cold until needed.

Some farmers do not use this care, but strain the milk directly into a large can, which stands in any convenient place, usually within the stable. When the can is filled it is placed, as soon as convenient, in a tub of cold water and stirred until partly cooled, then left with the cover ajar until wanted for delivery.

*Milk Easily Absorbs Odors*—Persons handling milk in this way do not appreciate how sensitive

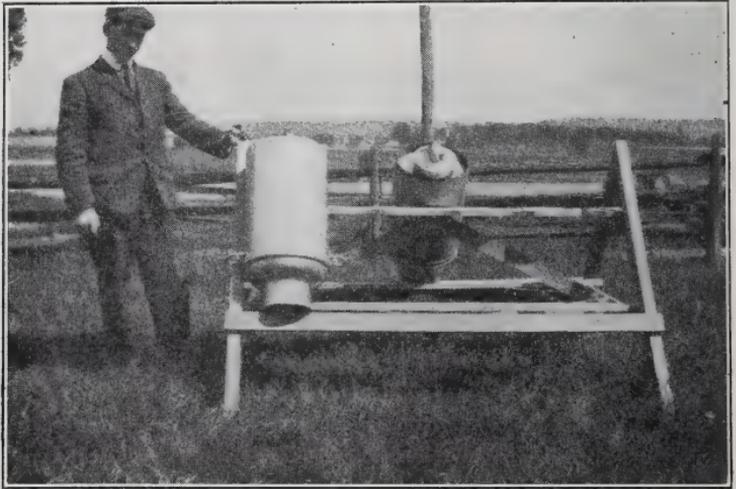


A TASTY MILK HOUSE

The old, dirty, dilapidated, sloppy milk house has given way to modern buildings that permit of thorough cleanliness, and which are sanitary in every way.

the fluid is to surroundings and how quickly it will absorb injurious odors. It is fortunate for consumers that milk shows so plainly when it has been carelessly handled. If purchasers are sufficiently watchful they can avoid being supplied with milk which has been improperly cared for. A dairyman should always bear in mind that milk is food, and he should not leave it unnecessarily in any place where he would be unwilling to have his own food left an equal length of time.

In some cases the milk delivered in the morning is that of the previous evening, well cooled and kept in a cold place, and the milk delivered in the afternoon is the morning product similarly treated. This is a much better method than the delivery of perfectly fresh, warm milk. When but one delivery is made each day, and that in the morning, the



#### A GOOD WAY TO DRY AND AIR MILK CANS

Air and sunlight are death to all kinds of germs.

production of the same morning and the previous evening is usually distributed.

Many dairymen do this when they drive directly from the farm to the places of delivery, except when it is necessary to start before the hour of milking; then the milk of the morning and evening of the previous day is taken. During the hottest weather, the evening's milk is sometimes delivered by itself early in the morning, and the supply of the same morning is served later.

## MAKING CHEESE AT HOME

Use milk three or four hours old that has been held at 70 degrees and which has not as yet commenced to sour. Heat to about 86 degrees, add commercial rennet at the rate of three ounces or 85 cc (cubic centimeters) to 1,000 pounds of milk. Allow to coagulate for about 30 to 40 minutes, break the curd with a spoon or three-cornered stick until the particles are the size of the end of the small finger; heat slowly to about 100 degrees, stirring almost constantly in the meanwhile, and allow to stand at 100 degrees until the curd becomes firm.

A few experiments along this line will show about how firm the curd needs to be, but roughly it may be stated that it will require about 2½ hours from the time the curd is broken. Drain off the whey, stir the curd for 15 or 20 minutes, allowing it to cool slowly. Salt at the rate of 2½ pounds salt per 1,000 pounds milk; put in a mold, square or round, as desired, and apply considerable pressure. The amount of pressure required is rather indefinite, but should not be less than 100 pounds to each cheese. The utensils required are a thermometer, a tin vessel for heating and a measure for measuring the rennet extract. All of these articles, including the rennet extract, can be purchased from any supply house.

## KEEPING UP THE MILK FLOW

It is a matter of importance that the flow of milk be kept up to the highest possible point. It is too often the case that the matter is not attended to on account of the press of work during haying and harvest. The feed gets too short in the pasture,

the flies bother the cows, and as the amount of milk is reduced a little each day it passes unnoticed until it is too late to remedy the matter.

If supplemental feed has been provided in the shape of oats and peas, it is well to begin feeding them as soon as a shrinkage is discovered. In the absence of such feed, green clover, cut and put in the manger for the cows to eat when they come in at night, makes a good substitute. If fodder corn



PART OF A DAIRY PLANT

In the illustration is seen the cement silo, a permanent improvement of the dairy farm. The silo is steadily increasing its popularity.

was sown or planted thickly for the same purpose, one can begin on it soon after the tassels appear. I have noticed that the best results from it are obtained after the ears have formed and the kernels are approaching the glazing point.

When I have had fodder corn to feed during the latter part of the summer, especially sweet corn, I have found that it was a saving of time to use it, for the cows relish the feed so well that they would come up for it at milking time. Those who now

have a supply of silage to feed can meet the requirements of the cows very easily, and they are then masters of the situation. The silage can be fed with the least extra trouble of any of the supplemental feeds.

### ALFALFA FEED FOR DAIRY COWS

During the past few years many dairymen have investigated the merits of alfalfa. What you have found out about it has been sufficient inducement for you to attempt to supply your wants by growing it on your own farm. Unfortunately for you, however, climatic and soil conditions offer a handicap which will be hard for you to overcome in the successful growth and harvesting of alfalfa. Our best posted men on alfalfa have named it the king of all forage crops for feeding purposes and the results of feeding tests prove that it has not been misnamed. Unlike other feeding material of the forage character, it contains that valuable food element known as protein, the milk producing material.

Two equally important conditions confronting eastern dairymen are: (1) The ever-increasing demand for dairy products; (2) the insufficient supply of good milk producing feeds to keep feed prices down to an economical basis, from the feeder's standpoint. It was the shortage of home-grown feeds and the lack of protein in natural farm grains that developed the necessity of utilizing commercial feeds to supply what the regular farm grains lacked, the milk producing material.

I call your particular attention to the alfalfa that is grown out West and which is now being offered for sale in eastern markets. It offers you an advantage you should not be slow in accepting by



DAIRY COWS FEASTING ON COWPEAS

adopting its use. Alfalfa contains more protein than wheat bran, and, as a basis of a feed for the dairy cow, it perhaps has no equal.

*Alfalfa Meal*—How are eastern dairymen to be supplied with this alfalfa grown so far away in these arid sections? My answer is that it is a milling proposition, just the same as supplying you with wheat bran and concentrated feeds made from wheat, corn, oats and barley, all of which are produced in surplus quantities throughout the middle west and far northwest. Alfalfa mills located in the arid producing sections will be even more necessary than wheat and corn mills, from the fact that the rate on alfalfa in the baled form is excessive, while in the milled form it will be reduced to the grain products rate basis, the same on which you are buying all other commercial feeds.

## COW FEEDING WHEN PASTURE IS SHORT

A genuine dairy cow is a splendid machine for converting a variety of food products into milk, but oftentimes, especially during the busy fall, the operator fails to realize that the task of changing fuel is a severe test for the machine, and, as a result, often finds himself trying to repair the damage.

Cows used to making milk from grass alone find a great difference in its palatability and nourishing qualities as the season advances, and, while they may not decrease the flow of milk as long as there is an abundance of grass, a careful survey of their general appearance will indicate that they are losing the bloom, the freshness, and possibly the vigor, that was so marked earlier in the season.

*Supplementing Pastures*—The watchful herdsman needs no orders. He at once begins to supply the wants thus made known. He has found from experience that it is a costly practice to allow the milk system to draw from the needed physical vigor of the animal, and realizes, too, that the milk flow once checked is hard to restore. The alfalfa field is called upon to furnish a little greenery, else he tempts their appetites with green sweet corn fodder, second crop clover, cowpeas, a few potatoes, or, better yet, some silage; they are invited to nibble at some bran, corn meal, moistened beet pulp, or, if necessary, some brewers' grain, and if one mixture fails, others are tried until the trying fly season is passed and the needed rains flush the dry meadows and prompt the clover and timothy meadow to furnish a few welcome, succulent mouthfuls.

*Some Grain May be Fed*—Even then the grain or selected-variety feeds are not removed entirely from the ration, for winter is coming and the cow's vigor can more easily be maintained and reinforced for the coming cold weather. Oats and pea hay may be tried; the early corn fodder looks very tempting, and a few hills are cut and thrown over the fence and greatly relished by the milkers. The straw stack needs brushing down, and the chaff should not be left to sour or spoil, so the cows are given a romp in the stack yard.

By this time the evenings are chilly and changeable, so the herdsman finds it profitable to keep the cows in the barn all night, and soon has them on a satisfying winter ration, which he changes occasionally for variety's sake.

His cows have not missed the change from grass to hay; they are healthy, vigorous and functional, and eat with relish the various fodders and grains which he has in store for them. The milk flow is increasing, rather than decreasing, and all bids fair to a profit-sharing season.

*Begin Before Cold Weather is at Hand*—The wave of prosperity will not come to the farmer who is less watchful and who waits until cold weather before he begins feeding his winter forage.

The grass-made flesh and vigor are lost during early fall; the milk check is scarcely worth while cashing; the animals have unsatisfying appetites, and refuse to respond, even if the herdsman allows them special excursions to the feed trough; all excess energy stored while the pasture was green was expended in trying to make milk out of dry, dormant grass, while the milk-making function could not be maintained when there were calls for the nourishment of the growing foetus.

The milch cows are mere strippers during the greater portion of the winter, and most of the blame comes from a lack of care, feed and attention during the critical period. It is well worth while to take simple precautions in tiding the milk cow over from her summer to winter ration.

### FEEDING DAIRY COWS IN WINTER

The kind of food that will be fed to cows in milk, will, of course, be much governed by the production in any given locality. The aim should be, of course, to feed approximately a balanced ration. Opinions may differ somewhat, but not greatly, as to what a balanced ration may mean. On this

point, however, divergence of opinion is not great. Where fertility is in equilibrium nearly all will agree to the statement that the aim of every dairyman should be to grow, as far as may be practicable, the food needed on his own farm.

*Food That Nearly All May Grow*—There are certain foods that may be looked upon as standard for feeding the dairy cows. Nearly every dairyman can grow them wherever he may be located, and because they are standard foods, he ought to



#### HAULING IN THE SILAGE CORN

Corn ensilage, where known, is highly prized. In time it will be considered a necessary feed on every stock farm.

try to grow them. These include as roughage, plants of the clover family, as silage, corn in one or the other of its varieties, and as grain, a mixture of wheat and oats. Of course, in addition to these, many other foods will be grown, but these are of less importance than the foods named.

*Providing Clover*—Wherever this beneficent plant can be grown it ought to be used with much freedom. The food furnished for cows represents only one element in its value. The benefit to the soil is always helpful, and in many instances greatly so. This fact should never be lost sight of when

taking into account the comparison in nutrients furnished by clover and other plants.

Usually clover can be best grown in mixtures for dairy cows. This means that two or three varieties may be grown together. This not only adds to the yield, but also increases the value of the products. It would also seem correct to say that quite a sprinkling of timothy improves a clover ration for dairy cows. It does so by helping to support the clover while it is growing and makes it easier to cure when the crop is out. Alfalfa will, of course, answer the same purpose as clover. Where neither may be had it may be quite possible to get vetch hay or cowpea.

*Providing Corn Silage*—No food can be grown in the United States that will provide so large a proportion of nutrients as corn. But the nutrients furnished do not tell all the story. In addition to nutrients, when cured in the silo, its succulence is beneficial. It is helpful to the digestion. It also favors milk production. There are two advantages that it always will have over corn and fodder fed in the dry form.

When the extent of the production that may be obtained from corn is considered, and when the ease with which it is fed is taken into account, it does seem, indeed, surprising that any persons engaged in dairying will be content without a silo.

*Furnishing Grain Food*—Clover and corn furnish a fodder ration that cannot easily be improved upon for dairy cows. The grain complement is not always so easily obtained. Wheat and oats do not grow equally well in all parts of the country, but they do grow well over large areas. The first advantage from growing them together is the increased yields. The second advantage is that when

grown in due admixture they furnish a suitable food. The third is that in very many instances they can be grown more cheaply than they can be bought. When silage from corn well grown is freely fed it is not necessary to add corn to the meal ration.



#### DAIRYING AS A SIDE ISSUE

In this case the cow is appreciated for her work in maintaining the fertility of the land and for the money she brings in.

*Amount of Grain to Feed*—Two factors should be taken into account when determining the amount of grain to feed. One is the extent to which clover or alfalfa is fed and the second is the production of the cow. The rule with some is to feed one pound of grain for every three pounds of milk produced. When clover or alfalfa form a large part of the ration it would seem reasonable to suppose that a

less quantity of grain would suffice than the amounts named above.

### DAIRYING: A BALANCE IN FERTILITY

Dairying is one of the most effective practices in agriculture for retaining and restoring the fertility of the soil. A great array of facts are on record that prove that soils, devoted to dairying, may be as fertile after centuries of farming as they were in their original state. In European countries, as well as in all parts of the United States, we find farms that once were abandoned because the soil fertility was exhausted; it did not pay to farm them. As a last resort, dairying was introduced and the fertility was restored completely. Many of these farms are even more fertile today than they were in the beginning; and so long as dairying is carried on, they will continue to increase in fertility and productive power.

*Grain Farming Exhausts the Soil; Dairying Does Not*—In grain farming the fertility is removed from the farm by selling the grain. According to Professor Woll of the Wisconsin experiment station approximately \$8.35 worth of fertility is removed from the soil with the sale of every ton of wheat. With every ton of corn that is sold approximately \$6.50 worth of fertility is removed from the soil.

But in the case of dairying—where butter is made on the farm and where all the by-products are fed to pigs and calves—we find that only 36 cents' worth of fertility is removed in each ton of butter produced. The commercial value of a ton of wheat at 75 cents per bushel is approximately \$24.75; but the commercial value of a ton of butter



A GUERNSEY BULL RICH IN DAIRY QUALITY

Guernsey cattle are considerably behind the Jersey in numbers, but those who know the breed are its staunchest supporters, because of the splendid qualities they possess.

at 25 cents per pound is \$5,000. Hence, for each \$100 worth of wheat that is sold from the soil \$34.50 worth of fertility is removed from the farm, but for every \$100 worth of butter that is sold, 7 cents' worth of fertility only is removed.

This vast difference between wheat raising and dairying is explained in this way: A cow is fed a ration, say, of alfalfa and corn. Both the alfalfa hay and the corn have been raised on the farm. When consumed, the cow has assimilated approximately  $10\frac{1}{2}$  per cent of the fertilizing elements. The remaining  $89\frac{1}{2}$  per cent go back to the soil in the shape of manure. Of the  $10\frac{1}{2}$  per cent of fertilizing elements that are retained by the cow, about three-fourths go to make milk, and one-fourth to the maintenance of the body.

In the case of butter made on the farm: The milk is separated; its analysis shows that 90 per cent of the fertilizing elements of the whole milk is found in the skim milk; hence, cream and butter remove but ten per cent of the whole amount. But the skim milk is returned to the farm and is fed to pigs and to calves, which utilize a part of these materials for building up the body; the unused part passes on to fertilize the land.

*Dairying Is a Fat-Making Process*—It may be said that dairying is a sort of fat-concentration process. That is to say, the resultant product, which is butter fat, is distilled from corn and alfalfa hay (and from all other materials used as food) through the agency of the dairy cow, the cream separator, and the churn, by means of which the distilling process is carried on.

Butter fat, from a chemical standpoint, is a concentrated form of heat. The heat comes from the



CLEAN MILKING IN A SANITARY STABLE

In the crusade for clean milk, the filthy stable has been condemned and in its place is coming the modern cow barn which contains much light, plenty of fresh air and sanitary fixtures.

sun, in the first place. It is then taken up by growing plants—such as enter into feeding rations—and made into palatable products for the cow; made into products that satisfy hunger, and produce heat and fatty tissue in the body of the animal. Speaking strictly, this is one way by which man can sell concentrated heat for butter prices. Now, if the dairyman harvests hay and grain as feed and applies nothing whatever to the land to replace the fertility withdrawn, he will gradually reduce the fertility of the soil; but the process of tearing down will be slow. In 20 years a wheat farm may be worn out by continual cropping; but to wear out a dairy farm to an equal degree 9,720 years will need to pass. Wheat raising makes swift work in ruining lands; but dairying preserves them.

*Dairying Remakes the Soil*—A great source of profit in dairying lies in the fact that it remakes the soil. When you purchase feed for the cow that more milk may be produced, you add fertility to the land. Such feeds as linseed meal, cottonseed meal and bran are exceptionally rich in fertilizing elements. It is not unusual to purchase elements of fertility more cheaply in the form of feeds than in the form of fertilizers. And the feed is paid for by the milk; the milk pays also for the labor and allows, in every case, where attention and care are given, a fair margin of profit. In this way the fertility of the soil is restored at practically no cost.

While soil building can be accomplished by using other classes of animals, it is, however, a fact that the dairy cow produces more real fertility than any other farm animal. A cow weighing from 1,200 to 1,300 pounds, if fed to produce milk, during the year produces about 2,800 pounds of manure.

Nearly one-half of this is liquid and should be saved, for it is exceedingly rich in fertilizing elements. But right here comes a great loss to the average farm. The liquid manure gets away from the land which would not be the case were it guarded as its importance merits; for liquid manure is even more valuable than the solid manure; and if proper arrangements are made, it will take care of itself, and will not only fertilize the soil to which it should be passed, but it may be used for irrigating the land at the same time.

This can be done by means of a septic tank if the gutters in the stables are properly constructed so as to allow it to pass into the septic tank. When there, it ferments and later is discharged, through a system of tile drains, onto the land, where it becomes distributed into all parts of the soil. The solid manure can now be hauled onto other fields with half the labor that otherwise would be required, and all the fertilizing constituents in the manure can be completely recovered and restored to the soil.

The loss of manure ought to be guarded against with zealous care; certainly as much as is given to guarding against the loss of any other farm product; for it must be borne in mind that the manurial value of feeds like bran, after it has passed through the cow, is worth \$10.50 per ton; of red clover, under the same conditions, approximately \$7.30 per ton; of linseed meal \$16.77 per ton; and of cottonseed meal \$19.70 per ton. This bears out the statement, made elsewhere, that the fertilizing elements in manure are governed by the feeds that are fed to the cow. Hence, rich feeds make rich manure; poor feeds, poor manure and little product.

*Dairying Is Behind Rich Lands*—Dairying sets

in motion the processes that make rich lands; that make plant food available. Your land may contain an abundance of plant food, but it may be unavailable as food. Dairying will set the strings going; it will produce the food for plants in a soluble way and in abundance. Suppose you are served a cup of tea. You taste of it and find it is not sweet; but you are told that sugar has been added and you should stir the tea; it now becomes sweet. The sugar, in this case, remained at the bottom of the cup and was not available until thoroughly stirred and dissolved; until then there was little sweetening effect.

So it is with soil fertility. Until it becomes soluble it is not food for plants. Manure has a disintegrating action on fertilizing compounds; it sets free the plant food.

*Dairying; a Balance in Fertility*—An illustration may now be in place to show the important role that dairying plays as a soil builder in the realm of agriculture. Let us assume that a man purchases a farm of 100 acres for which he pays \$100 per acre, the whole amounting to \$10,000. In this case, he invests his money in soil fertility, from which he desires to draw interest just as he would were he to deposit his money in a bank.

We will now assume that wheat is grown on the farm on the entire 100 acres and for 20 years, the rate of production being 16 bushels per acre, which, according to statistics, is a high average for 20 years of continual cropping on good soil without the addition of chemical or stable manures. At 80 cents per bushel, the entire production of wheat, at the end of 20 years, will amount to \$25,000.

But there is still another side: With each ton of wheat there goes \$8.35 worth of fertility; with

the entire yield for the 20 years there goes \$8,832 in fertility—leaving \$1,168 only, out of the entire original investment. Instead of simply drawing interest on the capital invested, there has been drawn nearly the entire capital. On the face of the purchase 88 per cent of the original investment has been withdrawn by 20 years of continual cropping.

We now will assume that instead of wheat alone, a dairy herd of 15 cows is maintained in connection with wheat farming and that all the grain fed to the cows is purchased and that the manure is carefully preserved. It has been determined that a cow produces 14 tons of manure per year; but since there is always some waste, we will say that ten tons only are recovered, each ton of which is worth \$2.95 per ton, as actual crop-producing experiments have shown to be the case. On this basis of valuation the fertility from the 15 cows will be worth, annually, \$442.50, or \$8,850 for a 20-year period.

Besides the value of the fertility, there is to be added to the gross receipts of the farm \$18,720, received from the sale of butter fat, and \$3,600, the value of the skim milk; and these have paid for feed and labor, and some is left for profit. If the manure has been cared for and distributed properly over the soil, the 15 cows in 20 years have replaced the \$8,850 worth of soil fertility that was removed from the soil by the 20 crops of wheat. Hence, 15 cows are able to balance the soil fertility that is removed in growing 100 acres of wheat.

Combined with dairying, wheat growing can be carried on indefinitely without the loss of fertility.

In other words, interest, and not capital, is withdrawn in this farming operation. Consequently, the full crop-producing power is maintained and an increase of \$18 in plant food is added to the soil. If 20 cows are kept on this land, the crop producing power of the soil will be improved to the extent of \$3,000. Therefore, the farm daily



#### THE NEW WAY OF MILKING

The milking machine is gradually being improved, and before many years will be a fixed feature on every commercial dairy farm.

grows in value; it adds quite a little to the capital invested in the plant.

#### WHAT A DAIRYMAN SHOULD BE

It is a trite but true adage that in all sorts of farming "there is more in the man than there is in the land;" and this applies in the most forcible manner to the dairyman. For he must not only be a skillful farmer, but a good judge of cattle; a

careful, cautious man, and habitually regular in his habits; endowed with the virtues of patience and perseverance, and good, sound, common sense; he must be studious, of a retentive memory, and able to judge wisely as to points of his business which may be in dispute; a good business man, and of a certain refined disposition and habits, and exceedingly neat and particular in his person. All these characteristics are indispensable for success in his vocation, and for the following reasons:

*A Skilled Farmer*—He must be a skilled farmer, because he must grow a large variety of crops, and make his soil exceedingly productive by the aid of the large quantity of manure he may make and gather; and he must expend the crops he raises in the most economical and effective manner. He must understand well the character and uses of the different kinds of soil, so that he may select the best suited for his purpose; and he must know how to manage such land as he can best select or procure with the greatest effect and success. His profit depends upon the raising of large crops, and those of the most valuable kinds for feeding; and he must thoroughly understand the different modes of culture for grain, grass, root and fodder crops.

*A Good Judge of Cattle*—He must be a good judge of cattle, because the cows are the tools of his trade, and without the best tools, no good work can be done. Moreover, there is such a large variety of breeds, and such a great variation in the quality of cows in use for dairy purposes, that without good judgment, and some accurate knowledge as a basis for the exercise of judgment in this respect, a dairyman would be at a loss how to make a proper selection, and would be very apt to make a serious and perhaps ruinous blunder at

the outset. There are exceedingly great differences in cows, and yet, as a rule, good cows are easily distinguished from poor and unprofitable ones, and the distinguishing marks and characteristics should be well known to the dairyman who expects to make a profit from them. So, too, he should be able to choose the most promising calves from which to replenish his stock, and also to choose a good sire for his calves, that he may steadily improve his herd in character and value. It is also indispensable for full success in the dairy that the dairyman should be able to judge of the character of the cows he is feeding, that he may discard those which are not profitable and keep only those which pay the best for keeping; and while there are certain accurate tests by which they can be ascertained, yet it is a valuable acquisition for a dairyman that he can tell at a glance which cows of his herd are the best and which he had better get rid of as soon as practicable.

*Broad Executive Ability Necessary*—Carefulness in every detail, cautious supervision over his stock, and in every little matter which calls for change or modification of method, are necessary qualifications in the dairy. A thousand small things are coming up at times which need foresight to guard against, and caution to avoid or evade. There are so many contingencies which are to be apprehended constantly, and so many accidents continually threaten to occur in this most intricate business, that unless one is naturally inclined to be careful in every matter of management, the accidents which will surely follow will be sufficient to rob the dairyman of his profit. For instance, a gate may be left open, and the cows thus get into a luxuriant clover field, become

bloated or otherwise injured, and some of them permanently ruined; or a cow may be left unfastened in her stall and spend the night in roaming about the stable, molesting the other cows and perhaps injuring or even killing one or more of them. The feed box may be left open and the loose cow may be found dead in the morning from overgorging herself with the feed. The water trough may be permitted to overflow on a cold day and an icy spot thereby formed upon which the cow may slip and fatally injure herself. The root cellar may be left open and the roots become frozen, and this stock of an indispensable feed be lost. The water trough may be leaking and the cows may go without a supply for the day, and half the day's milk be lost. And so on all through the daily routine of work there are so many chances of damage which are to be avoided only by the exercise of great care and constant caution.

Regularity, too, in every detail must not be neglected. It is one of the rarest attributes of a man, to be constantly regular to hours and minutes, and to methods. And yet it is of the utmost importance in the dairy. A cow is a machine for making milk and butter. This fact should never be lost sight of. And the cow must be fed and watered, and supplied with every attention; milked, turned out and turned in, protected from storm and weather, and in every way managed with perfect regularity. She is an accurate time keeper, and if her feed is late she frets, and fretting wastes milk, and the milk loses cream.

*A Dairyman Must Be Patient*—Patience, perseverance, and good common sense are requisite for success in the dairy. From the training of a calf to the last operation in dairying, patience is called

for. The calves and cows should be well trained, and made docile and good natured. This cannot be secured unless the trainer is a patient man, able to control his feelings, and quell any rising anger stimulated by some accidental mischance. Impatience will make cows vicious, and their owners, at times, brutal. An accidental movement made by a cow, when the milker is careless or incautious, may cause a pail of milk to be upset. An impatient man will kick or beat the cow for his fault; for, as we have seen, he should at every moment be on his guard for such accidents, and always ready to avoid them. We should remember that the man is the reasonable animal, able to exert self-control and to think, while the cow has only a natural instinct, and that alone makes her suspicious and always on the defensive against danger or attack. An unguarded, hasty approach may cause a cow to kick or attempt to do it instinctively, and to avoid all such dangers the dairyman should, as we have already shown, be exceedingly cautious; but when they occur, the greatest patience is to be exercised. Cows should be pets, without fear, and with affection for their keepers; they are then most profitable to their owners; and to bring them to this desirable condition of docility the dairyman must exercise great and constant patience with them.

Perseverance and common sense will enable one to surmount difficulties and to apply proper remedies for them at the right moment. Dairy work is full of risks, and as few persons are able to meet with every contingency until they have long experience, it is necessary to persevere in spite of disappointments, using good common sense to make the

lessons learned from time to time available for future service.

*Always a Student*—A dairyman must be studious, and remember what he learns, applying his gathered information to the better working of his dairy. There is no other business connected with agriculture which is so intricate and involves so



#### BUSINESS-LIKE DAIRYING

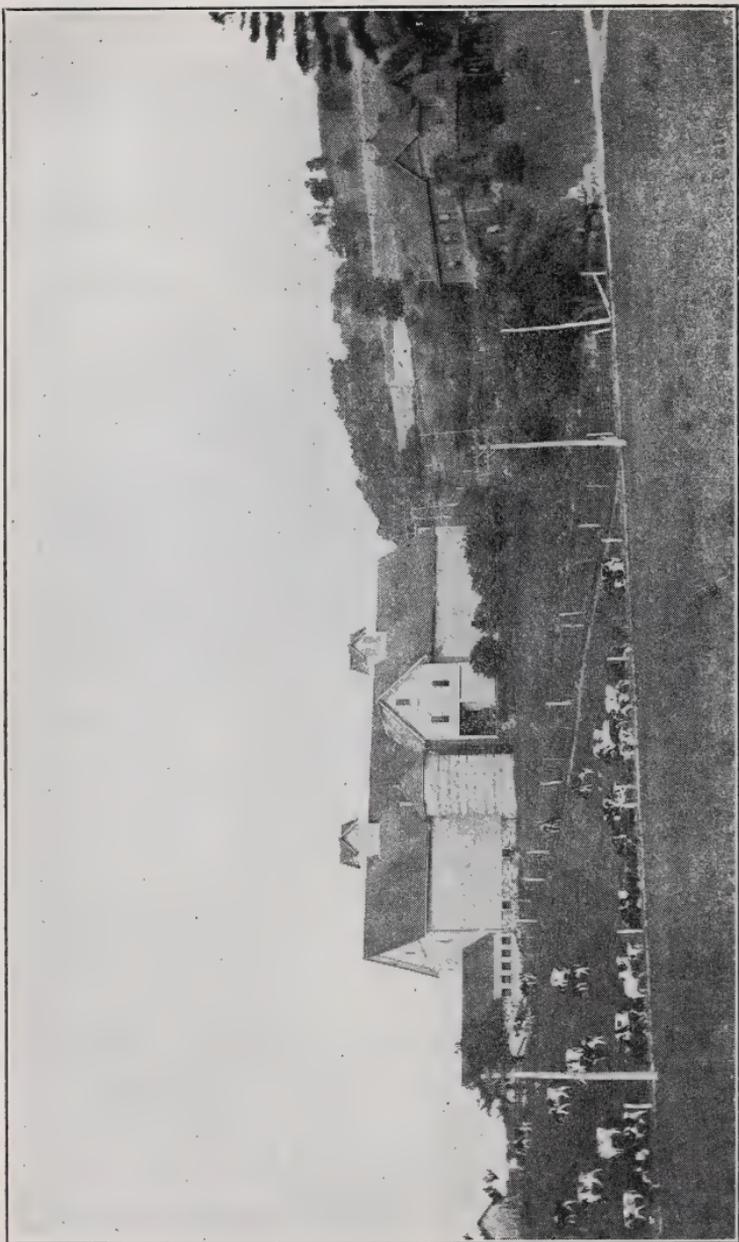
The up-to-date dairyman is a business man in every sense of the word.

many uncertainties, or which requires such constant applications of special scientific experiment and of careful personal investigation and practice; and to meet successfully all these and other requirements of his work, a dairyman must have at least a fair knowledge of dairy literature, and know what other dairymen are doing, and what is done at the numerous experiment stations and by private investigations. At least he must have a

good handbook or manual for reference in case of need, and must not be averse to learn something from every possible source of information. Besides, one man alone is weak and helpless, and knowing this, the dairymen have formed associations for mutual help and information. It is very necessary, then, that every dairyman should make himself competent to discuss at these meetings such questions as may arise, so that from a multitude of counselors he may find safety from the difficulties which he meets constantly in his daily work.

*Must Be a Business Man*—The dairyman must be a good business man, and make himself acquainted with the ordinary principles of business; able to keep accounts, and discipline himself as much as possible in the strict rules of regularity and promptness which conduce so much to success in any avocation. He is a manufacturer as well as a farmer; a purchaser and a seller in the markets, and should, therefore, keep himself acquainted with the markets, and should habituate himself to weigh and measure accurately everything he buys, everything he produces, and all that he sells, keeping strict account of all these matters. Otherwise he cannot tell where he loses and where he makes a profit; he will not know an unprofitable animal from a well-paying one; he will not know which are the best and most profitable crops to grow for use, or the best foods to purchase; he will be groping in the dark all the time, and must necessarily suffer in pocket from his want of accurate knowledge of his business.

*Must Be a Gentleman*—Lastly, he should cultivate a certain refinement of manner and disposition, a kind, considerate and thoughtful habit,



A WELL-KEPT DAIRY FARM

and, above all, practice the most thorough neatness and cleanliness in his person and manner. These requirements should be so constantly cultivated that they will become a second nature, an instinct which is so thoroughly and completely a part of the man's character that they come into action spontaneously and without thought or effort on his part. For instance, the treatment of his cows should be instinctively kind and gentle, and the dairyman must so train himself to this habit, think it so often, and make it so much a con-



MILKING-TIME

scientious duty and a regular system of action, that he will never be tempted to act otherwise. Mr. Harris Lewis, President of the New York State Dairymen's Association, once remarked in reply to a question as to how cows should be treated, that every man should treat a cow as he would a lady; that is, with as much consideration for her comfort and happiness, and with the same gentleness and politeness. Politeness is simply the essence of thoughtful kindness, and this every dairyman should accord to his cows as a matter of common habit. Cows so used will well repay the favor, and in turn, become kind and gentle, and never

exasperate or annoy their owners with the common and troublesome vices of cows. Perfect cleanliness should be made a constant study, until it is so thoroughly a part of the daily life that a dairyman would no sooner milk a cow or handle milk or butter, or go about the work in the dairy in an unclean condition or manner, than he would put a dirty hand to his food, or go to a social gathering all unwashed and with clothes reeking with filth. This scrupulous cleanliness is indispensable in the dairy, and it should be so made a part of the nature and disposition of the dairyman by constant self-training, that it will naturally apply itself to every part of the dairy work—the care of the stables, the management of the cows, frequent carding and brushing them, the washing of the udder when necessary, but always the wiping of it with a wet sponge or towel, the cleansing of the utensils, the careful protection of the milk from everything which would make it impure or offensive, the situation and care of the milk house, the manner of milking, churning and preparing the butter, and every other of the various details of the work. In every way the most constant and perfect cleanliness being necessary, this habit must be so thorough and strong that no effort will be needed to accommodate one's self to it, and, therefore, it must be made a part of himself by every thorough and successful dairyman.

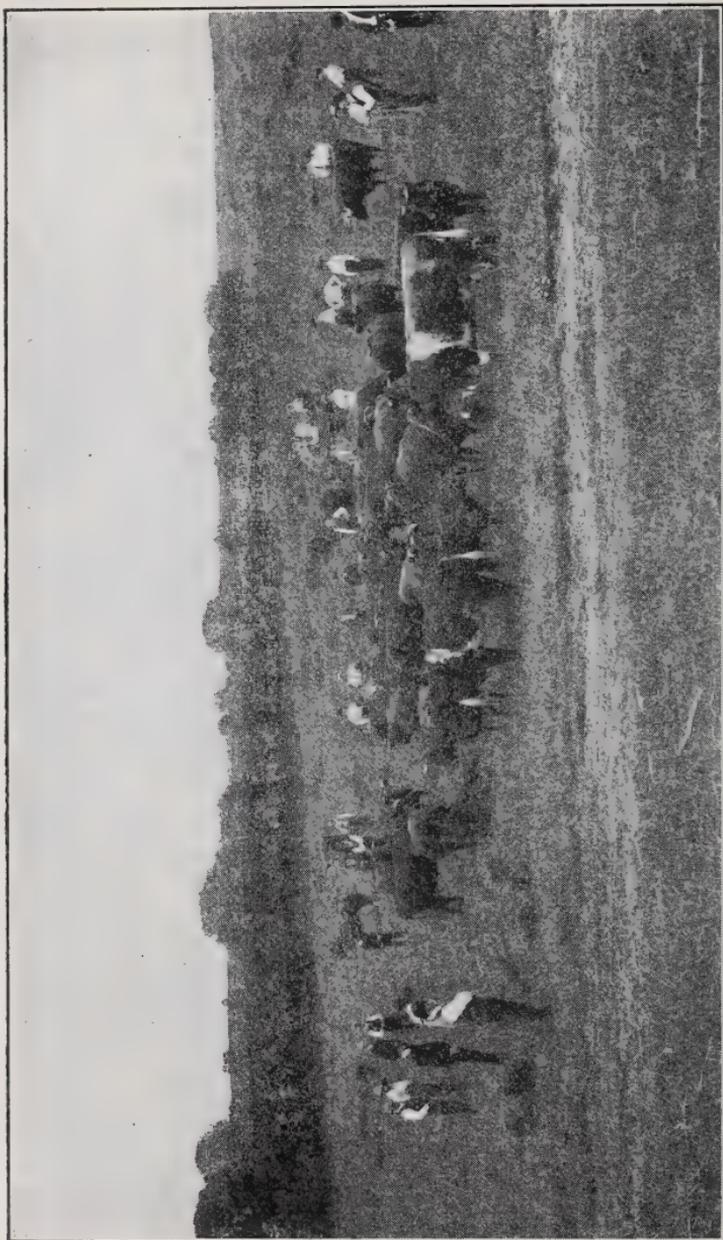
## CHAPTER XIII.

### **The Business of Beef Making**

The making of beef is one of the large farm industries and calls for much capital, great skill in breeding and feeding, and constant attention to details. Beef raising has had its ups and downs; at some periods profitable, at others a losing venture. Even the cattle kings in the older days had many losses as well as good profits, at times. The demand for beef is always equal to and sometimes in excess of the production; and this is more likely to be true in the future than it has been in the past.

The control of prices in the sale of beef has brought about much hardship to the producer. Whether co-operative slaughter houses and sale yards will be things of the future only time can tell. However, there is certainly now too large a difference between the cost of the live animal and the cost of the product to the consumer. Either the consumer pays too much or the producer gets too little. The simple fact that a number of large slaughtering houses have been built up, bringing their owners immense profits and incomes, is enough to indicate that the margin between production and consumption is too large.

One of the first essentials in the business of beef making is the right sort of stock. The manufacturing animal should be a good beef-making machine. If you have primitive live stock, you certainly cannot expect very large profits. Delicate machines produce high-grade work. Finely



THE BUSINESS OF BEEF MAKING

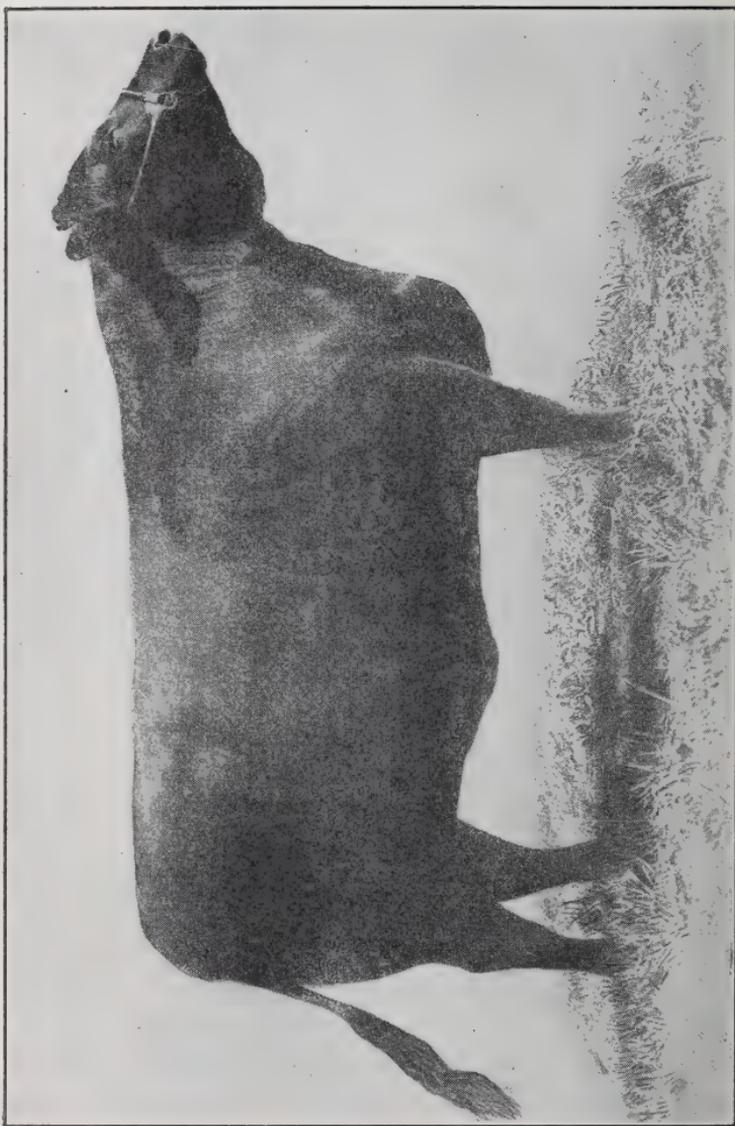
bred and carefully attended animals are profitable; and just in proportion as the owner is skilled and trained in the art of right breeding and right feeding, will he succeed in the production of beef animals that pay. A scrub beef cow is a failure and has been so for a long time. She is an old-fashioned beef-making machine; she is out of date; she is too slow in doing her work; and when that work is done its quality is often so poor as to be unsatisfactory to both producer and consumer.

Then you must know about the market requirements. Too many men insist on growing beef to suit their own ideas and pay no attention to what the market requires; hence, when they sell their stock they must take what they can get. Not only should you study the best market from the standpoint of your locality, but study the best market from the standpoint of the class of beef you raise. This refers to breed, to size of finished animals, and to their general quality.

### LEARN TO JUDGE CATTLE

There are several reasons why the feeder should be able to judge cattle. Every steer is not a good feeder and a poor feeder in a herd cuts down the profits. The good judge knows which steers will utilize their food to the best advantage, and his herd is composed of cattle which will put on flesh rapidly. Some experiments have shown that pure-bred cattle can be fattened on less than the poorer grades, while, on the other hand, many scrubs are found that will make larger gains than thoroughbreds, on the same amount of feed.

Reasoning from these facts, the feeder who knows just what degree of purity will make the



A PRIZE-WINNING ANGUS

best feeders, and who can pick from the cattle of low breeding those that will make the best gains, has a great advantage over the man who cannot distinguish between good and bad feeders.

The success of the feeder depends as much upon the kind of cattle bought, and the price paid for them, as upon the way in which they are fed. It is evident that, if a stockman buys inferior cattle and pays a big price for them, he will not make a very great profit on them. The buyer should know when, where and how to buy, and, more important, what to buy. The time of year at which the herd is to be marketed influences the kind of cattle demanded.

*Christmas Beef*—An example of this is the demand for beef of fancy quality at Christmas. If a feeder intends to market at that time, he should buy feeders of fancy quality. To be able to do this he must know what degree of quality is required, and what kind of cattle will finish in a fancy condition. During the feeding period, the feeder should be able to determine the exact condition of his herd. If his animals are not making the proper gains, the feeder should at once detect it, and change the ration. The expert judge knows just when to add more roughage, or when the feed does not contain the proper amount of carbonaceous or nitrogenous food.

Another very important thing that the good judge knows, is that he is able to detect disease and unhealthiness in cattle. The man who buys diseased cattle has a poor chance of making any profit. Unhealthy cattle do not make profitable gains, and are as objectionable in a herd as the poor feeder. The purchase of one diseased animal may cause the infection of the entire herd. If disease

comes into a herd during the feeding period the feeder should be able to detect it, and separate those affected from the rest of the herd.

*Study the Requirements*—A feeder learns to be a good judge by studying the requirements of a good steer. He must know what the form of a steer should be, low-set, deep, broad and compact, rather than long-legged, gaunt, narrow and loosely put together. The broad, compact form indicates strong constitution, and the low-set animal is usually a good feeder. The top and underline should be nearly parallel and the flank and twist low. Cattle having prominent hips, tail, heads and shoulders should be avoided, as smoothness of outline is essential.

The quality depends very much upon the breeding of the animal, and the market class into which the steer shall go depends largely upon the quality. Good quality is indicated in a smooth, refined head, fine bones, and thin skin, covered with silky hair. The skin should be loose and mellow. Strong constitution is necessary if the animal is to make good gains. The rapidity of gains depends largely upon the amount of food that a steer can digest and assimilate, and a strong constitution is required to handle a large amount of food. Strong constitution is indicated by a wide, deep chest, long and well-sprung ribs, compactness of form and fineness of bone. If a breeder knows when an animal possesses these perfections, he can choose a herd that will be good breeders and money-makers.

### BABY BEEF

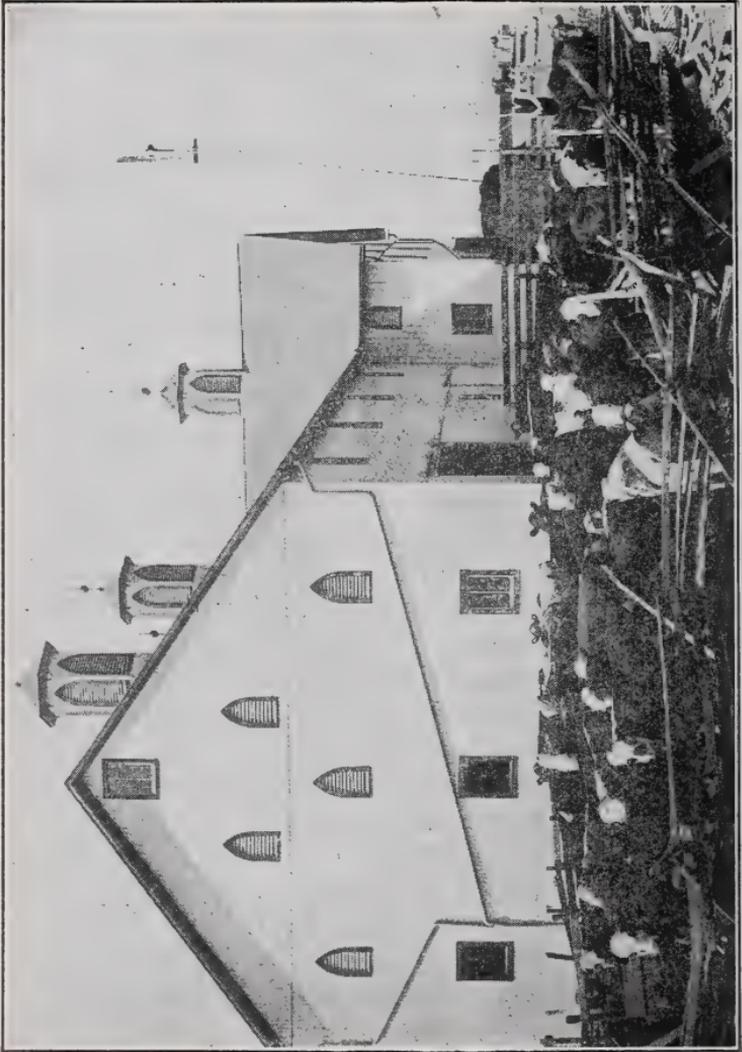
In the old days the idea was to raise cattle until they reached the age of four or five years and then to fatten them. The new idea is to grow beef,

starting with the young animals, that are gradually brought to the block at as early an age as possible. It requires a great deal of feed, much time and effort; and money is locked up for a long period if cattle are not sent to the market under five years of age. If they can be brought to nearly the same weight in from 15 or 18 to 24 months, all the feed for maintenance is saved, but half of the labor is expended, and the money is used but half the period. These are important considerations in growing beef or live stock of any kind.

The raising of baby beef is somewhat of a difficult and complicated specialty that has grown up within the last few years. Of course, in this business there is no chance for scrub animals. Only highly bred individuals that possess good quality, good health and the right type need be entered into the race of baby beef making. Now baby beef is coming to be the rule. It is the sensible kind of beef to raise. It is obvious that the sooner an animal can be brought to a market condition, the greater is the profit. The quicker stock can be grown and fattened for the market, the greater the profit and the more satisfaction to the producer. Many experiments have been conducted in the beef-raising section which all point to the greatest success in the production of baby beef. But this style of farming requires just a little more skill than the old style. Better feeds must be used, they must be fresh and palatable and they must be presented in a way that the animals will eat the largest possible quantities.

### SHELTER

Several experiments have been made to determine if shelter is necessary in the production of beef.



A BUNCH OF FAT CATTLE

The results indicate that an open shed is preferable to either a closed barn or an open barnyard. In stall feeding no better results were obtained than where fed out in the open with exposure to all kinds of weather. The best results are obtained by allowing the run of the yard with shelter provided so that during the cold rains and snows the animals may get in out of undesirable weather. A small amount of exercise is good for the health, and not enough to cause any loss in feed.

### FINISHING STEERS IN THE SPRING

After being fed all winter on dry foods, which, to a certain extent, become monotonous to the fattening animal, steers will frequently eat but little else when turned suddenly upon fresh pasture. Unless they are kept off the grass for all but brief periods during the first weeks, there will be a checking of growth due to the fact that the succulent grass has disordered the digestion of the animals. At the same time they will consume more of the fresh, palatable grass and will not eat enough of strong nitrogenous or fat producing foods.

*Do Not Give Pasture Exclusively*—This calls for careful regulation of the diet of the growing steer when first put upon the green pasture. They should be allowed enough palatable mixed feed to take the edge from their appetites, so they will not feed heavily upon the grass when turned out. It has been found that a good feed of mixed grain, early in the morning, will serve this purpose best. If the steers are then turned upon the pasture, they will not overfeed on the green forage. At this time the concentrated meals and ground grains are not as good as properly mixed whole grains, for

the reason that if these are fed in addition to the already extremely laxative fresh grass, the animals will be checked in growth.

A balanced ration cannot be said to be furnished by early spring grass alone. This early growth is large succulent grass containing practically no nitrogen or fat-producing matter. For this reason considerable corn with some dry alfalfa or clover hay or some of the small grains should form a part of the morning ration. The well-mixed feed composed of grain, such as oats, barley, rye and corn, is, at this time, to be preferred above one formed chiefly of corn.

### FATTENING STEERS IN SUMMER

It is a significant fact that many extensive feeders, especially along the borders of what is known as the bluegrass region, have turned from bluegrass to the clovers, or a mixture of the same with timothy or broom grass. They believe that the net returns in beef per acre are thereby enhanced and the crop rotations of the farm better provided for.

The permanent bluegrass pasture has many advantages of its own; but in many localities in the latitude of central Illinois and northward, large yields of such pasture are precluded by conditions of soil or climate. In this event, it is but the part of wisdom to replace it by that grass or legume crop which will contribute most largely to the annual net profit of the farm and to the advantage of the live stock thereon. Unproductive pasture land is certainly one of the largest leaks in the farming and animal husbandry systems of the central west at this time.

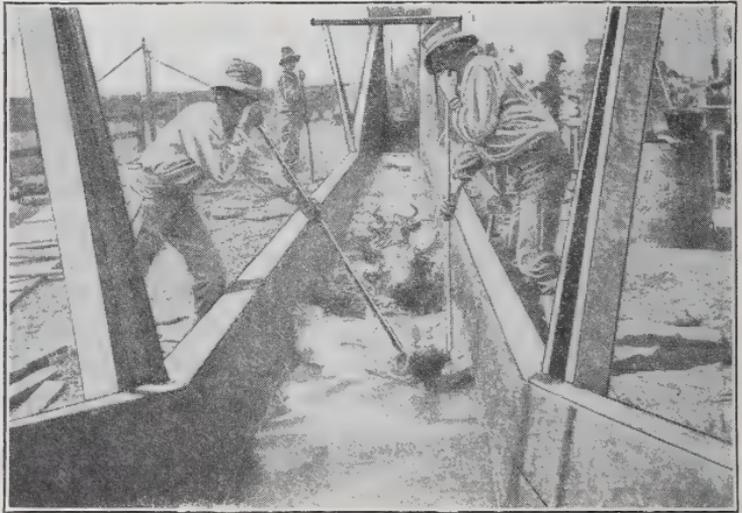
One common mistake in the handling of pasture lands is that of supposing mere grazing to be the means of keeping up the fertility of the land. If the cattle have their feeding, bedding and watering places apart from their pastures, the fertility they take from the land will be deposited about these places. This results in a removal of plant food almost as marked as if hauled off in the form of hay. The mechanical application of manure to the pasture in that case becomes of importance equal to that of the fields devoted to several crops.

As to the grain rations advisable for finishing steers on grass, we may note, in the first place, that the amount of grain fed should be governed largely by the relative cost of grain and grass. That is, when grass is cheap and corn dear, it is good practice to utilize the former to the greatest possible extent consistent with the production of a satisfactory marketable product. If the quickest finish is wanted, the appetite of the steers is the best guide to follow. They will commonly eat 17 or 18 pounds of corn per 1,000 pounds live weight, or about the same amount as in winter.

If fed a full grain ration, about one-half as much pasture area will be required as on grass alone. Further, the question whether such a supplement as linseed-oil meal or cottonseed meal can be added profitably to the corn fed, must be answered conditionally with reference to the character of the pasture crop. With any of the clovers or other legumes the need of a nitrogenous supplement is generally doubtful, while with bluegrass, or still more markedly, with timothy, orchard grass or native prairie grasses, such feeds are of distinct value.

## BEEF CATTLE IN AUTUMN

The critical time with beef cattle is the period when grass fails and they are not yet taken into winter quarters. The reference is, of course, to cattle that are to be finished some time during the winter. To meet the emergency of a dry summer, the pasture provided should be in excess of the



A HOME-MADE DIPPING TANK

This dipping tank is always ready for use. An occasional dipping wards off disease, and plays havoc with lice and mange.

needs of the stock. Such pasture, though in excess, will not be wasted. What is not eaten in the fall will so protect the plants that early growth will follow in the spring, and this will probably more than offset any loss from uneaten grass. But even the most careful forethought will not prevent a shortage at such a time in a very dry season.

*Supplementary Food*—When pastures are short, supplementary food of some kind must be fed. If no increase was made during this period of shortage, all the food eaten would be lost in the sense that no direct profit would be made from it. Wise forethought, then, will provide such food. The form in which it is most commonly furnished is that of corn in the stalk, and in some areas sorghum. It is sometimes furnished in northern areas in the form of rape. When thus furnished, the cattle are introduced gradually to the rape to avoid the danger of bloating. They are allowed access to an old grass pasture at the same time to counteract the tendency to scouring. Where one has only a small bunch of cattle to carry, a few acres of rape will go a long way toward putting the cattle in high condition, providing the rape is well grown.

*How Corn and Sorghum Are Fed*—Of course, the feeding of corn may begin before the season has arrived for harvesting. But to harvest by hand, and feed from day to day, is laborious work. It is much easier when the corn can be harvested with the corn harvester and can then be drawn and spread over the pastures. Where the number of cattle is large there should be two pastures. The corn for one day's feed is thrown down on a fresh place each day on the sod, but only every other day in each field or inclosure. The cattle that are being led up to fattening take the choice from the food, and other store cattle eat up what is left. Swine, of course, glean also with the latter. Sorghum is cut and shocked like corn or is piled in heaps and is carried from these to the pastures or paddocks.

No additional grain is called for unless the cattle are to be made ready for the early market; that

is, before the end of the year. If more grain is called for it may be given most cheaply in the form of corn. But, of course, other grains will answer fed in the ground form. More commonly, it is not added to the food until the animals go into winter quarters. If farmers would only provide for it, the cheapest food that could be used would be corn silage. The idea is common that corn silage is only good for milk production. When the silage is made from corn that is well stocked with ears, it is even better relatively for beef production than for milk production when it is the chief factor in the ration, as it furnishes a ration much more nearly balanced for making beef than for making milk. Such food would meet the needs of cattle on short pastures better, probably, than any other. Think also of the economy of feeding the silage, because of the almost complete consumption of the stalk. Should the silage not be ready for a week or two at the first, corn in the stalk could be fed until it is ready. The feeding of the silage could begin the day after the silo had been filled.

It is a matter of much importance that cattle thus in process of fattening should be protected from cold storms. Especially is this important at night. During such periods they ought to be protected. Such exposure will greatly retard increase. No detail should be overlooked that will tend to promote their comfort. They can then be taken into winter quarters without any hindrance to progress from the change.

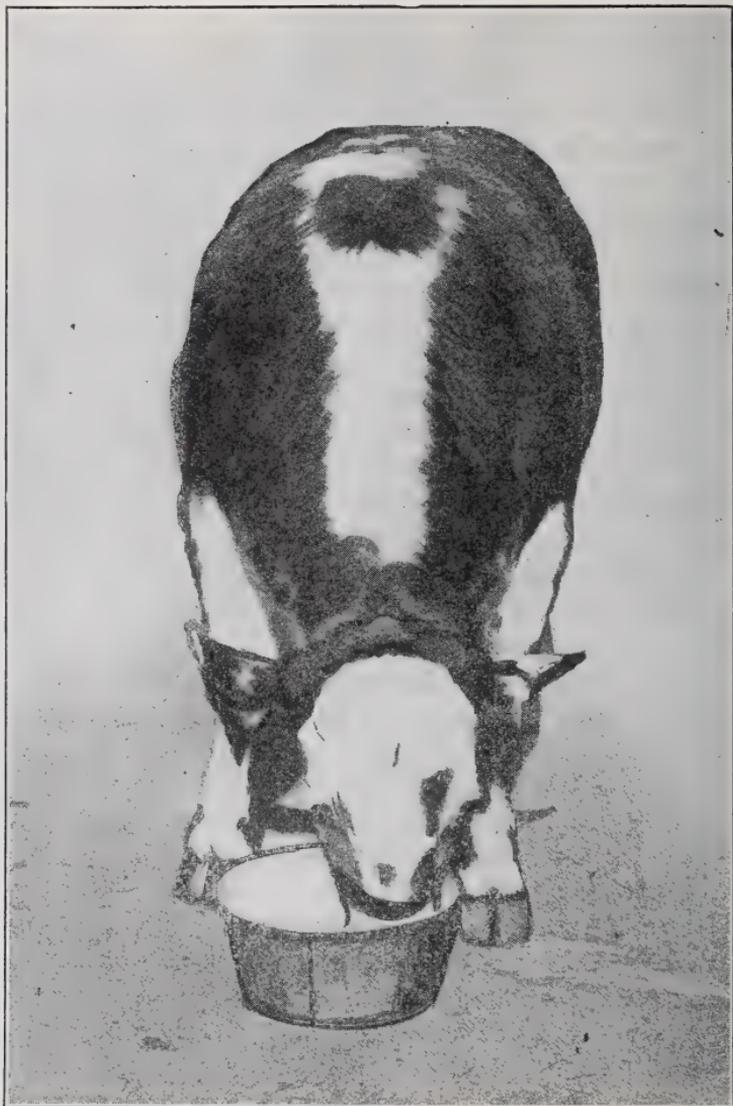
### SWINE FEEDING AFTER CATTLE

The plan of allowing swine to feed after cattle that are being finished on corn has become so common in the corn-belt states that to fatten cattle

successfully in any other way than in conjunction with swine feeding after them is looked upon as an impossible thing. That is to say, it is looked upon as impossible to make the financial end of the work come out right without making swine to glean among the droppings.

The plan of thus fattening cattle and swine in conjunction grew out of the exigencies of necessity. Corn was so cheap relatively in former years that it was possible to feed it ever so freely to animals that were being fattened. When corn was 10 to 20 cents a bushel, it did not matter much, though it was fed very freely to the cattle. If feeding a large amount fattened them quickly, that was the great consideration. It was of more consequence to rush the cattle in the fattening process than to try to save corn. Because of this, it became quite common to feed to a cattle beast of 1,200 to 1,500 pounds weight not less than 25 to 28 pounds of shelled corn per day. The animal so fed would probably gain  $2\frac{1}{2}$  pounds per day for the short feeding period of 100 days, and so much of the corn would be undigested that a pig gleaning after it would get enough, to produce, say, one pound of increase per day.

Putting the corn at 20 cents per bushel, the beef made at 4 cents per pound and the pork at the same price, the increase in meat would be worth 14 cents and the cost in corn would be but 10 cents. There would thus be a gain of 4 cents on the meat made in one day, also a further gain in the enhanced value of the meat, as shown by the live weight when the feeding began. This does not take into account the fodder fed or the cost of feeding, nor the value of the manure, which would offset both by such a system of feeding.



THE NEW IDEA IS TO GROW BEEF

*Influence of Changed Food Values*—The influence of changed food values is going to affect mightily such a system of feeding. Take corn at 40 cents per bushel. Suppose the gains in beef and pork are the same. Present prices will scarcely warrant putting the average value of the finished steer at more than 4 cents per pound in the feed lot, and the same is approximately true of pork. The cost of the increase in beef and pork in this case would be 20 cents, while the value of the same in the feed lot would be but 14 cents as before. Therefore, the loss would be 6 cents. To offset this would be the increased value of the meat each day that composed their original weight.

It is questionable if this would offset the loss referred to. Now, suppose corn went up to 50 cents, the prices of meat remaining the same, the chance for making a profit would be further reduced.

*What Must Happen*—It is very evident, therefore, that if finishing beef by this system is to continue, there must be modification somewhere. It may come in different ways. It may come first through the enhanced value of meat, or second, through modification in the system of feeding. It is evident that the present system is not attended with large profits as things are. The prices paid for meat must advance or the value of grain fed must decline. The margins at present are too narrow. When they become too narrow feeders must shut down, or at least curtail their operations, and this ultimately reacts upon those who supply the cattle. Now, food values are not likely to decline seriously. The trend of the level of food values is to go up as countries grow older, hence, if meat is to be grown in sufficient supply, it must become

more expensive; that is, it must become higher in the sense that the grower shall get more for it.

*Another Plan of Feeding*—It may be that another plan of feeding will be introduced. By this plan the corn and other grain will be ground. It will be mixed with ensilage and fed, or with other cut food. Instead of feeding each animal 28 pounds of grain a day they will be fattened on less than 14 pounds a day and the swine will be eliminated from the feeding. The gains will be somewhat less than two pounds a day on the average and the feeding period will extend over five months rather than three months. This system calls for more labor than the other, but the time is unquestionably coming when it will pay better.

It may be, however, that this time is not quite here. No one in Europe or Canada would think of feeding a cattle beast 28 pounds of grain a day. They would not think of doing so, because they could not afford it.

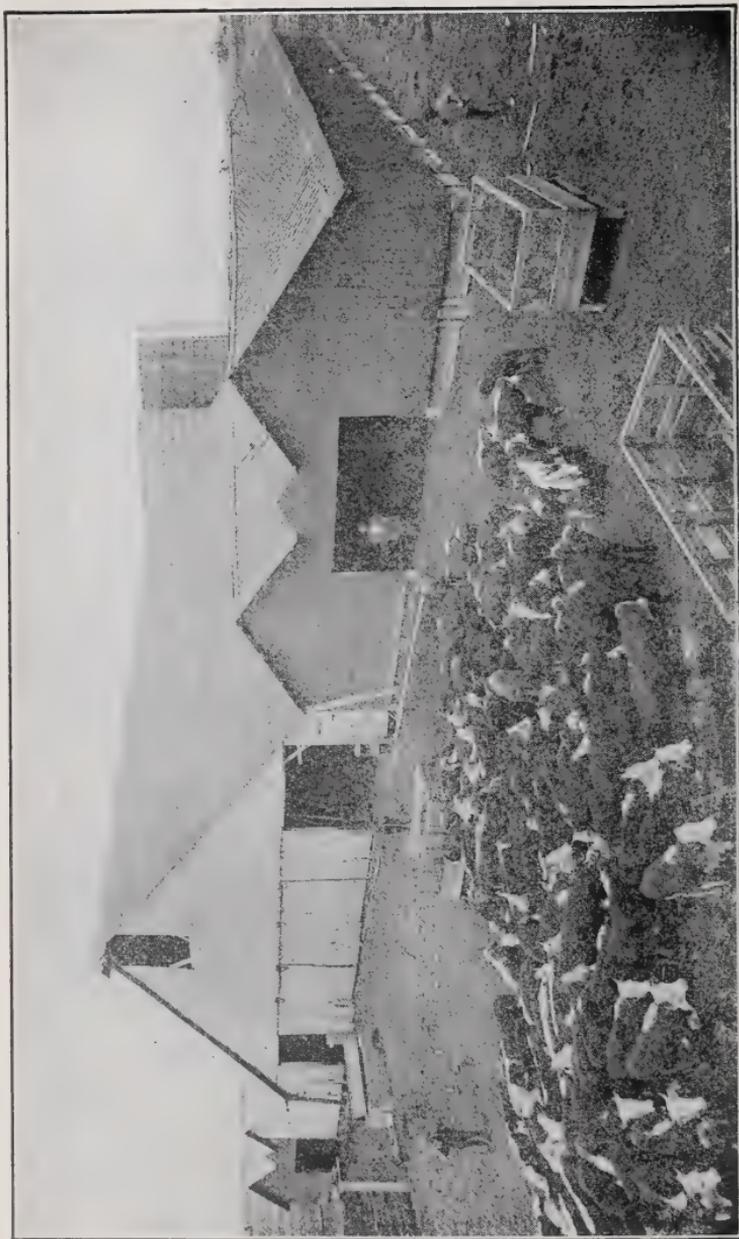
### FEEDING INFERIOR CORN TO CATTLE

The feeding value of inferior grades of corn is usually underestimated by the farmer who finds a lot of it on his hands. Consequently, he often sells it at a sacrifice to some neighboring stockman, whose experience has taught him that such corn is better than it looks. This is true of light-weight corn, which has matured too early by reason of drought, and it is true of soft, frost-bitten ears. The former is low in starch and oil, having been halted in its growth before the storing of these substances was completed; but the protein is there in nearly normal amounts so that the proportion of protein to other nutrients is greater than in sound corn.

*Good Gains on Frosted Corn*—Soft, frost-bitten corn, excepting its high percentage of water, compares favorably in composition with sound corn and its feeding value depends chiefly upon the amount of moisture it contains. In 1896 and 1902, when large areas of corn were damaged by early frosts, professional cattle feeders were able to buy at their own prices, below ten cents a bushel in many cases, all the corn they could use, and in most cases it was found that the steers fed out with as good gains as in normal years. It is not to be inferred that the highest finish can be put on choice or fancy feeders with soft, watery corn, but it is a fact that medium and good grades of cattle can be made about as thick and ripe as the market demands of these grades on a ration of soft and even moldy corn, such as the crop of 1896. Combined with hay at its present low price, it should be the means of producing beef at very low cost. Let unsound corn, therefore, be reckoned at its true value.

The class and grade of cattle best adapted to the circumstances is the most important matter to be decided by the farmer who proposes to convert his damaged crop into beef. Those who have to buy feeders will find that the prevailing cheap hay, plentiful grass and high-priced corn of this season generally favor the handling of yearlings rather than calves or two or three-year-olds, because they have the greatest capacity for utilizing a coarse ration to good advantage. The farmer is fortunate who can buy in his own neighborhood native yearlings suitable for feeding, but most buyers will have to look to one of the markets.

*Quality of Feeders Important*—Quality of feeders is the essential point in cattle of yearling age



WHERE BEEF IS MADE

Just back of the Hereford calves are seen the cattle barns, sheds and silos, all essential for profitable beef making.

whether they be natives or western range cattle. They should be started on feed while grazing on fall pasture, stubble or stalk fields, together with the best available roughage. They cannot be fattened most profitably under eight to ten months, and an effort to crowd them more rapidly will give disappointing results. Let ten or 12 pounds of shelled corn per steer be the upper limit during the winter. Regulate the ration so as to keep the cattle growing fast and fattening somewhat. A 600 or 700-pound steer started in October should weigh 300 pounds more before the opening of the next grazing season. They may then be full fed on grass for the July market or grazed over summer with little or no grain and fattened in the fall. This proposition, of course, requires pasture and a supply of good roughage like clover hay. It would be advisable only where a part of the corn crop matures sufficiently so that it can be kept over winter.

*Buying Feeders in Fall*—Supposing that a large amount of badly damaged corn must be disposed of in a short time, or that pasture or leguminous hay is lacking, the most suitable cattle to select are usually either heavy, fleshy feeders or some kind of thin butcher stock. Whenever medium or good grade, 1,100 to 1,250-pound, three-year-old feeders can be bought at feeder prices, they are the most profitable cattle that can be fattened; but they are difficult to find in the country, and can seldom be bought at conservative rates at the large markets. They must be thrifty, and not previously burnt out with corn. They can be fattened in 90 to 120 days, according to their condition and age. They may be started on shock or snapped corn, and should be on full feed after about three weeks.

Various kinds of butcher stock—cows, heifers, bulls and low-grade steers—will also be handled in large numbers this fall by experienced cattle feeders who wish to make a quick turn. Such cattle are especially suited to the man who is located near a large market, or who can pick up mixed lots of cattle cheaply in his own neighborhood. Little capital is required and such cattle can be handled with less care than any other class. For instance, a field of corn that is scarcely worth husking or shocking may be harvested by turning the cattle into it, gradually, of course, until they are on full feed. High prices of milch cows render the butcher stock proposition unusually safe at present, in view of the good returns that can be secured from cows or heifers that prove to be in calf. Some skill and experience in trading are necessary in order to buy cattle of this class worth the money.

*Best Methods of Feeding*—As to methods of feeding immature corn, it may be said that, on general principles, the simplest methods should be used; that is, the greatest profit is usually made by feeding it as shock fodder, snapped or husked ear corn. The silo, also, is undoubtedly one of the most effective means of extracting the full value out of such a crop as we are considering. Cutting damaged corn for fodder has an advantage over snapping and husking in that it keeps better in that condition. The degree of softness and the percentage of water contained must be considered in determining the way in which the crop shall be fed.

It is now settled that grinding corn does not pay, ordinarily, even though corn is high and though no hogs follow the cattle. Shock corn is

best fed by stringing it out on the ground in a dry yard, keeping the hogs out until the cattle are through eating. Feed half a shock a day to a carload of steers at first, increasing up to the amount desired at the rate of one or two stalks a day per steer. Nitrogenous concentrates, like cottonseed meal, linseed-oil meal, gluten meal and gluten feed, may be profitably fed, considering the price of corn. They are most effectively used when leguminous roughages, clover, alfalfa, cowpea hay, etc., cannot be obtained, as they take the place of such roughages to some extent; and wherever cornstalks, timothy hay or straw must be depended upon, the by-products named can usually be fed with profit.

### FATTENING CATTLE IN LATE FALL

Never in the history of all live stock feeding has the necessity been greater for the exercise of a prudent caution on the part of those who feed live stock than at the present time. The prices of coarse grains have run up to such a pitch that the greatest of care and judgment will be required to make any considerable profit from feeding cattle the coming winter. It would seem, therefore, to be the part of wisdom with those who have cattle in good condition to push them forward for the early rather than for the late market.

Where the facilities are present, there are two or three ways of doing this. If the owner has a good field of well-grown rape he can turn it to excellent purpose in fattening cattle in the autumn. He must introduce the animals to that kind of pasture with much caution. When once really introduced onto a rape pasture, they may be left on it,

but should have a chance to graze on a pasture not too distant in which the old grass and the new are abundant. Such a condition is frequently found in bluegrass pastures in the autumn. On such pastures the cattle should gain rapidly, even without grain. In the absence of a grass pasture, access daily to clover or alfalfa hay will have a good effect upon the digestion. Rape, soft and immature, will not be nearly so valuable for laying on



CATTLE FEEDING ON A WESTERN FARM

They have both quantity and quality in the West. In time these big herds will be broken up; better care will be given and a higher quality of product will result.

fat as rape that is well matured. When the rape begins to fail, it may be supplemented by shock corn, or in the absence of corn, by grain.

*Feeding Shock Corn*—This is one of the commonest and best ways of finishing the cattle where such food is to be had. There is no better way of feeding it than by strewing it on the pastures. The cattle will consume the ears and also much of the stalk. If two pastures can be had and the cattle are fed in these on alternate days, and if other

store cattle can follow, then the waste in the corn will be much reduced. It will be further reduced, if not entirely obviated, if the pigs can follow to glean amid the grain that shells. But in northerly areas it may be necessary to finish the cattle by feeding shock corn and hay, preferably clover, in the paddocks or sheds, and by adding some corn in the ear or shelled in addition.

*Finishing on Meal*—In areas where corn is not abundant, the cattle can be finished on meal, which at first supplements the pastures and later the fodders fed in the sheds. Such meal may be obtained from any of the coarse grains, as oats and speltz, or oats and barley, or it may be obtained from any one or two of these and ground millet. While the cattle are yet on rape or other good pasture, the feeding of the meal may begin, giving only two to three pounds a day at first, and increasing the quantity according to the needs of the cattle. Corn fodder or hay, or both, may, of course, be fed when the pastures begin to fail. Good corn fodder, quite equal to hay, may be grown away north and several tons may be obtained per acre.

*Protecting from Storms*—When cattle are thus finished in the autumn, they should be most carefully protected from storms, especially when accompanied by cold. Exposure to one storm will prove a hindrance to gain fully equal to the ordinary gain of several days. Ontario feeders aim to protect their cattle from exposure to the early frosts even, by giving them the cover of a shed at night. They give them a light feed of hay in the early morning before turning them out to graze. The practice is excellent, as it prevents them from filling the stomach with grass while still covered with rime.

*A High Finish Essential*—When cattle are thus finished in the autumn, a high finish should be sought; such cattle reach the market when it is flooded with common cattle, which affects the price. But the proportion of highly finished animals at such a time is not large; hence, if they have the finish, they will usually be in demand at fair prices. They should be marketed, as a rule, before poultry begins to arrive at the holiday season, otherwise they should be carried over until after the opening of the year.

Good cattle in fair flesh, say in August or September, may be finished as outlined above with more profit than by carrying them on into or through the winter. This cannot be done with lean cattle, as the time is too short to bring them to a high finish.

## CHAPTER XIV.

### **The Care and Management of Cattle**

The cattle-man, regardless of his line, recognizes that the most intimate association must exist between himself and his stock. It is positively out of the question to make a success of dairy cattle or beef cattle when the tender is not in close sympathy with and earnestly attentive to the animals under his charge.

The "animal knoweth his keeper." He who is abusive, rough and thoughtless is not a success. When you see a flock of sheep, a drove of hogs or a herd of cattle at the very heels of their master, licking his hands and clothes, you may know that there is a chord of sympathy and good will existing between the man and his animals. No slipshod attention and care will do.

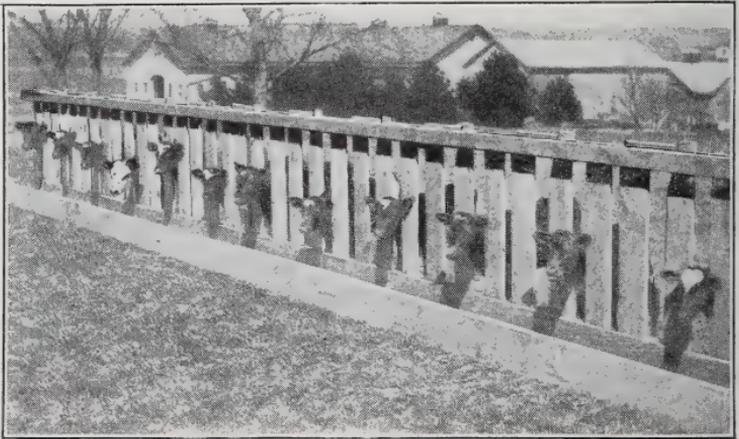
You must study the needs of your herd from day to day. You must feed and care for them according to each particular period in the lives of your animals; and you must be ever ready to make some sacrifice in some direction, if you would secure the greatest success in the raising of the stock, in the production of milk, or in the fattening of the steer.

Just as there is a constant changing demand for food from early calfhood to adult age, so must there be constant changes of management during the period of growth to maturity.

No general rule will apply for all classes of cattle. The scheme or plan of managing a beef herd will not be applicable to a dairy herd; and each

breed calls for close attention, in some single direction, to some particular point; consequently, each cattle raiser must thoroughly understand his herd, be in close touch with the market to which his milk or beef products go and give close attention to the feed of his section, the community and individual farm.

He must be conversant also with the drawbacks



#### JUST WAITING FOR SUPPER

This simple contrivance is much esteemed where many calves are fed and raised. Each gets its own ration, without fuss, confusion or fight.

or strong points of his own farm in its relation to the particular breed of cattle or to style of product he produces.

#### REARING CALVES ON SKIM MILK

A great many people think a good calf cannot be raised on skim milk. For many years our calves were such long-haired, stunted, little things we were ashamed of them. But we kept on trying until we had something to be proud of. After much reading

and experimenting, we have mastered the subject and now raise fine, thrifty calves. After letting the calf suck for three days we put it in a pen by itself and let it get hungry. Then, with three pints of its mother's milk, we teach it to drink; this may necessitate two or three trials. A total of only four quarts and a pint is given at first in three feeds. If the calf does not seem to be very strong, we give four feeds, the last at bedtime. It always gets new milk warm from the cow until it has a good start and is drinking well. This practice continues for two weeks.

*When to Begin*—At two weeks we begin to feed skim milk. A teaspoonful of flaxseed meal is mixed with half a teacupful of warm water and placed on the back of the stove a few minutes. This is mixed with one quart skim milk and one quart new milk, and fed three times a day, always at a temperature equal to blood heat. Now we have the calf taking two quarts three times a day. The new milk must always be sweet. We never overfeed; if the calf does not drink its milk up clean at once we take away what is left and give less next time until it has an appetite for three quarts three times a day; never any more. Overfeeding on skim milk always stunts a calf. Each calf is kept in a pen by itself. Since no two calves are alike, we are very particular to give his own ration according to his age. When each is a month old we begin to feed a little hay and a few oats or a little meal, thus keeping it growing thriftily. This method involves some trouble at times, but it pays.

### FEEDING THE DAIRY CALF

If strong and healthy, the calf should be taken away from the dam when two or three days old.



HOLSTEIN COW AND CALF

The calf should be fed whole milk for about two weeks; then add about one-fourth skim milk, and keep increasing it for a week or ten days, until the whole milk is entirely displaced by skim milk altogether. Frequently, with excellent results, a little flaxseed jelly can be used in the skim milk. Add this when beginning to feed skim milk; and even if the calf is a week old no bad results will follow.

To make this jelly, soak whole flaxseed in hot water. This is far superior for young calves to any calf meals used as a substitute for milk. If you cannot get the whole flaxseed, ground oil-cake meal, as found on the market, is a very good substitute.

At two weeks old, place a little whole corn and oats in a box so the calves can get at it—they soon learn to eat and relish it—as well as hay. With this system, calves do well at three weeks old on flaxseed jelly, grain and hay, with about one pint skim milk added to each feed, morning and evening, so as to give the jelly a milk flavor.

Do not allow calves to get fat, but keep them in a good, thrifty, growing condition. Get them to eat a minimum amount of concentrates. Continue this system with the calf until within three or four months of cowhood, then feed concentrates liberally so as to develop the milk-secreting organs for service after the birth of the calf.

### FEEDING MILK IN GOOD CONDITION

Many of the ills of calves arise from giving them milk in poor condition. At the creameries the vats are sometimes allowed to get in a very unsanitary state. They are not emptied and

scalded out with sufficient frequency, and sometimes washings from the utensils are dumped into the vats. In some instances the milk is drawn back and kept for a day or two before it can all be fed. It has time to become acid and otherwise deteriorate, and when fed in such a condition does not make a very good food for calves.

*Separator Milk is Best*—The best skim milk that can be obtained for calves is that which has been obtained from new milk run through the separator soon after it has been obtained from the cow. It is then fresh. It is of proper temperature, or nearly so, and is in its constituents almost as good as new milk for promoting growth. If the pails in which it is kept are scalded, then the danger from bacterial contamination is obviated.

The temperature at which milk is fed is a matter of much importance. Cold milk lowers the temperature of the stomach, and through it, the temperature of the body. Though no further harm be done, the lowering of the temperature of the body means more food, as, before any gain can result, the temperature must become normal, and this means that it is made so at the expense of food.

Milk, from what is known as the setting process, is usually, if not, indeed, always, below the normal temperature. If fed, therefore, at the normal temperature, it must be heated.

Sometimes it is heated by adding hot water. This dilutes it too much. Again, it is heated over a fire. This changes its properties somewhat, and is troublesome. Heat is added by pouring in hot gruel. This is as good as far as it goes, but does not go far enough usually. Hence, simple as the

problem of heating milk seems, it is not so simple after all.

### AMOUNT OF MILK FOR CALVES

The amount of milk for calves varies greatly with the capacity of the calf to take it. The amount recommended to be fed also varies greatly, some authorities recommending twice as much as others. With reference to this question it will be correct to say that during the earlier weeks of the life of the calf no adjuncts will be found superior or equal to milk. It is also true at the same time that as soon as calves can utilize other food to good advantage, it will be found cheaper than milk. It follows, therefore, that the calves should be given all the milk that they can digest properly until they can make good use of substitutes that take the place of milk.

But care should be taken not to overfeed milk, good as it is. This can be easily done. The indications of overfeeding soon show themselves in deranged digestion, and such derangement is commonly indicated by scouring. The moment that such an indication appears the amount of milk fed should be reduced.

It is very evident from what has been said that it will not be possible to name the amounts of milk to feed that will be suitable for calves of all ages, but it may be possible to state average amounts. It would seem safe to say that during the first week of the life of a calf it will safely take from six to eight pounds of milk, the latter quantity being fed at the close of the week. Strong, vigorous calves may take as much as ten pounds, but ordinarily the smaller quantity is the safer one. Then add one

pound of milk every week with the advance in the age of the calf until it is, say, ten weeks old.

### CARE OF CALVES AFTER WEANING

Subsequent to the weaning period, calves are frequently allowed to lose in flesh, thus, in a measure, losing the benefit that would otherwise result from careful feeding during the milk period. The food and care are not exactly the same with calves weaned in autumn as with those weaned in the spring.

Calves weaned in spring usually go on grass pasture as soon as it is ready. Such food is very suitable for them, and when it is abundant, no other food may be necessary. Usually, however, it is advantageous to keep up the supplement of grain, though it may be in lessened quantity.

The same is true of calves that are to be finished quite young, as when grown for baby beef, calves of the beef types or classes intended for breeding should be given a less amount, and those intended for milk production may fare well enough without any. No kind of meal supplement, probably, is superior to the following for summer feeding: Ground corn, three parts; ground oats, three, and wheat bran, one. If only one grain is fed, let it be oats.

### WINTERING YOUNG CATTLE SUCCESSFULLY

Four things are necessary to insure fair growth and good condition in young cattle during the winter. These are all within the power and reach of everyone to obtain if he so desires. First, shelter.

Since our timber has been taken away, live stock cannot be left out in open lots as in former years without suffering serious loss and discomfort. Where the owner has not sufficient barn room and is not able to build it, good shelter can be had by making straw sheds for the cattle with but trifling expense. Or, in the absence of straw, warm sheds may be made by using fodder for sides and roof and this can be fed in late spring when the danger of cold rain or snow is past. At any rate, sheds can and should be provided for them so that they may have protection in bad weather.

*Supply Plenty of Water*—Then they should have plenty of pure, clean water. Many farmers entertain the idea that stock cattle will not drink much in cold weather. This is a mistake. They are eating dry fodder, hay or straw, as the case may be, and they must have plenty of water to assist nature in dissolving these dry feeds. And they should have it at will. By this means they will not be so likely to fill themselves full of cold water, or sufficiently so to chill their entire system and make what should be a source of comfort to them a source of discomfort. They should also be fed plenty of forage, either fodder or hay, clover or mixed preferred, and straw about all they will consume, with a small ration of grain once or twice a day.

*What Grain to Give*—This grain may be fed in the shape of corn in the shock if any is grown on the farm small enough that they can readily masticate it; if not, larger corn may be husked and chopped into small pieces with hatchet or corn knife so that the yearling steer can readily take hold of it and eat it. Some farmers shell corn, others prefer grinding corn, cob and all, and feeding it that



A SERVICEABLE BARNYARD FOR DAIRY COWS  
The covered shed provides protection in case of rain and storm during the open-air and exercise hours.

way. This latter method requires more careful equipment and greater care in feeding than either of the other two methods. For calves, however, we prefer shelling corn and mixing one part oats to two parts corn. The young animal will do better and make better growth with part ration of oats than where corn alone is fed. There is more protein in oats and the growing animal needs more of that. However, if clover or alfalfa hay is used, the protein in that will even up the corn and fodder and make better rations.

*Helping the Manure Pile*—When this method of disposing of the forage crops of the farms is practiced, all rough feeds, such as fodder, hay and straw, is worked up into manure and put back upon the land from whence it came. And we believe that young cattle, sheep or colts, carried through the winter on rough feeds mainly, do not pay large profits for feeding, yet the incidental profits coming from the business in increased fertility and consequently larger yields of other crops, makes the feeding of forage-consuming animals on the farms almost a necessity rather than a choice. And in these days of close competition and small profits in business, farmers are compelled to practice such methods as will give them maximum results at minimum cost of producing them.

### SUPPLEMENTING CATTLE FEEDS

Early in the history of cattle feeding in America, the problem was not as serious as it is today. Competition was at a minimum. Feeds were plentiful and cheap, so it came about that each farmer could raise a few steers each year, using the grains and forage produced on his own land. This he usually did at a profit.

The modern cattleman has a more difficult problem. Corn and other feeds are high and the packers have systematized the business so that they pay the least possible price for fat cattle. The matter of supply and demand does not cut as much figure as it did formerly, consequently the man who desires to remain in the business of raising and feeding cattle must use every means of getting his stuff on the market at the lowest cost.

*Good Feeders Wanted*—In order to do this, he must first secure feeders of good beef formation and get the kind that will mature early. Long two-year-olds are probably the most satisfactory, as they put on fat more readily than older cattle and at less cost. When these animals are secured, put them in a dry feed lot, so arranged that the drainage is good, and also so placed that the cattle will be protected from the storms and winds. A cheap open shed will keep off rain and snow. Have good feed troughs.

Corn is the most fattening feed in the region where the bulk of the beef cattle are produced and finished. It will always remain the standby, because it is a great fat producer and is one of the cheapest feeds we have. Oats and barley may be fed in limited quantities, but seldom is either used alone. Ground in combination with corn, results are satisfactory.

*Concentrates Profitable to Use*—Big feeders nowadays find that concentrated feeds are advisable. None of them suggest large quantities, but a small addition to the regular ration not only gives the animal a good appetite, keeping his coat smooth and his skin mellow and his digestive organs in good condition, but materially aids in increasing the live weight. Linseed meal is one of the chief

standbys and cottonseed meal is exceedingly satisfactory. Both these feeds are to be used with caution, and more especially where hogs follow cattle.

It behooves the feeder, therefore, to study the problem of feeds very carefully, secure prices of concentrated feeds, note the value of feeds produced on the farm, and make his combinations accordingly. Locality, distance from market, etc., have much to do with the problem, and all must be taken into consideration.

## CHAPTER XV.

### **The Diseases of Cattle**

The most successful directions in which the treatment of cattle diseases have gone are of the nature of prevention, of eradication of cause, and of improved sanitary conditions. It does not pay very well to attempt simply to cure disease, for the cause remains just as it did before. Another thing that has been learned is this fact. Our most troublesome, our chief contagious and our greatest loss-making diseases are due to germs. Take tuberculosis. A few years ago we considered that an hereditary disease only. Now we know it is not hereditary, but solely a germ disease, easily acquired by taking into the system, through air or uncooked food, living germs that find comfortable quarters in the body.

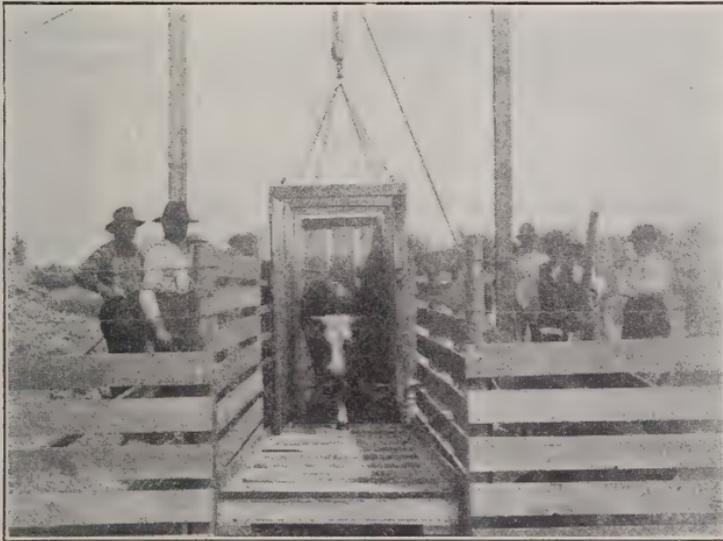
Take hog cholera—the most fatal and troublesome disease among swine raisers. It is a germ disease. It does not pay to attempt to cure a sick hog if the germ still remains on the premises, for the cause is still present, ready to rise up at any moment to attack oncoming herds.

The idea back of treating disease among our lower animals is to combat the cause, eliminate the starting troubles so as to secure thorough sanitary conditions, healthful environments and quarters free of germ or insect.

#### **SOME COMMON DISEASES**

*Tuberculosis*—Without question, this disease is the most far reaching among cattle. The annual

loss is tremendous, not only due to diseased animals being either killed or dying of the disease, but the loss in production, the shortage in work, whether it is beef or milk, is somewhat tremendous. Not only is this phase to be considered, but the number of people, especially babies and children, who by means of milk and butter from tuber-



A CATTLE BATH TUB

The cage here shown is used for dipping the cattle for treatment of mange. The dipping tank is now generally used throughout the West.

cular cows, take this disease annually, is alarming. The effort of the experiment stations, the department of agriculture, boards of health and a score of other workers to lessen and wipe out tuberculosis is going along right lines and in the end will bring about great good.

Tuberculosis of cattle is similar to that of people. It destroys the tissues of the lungs, is found

in the intestines and may locate itself in various parts of the body. The early signs of tuberculosis are unthriftiness, poor appetite, dry cough, papery skin, and coarse, rough hair. As the disease advances the flesh gradually wastes away, the cough increases and often a discharge is seen from the nose or mouth. By listening to the lungs, if far advanced, considerable difference will be noted from the normal action. A physical examination may be verified by the tuberculin test, a preparation that is injected into the animal just under the skin and readily taken into the circulation. If the animal is tubercular, the fact is indicated by the rise in the temperature eight or ten hours after the injection. This rise continues for several hours, reaching 105 or 106 or even 107°, and then gradually declines.

*Treating the Disease*—There is little to be said about the treatment of animals affected with tuberculosis. If they are common animals, perhaps the best thing is to slaughter them. In many cities, inspection of suspected herds is done under the direction of the state, and some compensation given by the state for the slaughtered animals.

Animals of considerable worth, especially dairy animals, may be handled as follows: Isolate the tubercular animals from the rest of the herd by giving them quarters of their own, off by themselves, where they may have plenty of fresh air, an abundance of ventilation in the stables, and nutritious food. As soon as the offspring are born, immediately remove each one from its mother, giving it none of its mother's milk at all. It has been proved conclusively that this new born offspring does not possess tuberculosis. If now given

milk free from tuberculosis germs, it will develop into a strong animal, free of the disease.

The milk from the tubercular herd can be made into butter, provided it has been thoroughly sterilized so as to destroy all of the germs. By this practice a costly herd of cattle can be maintained for the time being, until the offspring are born, at a small cost due to the isolation.

*Fighting Tuberculosis in the Stable*—A continued battle needs to be fought against tuberculosis in every stable where cattle are, in any great quantity, housed or constantly stabled. This will apply especially to dairy cattle. A wise practice is to test the dairy cows in your herd at the earliest possible moment by means of the tuberculin test. You can do this yourself; but it is better to get a veterinarian who is fully acquainted with all of the details of the work. If any of your cows respond, it is to your interest to dispose of them. They can be sent to the slaughtering houses and there they will be passed upon by the government officials. If not far gone, they will pass the test and you will get the usual beef prices. If in bad health, they will be condemned and, of course, you would not want them to be used or kept for any reason.

The next step is to thoroughly disinfect all of the cattle quarters. Any of the disinfecting fluids, and lime, will do for this purpose. A monthly spraying of the quarters is to be advised and the whitewashing of all of the premises at least twice each year. And then every six or ten months, test the cows for tuberculosis, or until you are certain that it has been eradicated. From now on, once every year or 18 months will be sufficient and by so doing you can be reasonably sure that your herd is free of this dreaded disease.

It is also advisable to have all purchased cattle that go into the dairy herd isolated and tested before admitted. In this way you will avoid danger.

*Anthrax*—This is an infectious disease due to the anthrax bacillus. While most common in cattle and sheep, it is known also to occur in horses, mules and goats. The disease may be transmitted from animals to man. It is first noticed as being in the skin, lungs or intestines; breathing is labored and the intestinal discharges may be covered with mucus and blood; swellings appear as carbuncles which, when opened, show a yellowish mass stained with blood. Pools of stagnant water are frequent sources if contaminated with the bacillus. If such a disease has been present, make a most thorough disinfection by the use of chloride of lime or other disinfecting substances. Vaccination of susceptible animals for the purpose of preventing the disease has proved very successful and is now generally employed.

*Abortion*—By this is meant the premature expulsion of the offspring. It may be due to an accident, a noncontagious trouble; or it may be due to an infectious germ that is contagious and unless checked will pass through the entire herd. Symptoms prior to abortion are not generally observable and no successful treatment has yet been discovered for handling the disease. It is necessary, however, to use the greatest caution in isolating aborting animals from the stables and barns, to thoroughly disinfect the quarters in which they have been placed, and then to frequently use disinfecting liquids every week or ten days so that the disease will not spread to other members of the herd.

*Texas Fever*—The greatest bane of southern cattle raising has been Texas fever. It has been only recently that this ailment has been clearly understood. Now we know it is due to the ticks that seek to live on southern cattle. One of the observations early made was that young cattle never were inconvenienced nor troubled with ticks, but



A CASE OF TEXAS FEVER

A familiar attitude assumed when afflicted with Texas fever, caused by the cattle tick.

that old cattle, if they had never had ticks on them, would invariably die when the ticks came. Cattle that had carried ticks from young calthood went into old age bearing this parasite for years without any disease manifestation at all. These differences were not clearly understood until recently, when the following facts were brought out:

First, that young calves are usually immune. Cattle ticks do not bother them and by the continued carrying of ticks they carried their immunity throughout life.

Second, that if the young calf was not rendered immune by having ticks on it at an early age, that same calf, when reaching the age of 15 or 18 months, would succumb to the disease if infested, because it had not been rendered immune while young.

Third, inoculation for the purpose of securing immunity has been practiced successfully. The most rational treatment of Texas fever is in the order of prevention. That is, to keep the ticks off the farm. It is not good farming to have each animal carrying thousands of big ticks, constantly filled with blood, even though they do not threaten the life of the animal. It should be remembered that these ticks consume great quantities of nutrients that have been given the animal in form of good food. The flesh of tick-infested cattle is not good, and they never reach the highest development; and it is an easy matter to keep ticks off the farm. By keeping cattle off the field for a year, the ticks will be entirely destroyed. The following year, turn the cows in a field that has been cleared of ticks, being sure that no ticks are on the cattle; and then, by keeping all cattle off of the infested parts of the farm for another year, complete eradication will be effected.

Any sort of grease or lard rubbed by means of a brush onto the cow along her abdomen and legs and neck, or such parts of her body as touch the ground when she lies down, will reach all of the ticks and in a short time they will drop off dead.

*Foot and Mouth Disease*—This is a common disease throughout Europe and threatened our country quite seriously a few years ago, especially in New England. The very quick and effective work of the states in conjunction with the United States Department of Agriculture quickly wiped out the disease.



FOOT AND MOUTH DISEASE

In this case the dreaded disease has affected the udder. When affected, the only method of treatment is immediate slaughter.

The disease itself is highly infectious, the virus being found in eruptions in the mouth and on the feet; in the milk and other products of the barnyard. The death rate is low. The chief symptoms are rise of temperature, loss of appetite, followed by blisters and sores in the mouth, on the tongue and lips. Even the udder may show such spots. Many cases are known where the hoofs were completely destroyed.

Vaccination has been practiced, but not very successfully. The best method has been to destroy all of the diseased animals and then to thoroughly disinfect all quarters where such animals have been.

*Milk Fever*—This disease is peculiar to the cow at the time of calving. It may be due to bad sanitation, poorly ventilated stables, mature age, etc. The disease ordinarily appears from one to two days after calving. Some claim that the disease is due to excessive milk secretion, but the cause is not clearly understood by the scientists.

Milk sickness is usually associated with the heavy milking cows. The common treatment of milk sickness now, is to inject ten grams of iodide of potash into the udder as soon as possible after the symptoms of milk fever are noticed.

One of the most common treatments is to simply pump air into the udder. I know many people who have resorted to the common bicycle pump for this purpose and in a few hours the afflicted animals were up, moving about, and as full of life as ever.

*Cornstalk Disease*—The cause of this disease is not known. The symptoms are digestive disturbances, accompanied by delirium and unconsciousness. The most reasonable view to take is that it is some germ disease associated with molds in the food. If once attacked with the disease, the afflicted animals succumb very rapidly. The greatest caution is here suggested in the use of moldy food. Cornstalk disease has, perhaps, been more prevalent throughout the western states than elsewhere in the country.

*Bloating*—This trouble is caused by the formation of gas in the first stomach. It is closely associated with indigestion. In fact, it is a form of indigestion. Green foods like clover or alfalfa, until

the animal has become thoroughly used to them, will ordinarily cause bloat. Even dry alfalfa when cured into hay, frequently causes bloat and death. Where alfalfa is mixed with other grass or where the pasture animals have access to dry hay, corn stover and sorghum, there seems to be little danger from its use as pasture.

In treating, large doses of soda dissolved in water may be administered, using with it melted lard or other harmless oil. When the pressure upon the inside of the stomach has become so great that the animal cannot walk, it is necessary to resort to paunching. This operation consists in making an opening in the stomach directly through the body wall and may be accomplished by means of a thrust with a knife. The incision is described as equally distant from the last rib and the hip bone and the set process of the vertebral column upon the left side of the animal.

## CHAPTER XVI.

### **Sheep**

From the earliest ages the sheep has been a source of profit to mankind, and its keeping and rearing an important industry. Abel, the second son of Adam, chose sheep herding as his employment; and although his brother chose to till the soil, the tending of herds and flocks became the favorite occupation of the human race in its early periods. In those days people did not till the soil more than they were obliged to. Of course it was very easy to tend the flocks, because there were few people and much land and it is very likely that the sheep was the earliest animal domesticated.

So dependent is this animal on man that without him he could not exist. Having always yielded to his master's will, gone where that master bade him and been protected as much as possible against all dangers, he has become stupid and dreamy. His senses have lost their acuteness.

As civilization progressed stage by stage, and the manufacture of garments of wool displaced those of skin, careful breeding began to improve the fleece, and varieties among sheep became fixed in type. Later on, as people became more settled in their occupations, cities were built and demands for mutton increased; and that demand has increased, until, at the present day, it is greater than the supply. It has been stated that the markets of the city of New York alone require more than one million sheep each year.

While the sheep industry has always been one of prominence in the United States, it has always been less than its worth has merited. There is a place on every farm for some sheep. Wool is in constant demand and usually commands good prices. Mutton may be consumed at home, replacing some of the pork, or it may be sent away to the markets of the world. Sheep will graze on pastures that other farm animals reject; and wherever the sheep's feet tread for any length of time, the land improves and wealth abounds. For this reason, this beast has been termed the "animal with the golden hoof."



A PAIR OF COTSWOLDS

The ewe and ram shown here are both prize-winning individuals. They have to their credit silver medals and championship ribbons.



ONE OF THE MAKERS OF AMERICA'S GREATNESS

## CHAPTER XVII.

### **Breeds of Sheep**

*Merino*—The Merino sheep was evolved in Spain, and has been reared there for centuries. From Spain they have been exported into the various countries of Europe, United States, Australia, etc. The first importation into the United States was made in 1802 by Col. Davis Humphreys of Derby, Connecticut. Under the influence of American and French breeders, the old Spanish Merino has been improved so that the forms now known in the United States are the American Merino, the Delaine Merino, and the French Merino or Rambouillet. The Delaine Merino has been evolved from the American Merino and differs from it in the longer fleece and improved mutton form.

*The American Merino* is one of the smallest breeds in the United States. The ewes at maturity weigh from 90 to 125 pounds and the bucks, when in good condition, from 140 to 175 pounds. The skin of the Merino is characterized by heavy folds, especially about the neck; wool is fine and very dense. The fleece will weigh 10 to 15 pounds more in the rams. It is one of the hardiest sheep in the United States and adapts itself to various conditions of climate and food products better than any other breed. It can be herded in flocks of thousands where the mutton breeds cannot be successfully herded in flocks of over 200.

They are the sheep par excellence for grazing. They do not become fully mature until the age of three or four years, and their feeding qualities are

inferior to those of the mutton breeds. The meat is lacking in tenderness and flavor, and contains a large proportion of bone to meat. Within recent years many of the eastern flocks of Merinos have been crossed with the mutton breeds, for the purpose of producing an all-around wool and mutton sheep.

*Delaine Merino*—The Delaine Merino has been produced from the American Merino. It has a larger carcass, a better mutton form, is nearly free from folds and wrinkles and carries a longer fleece, though not quite as fine nor as well glued together on the surface as the American Merino.

The chief sub-types of the Delaine Merino are the Standard, the National and the Improved Delaine. Closely related to these in their leading characteristics are the Black Top Spanish Merino, the Improved Black Top Merino and the Dickinson. All the Delaine Merinos have horns, and more or less wrinkles or folds about the neck and breast. The Black Top Merinos, likewise, have horns in the rams, but do not have wrinkles, and the fleece is more of a black. The Dickinson or Polled Merinos have neither horns nor wrinkles. They are a little larger in size and the fleece is longer than the Delaines.

Ewes of the Delaine type, when mature, will weigh from 100 to 150 pounds, the rams from 140 to 190 pounds. They are practically equal to the American Merinos in hardiness and grazing powers, but are superior to them in early maturing qualities, in the quality of the mutton produced and in feeding qualities. The Delaines are used extensively for crossing on western range sheep, where the fleece has become light and open. The fleece in ewes will weigh from nine to 15 pounds,

and in the bucks, 12 to 18 pounds. The minimum length of the fleece is three inches.

*Rambouillet*—In 1786 the French government imported from Spain 383 selected Spanish Merinos. These sheep were kept chiefly at Rambouillet, where they have been carefully bred by rigid selection and liberal feeding, and greatly



RAMBOUILLET RAM

A sturdy representative of the old French Merino class.

improved in mutton form, quality of meat and weight, without the introduction of any outside blood; both the weight of the carcass and the weight of the fleece have been increased from 100 to 150 per cent over the old Spanish Merino. These sheep were introduced into the United States in 1840, but did not become specially prominent until during the last 20 years. Full grown rams

of this breed will weigh up to 225 pounds and the ewes up to 175 pounds.

These sheep are much taller, stronger limbed and more rangy than the American sheep, have a better mutton form, are less wrinkled and the wool is longer, though not quite so dense or fine, and



SOUTHDOWN EWE

A saddle of Southdown has long been considered one of the choicest of all morsels. Some of the best in the world are raised in this country.

freer from yolk, than the American Merino. They are also taller and heavier than the Delaines, but have not quite so good a mutton form, though very similar in other respects.

The Rambouillets have the same hardiness and feeding qualities as the American Merinos and, while the quality of the meat is excellent, it is

not quite equal to that of the mutton breeds. These sheep are especially valuable for crossing upon range stock for the purpose of securing a larger carcass and heavy fleece of wool. They are at present largely used alternately with Cotswold rams on western range flocks.



A SHROPSHIRE AT ATTENTION

Of the medium wool breeds, the Shropshire leads all others in numbers. Nearly 25,000 were registered last year.

*Southdown*—The Southdown originated in England, and was imported into this country at the beginning of the nineteenth century. It is a smooth, round-bodied, symmetrical sheep, with a brown, gray or mouse-colored face and feet. The fleece is rather dry, coarse and light. They are hornless and while the smallest of the medium breeds, a

medium fat, two-year-old wether will weigh from 130 to 140 pounds. They are especially well adapted to hilly lands with a dry soil, short, dry herbage. They stand in the first rank among early maturing breeds, and the meat is of the best quality. They are vigorous and especially desirable



A PAIR OF HAMPSHIRE

Hampshires are black-faced, hornless and black-legged. This sheep is gaining in popularity, because of its heavy fleece, good grazing quality and large size.

for crossing where mutton is chiefly sought. They have been used to a greater extent in the production of the various other pure, dark-faced breeds, than any other of the Down breeds. They are inferior in wool production, giving an unwashed fleece that will average from five to seven pounds in weight.

*Shropshire*—The Shropshire is the most popular mutton breed produced in the United States. It is well proportioned, symmetrical, and a little heavier than the Southdown. The ewes will weigh up to 175 pounds, and the rams up to 225 pounds. It is of English origin and was evolved out of the Southdown, Cotswold and Leicester breeds. It was first imported into the United States in 1855. They are especially adapted to general farm conditions where the land is well drained and where pasturage is good. The ewes are very prolific, producing on the average about 40 per cent of twin lambs.

The unwashed fleece will average nine to ten pounds in weight in ewes, and 12 to 15 pounds in the rams. The face is grayish black and the legs still darker; in recent years there has been a tendency toward somewhat lighter faces.

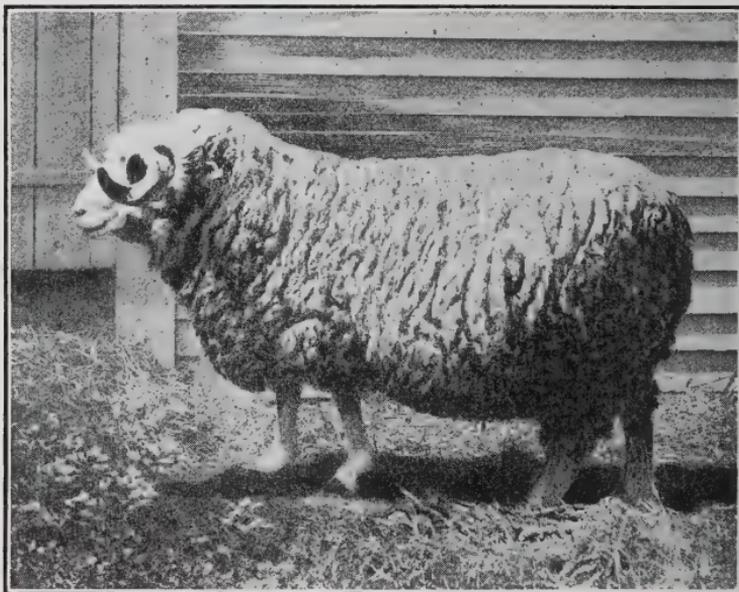
As compared with the Southdowns, the Shropshires have a longer and heavier body and a heavier fleece. The head is more completely covered with wool, and the wool is longer, though not so fine; it is what is known on the market as medium Delaine or half combing wool.

It is one of the best general-purpose sheep for farm flocks, since it produces a high quality of mutton, a good grade of wool, which brings nearly top prices, and a large percentage of lambs.

*Hampshire*—The Hampshire is a hornless, black-faced, black-legged sheep. Like the Southdown and Shropshire, it originated in England and is the outcome of a cross of the Improved Southdown upon the Wiltshire and Berkshire Knot sheep. It is much larger than the Southdown, more prolific, produces a heavier fleece, and has better grazing qualities. It is larger than the Shropshire

and the lambs grow more rapidly to maturity. They are especially adapted to an intense system of farming, and for crossing where early, quick-maturing, large-sized lambs are desired.

The unwashed fleece will weigh from seven to ten pounds in the ewes and a little heavier in the



A HORNED-DORSET BUCK

For the production of hothouse lambs no breed is more popular than the Dorset. The breed is gaining in favor every day.

bucks. The wool corresponds to that of the Shropshire, but is perhaps a little coarser. They are a stylish, handsome sheep of the mutton form, and are quite widely distributed throughout the United States.

*Suffolk*—This is a medium wool, hornless, mutton breed, with a long, black face, and a general

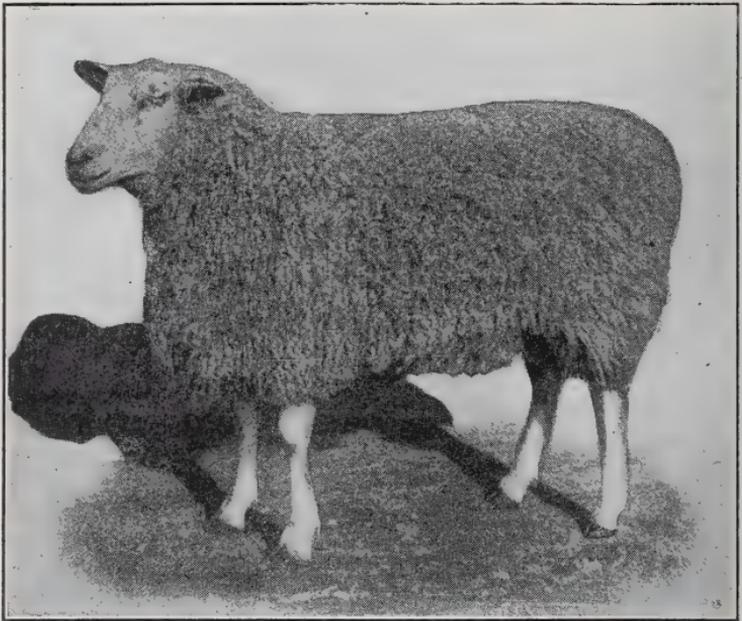
absence of wool on the head and between the ears, which constitutes the principal difference in appearance between the Suffolk and Hampshire breeds. The body is rather long, the legs jet black. The Suffolks occupy an intermediate place between the Shropshire and the Hampshire. They have not been extensively bred in the United States.

*Oxford*—The Oxford Downs originated in England as a result of crossing Cotswold rams upon Hampshire Down ewes and the selection and mating of the progeny. These sheep since 1857 have been known as Oxfordshire Downs or Oxford sheep. They are widely distributed over the United States. They are the largest and heaviest of the Down breeds. When in good flesh, the rams should weigh 250 to 275 pounds, and the ewes from 200 to 225 pounds. The wool is rather coarser than any other of the medium wools and the fleece is heavier, weighing from ten to 12 pounds unwashed.

The Oxfords resemble the Hampshires in general form, but are a larger breed and the face is not so dark. It is usually an even dark gray or brown, with or without a gray spot on the tip of the nose. They are best adapted for lands furnishing good pasture, and do not succeed as well under range conditions or on rugged, broken pastures as either the Shropshire or Southdowns.

*Dorset*—The Dorsets are one of the oldest English breeds of sheep. Both sexes are horned. The face is white with a tendency toward a slight Roman nose. They are considerably larger than the Southdowns. The average weight for a mature ram is about 215 pounds and for mature ewes, 165 pounds. The wool is short and will average six to eight pounds unwashed to the fleece.

The Dorset is a solidly built sheep, and especially esteemed for its prolificacy. When properly managed, two lambing seasons a year are possible with this breed. This makes the Dorset especially popular for the production of winter lambs. When bred in May, they produce lambs for the Christ-



A CHAMPION LEICESTER EWE

If you do not like sheep for wool only, then why don't you try mutton?

mas market, and will breed again soon after dropping their lambs. They frequently produce twins and often triplets. The ewes are frequently bred to Southdown or Hampshire rams to give the market lamb a black face, which is generally preferred by the butchers. The Dorset is generally regarded as the most prolific of the sheep breeds.

The ewes are exceptionally good milkers. They are a hardy sheep; good rustlers; have early maturing qualities, and the mutton is superior. They stand unrivaled among the sheep breeds for the production of winter lambs; i. e., unweaned lambs which can be marketed during the holidays and winter months.

*Cheviot*—The Cheviot is a mountain breed of sheep, hardy and does well on scant pasture. They are native to the Cheviot hills of England. These sheep are distributed in nearly all the states east of the Mississippi river. They are a medium-sized sheep, the rams weighing 175 to 200 pounds, and the ewes from 135 to 150 pounds. The wool is rather coarse, the fleece weighs eight to ten pounds. They are especially sought where hardihood is important. The breed is pure white, including a white face and white legs. Occasionally there are small black spots on the head and ears. The end of the nose is dark. They do not bear close confinement as well as some of the other breeds. The mutton, though of good quality, is not equal to that of the Southdown.

*Leicester*—The Leicester is one of the long-wool native English breeds which, though popular in England, have never made much headway in America. There are two types of Leicesters, the Bakewell and the Border Leicester. They both have the same general style, but the Border Leicester is a little the larger and not quite as compact as the Bakewell. They are a white-faced, square-bodied, hornless breed. The mature bucks weigh 225 to 250 pounds, and ewes 200 to 225 pounds.

The unwashed fleece will weigh from nine to 11 pounds. The wool is of good length and fiber,

and hangs in spirals at the outer surface, covering the whole carcass except the head and legs. They are especially suited to thickly settled conditions where there is an abundance of succulent vegetation. They are easy keepers, mature early and make excellent use of the food given them. They are only fairly well adapted for rough graz-



A FINE LINCOLN FLOCK

The Lincoln belongs to the large mutton class of sheep. This breed is growing more and more popular in this country.

ing purposes. In prolificacy they are not equal to some of the other breeds.

*Lincoln*—This is probably the most popular of the long-wool breeds of sheep. It originated in Lincolnshire, England, and has been distributed all over the world. They were first imported into the United States in 1836. They are the heaviest of all the breeds of sheep raised in this country, the mature rams in good flesh weighing 275 to 300

pounds, and the ewes 225 to 250 pounds. The unwashed fleece should weigh from 12 to 14 pounds on the average, and the staple should not be less than eight inches in length. It hangs in large and wavy spirals. This breed has a white face and a conspicuous tuft on the forehead. Both sexes are hornless.

They are especially well adapted to an intensive system of agriculture, are good grazers, dress out well on the block and the quality of the meat is good, though not equal in flavor to that of the middle wool breeds. The Lincoln has been extensively used by ranchmen in America and Australia for crossing upon Merinos to improve their size and mutton qualities.

## CHAPTER XVIII.

### **Sheep Feeding**

The variety of foods suitable for the feeding of sheep is extensive. Hay, straw, corn fodder, roots of various kinds, corn, oats, peas, rye, buckwheat, cottonseed and linseed-oil meal, and bran, furnish a variety of food from which a proper choice can readily be made. The relative feeding values of these various substances used as food will determine their relative money values, and as these differ and fluctuate from time to time, it is often necessary, to secure the most profit on the feeding, to choose the food that is most economical in use, although it may be the highest in price.

Clover and alfalfa hay are the most valuable foods for winter use, cut when in blossom, cured so as to preserve all good qualities and kept free from damp and mold. Where the main object in view is the production of market lambs, either kind of hay should furnish the chief subsistence of the ewes. They will also be found preferable as the staple and cheapest fodder when sheep are purchased for feeding for market and the most rapid growth of flesh is desirable.

Well-cured pea straw will be chosen by sheep next to clover or alfalfa hay, and before timothy or any other hay. Oat straw is readily eaten by sheep, and is a healthful food, especially if harvested before the oats were dead ripe. Barley, wheat, and rye straw will help to keep life in a flock, but are not sufficiently nutritive to contribute much to the growth of flesh or wool, and

should be used only as adjuncts to roots and grain or oil-cake meal.

### ROOTS ALWAYS FINE FOR SHEEP

Roots furnish a staple food of the greatest value for winter feeding of sheep. When fed in proper quantities, their laxative effect healthfully opposes the tendency of dry hay or straw to produce constiveness, and in addition they supply a considerable proportion of needed phosphates and sulphur for the growing animal and its fleece. But if fed in excess, the large quantity of water they contain, and their large bulk, especially when they are fed in the winter, reduce the temperature of the animal too much, and gradually act unfavorably on the health. When ewes in lamb are fed roots in any but very small quantities, abortion is frequently produced, and this ill effect has been noticed more conspicuously when the roots have been manured heavily with superphosphate of lime. This has been noticed by some extensive feeders and breeders in England, where that fertilizer is largely used in root culture, and their experience should serve as a warning to us.

The reason assigned for the loss of lambs by abortion when many turnips are fed, is not only that the foetus is affected by the presence of a mass of very cold matter in the stomach of the ewe, but that there is an irritation produced in the intestines by this unacceptable food, which causes the death and expulsion of the foetus. Nothing of the kind has occurred in flocks that have been largely fed on cooked roots, applied at such a temperature that would prevent a chill to the animal. It may, therefore, be understood that it is the low temperature,



#### A SMALL FLOCK OF DORSETS

The Dorset belongs to the mutton class of sheep, but the fleece possesses considerable money-making qualities also. The wool is graded as medium, between the fine fiber of the Merino and the coarse long wool of the Lincoln.

generally near freezing, and often below it, at which the roots are given, and nothing in the roots themselves that acts thus injuriously. Knowing this, the ill effect likely to be produced may easily be avoided.

The roots that are generally fed to sheep are sugar beets, mangels, rutabagas, yellow turnips and white or corn horn turnips, and are to be preferred in the order in which they are here enumerated.

*Roots Are Nutritious*—Considering the large quantity of water contained in them, roots may be considered as highly nutritious food, and when fed in conjunction with dry fodder, and in proper proportions, are generally conducive to the health and growth of the sheep. Their effect upon the quality of the wool, especially the lustrous wool of some of the long-wool sheep, is very favorable. The proper quantity of roots to be given depends upon the kind of sheep. As a safe guide, it may be estimated that one bushel of roots will be a sufficient daily allowance for ten sheep weighing 150 pounds each live weight, if along with the roots, 1½ pounds of hay and one-half pound of meal or bran per head be given.

### LET SEVERAL GRAINS BE USED

Grain, or preparations of grain of various kinds, furnish the concentrated foods which are found needful to maintain sheep in healthful condition, or to induce the rapid growth and fattening for the market. These foods exist in abundant variety, but no one alone can be fed with the greatest benefit for any length of time. A change of food is both acceptable to, and healthful for sheep, and the difference in the money value of these articles of food,

which exists at nearly all times, makes it necessary to exercise a judicious choice in this respect, in order to secure the greatest profit.

The fat-forming elements in any article of food consist of starch, sugar, gum, oil and fat, all carbonaceous matters, or matters rich in carbon, with the addition of certain proportions of hydrogen and oxygen. The chemical composition of these elements is very similar and in some of them is nearly identical. Thus an animal fed upon starch or sugar may become fat, and it is well known that bees fed upon sugar are able to produce honey or wax from this food. In the process of digestion and assimilation, starch, sugar and gum are changed to fat. This fat is either consumed in the process of respiration, or is stored up in the tissues of the body, and increases the weight of the carcass. But in the consumption of food rich in starch, a much larger proportion is necessary to produce a given weight of fat, or a given result in the process of respiration, than is required of a food rich in fat or oil.

### CHOICE MUST BE EXERCISED

In choosing the variety of food, then, for a special object, as, for instance, the feeding of a young growing animal, or the fattening of a mature animal and the sustenance of a sheep that produces fleece rich in oil or yolk, as that of the pure-bred Merino, those foods which would furnish abundant flesh should be chosen for the one, and those rich in starch and oil for the others. By thus choosing judiciously and skillfully, there is an economy in the cost of food, and the object sought is gained at the least expense

Much may be gained by varying or mixing the food of an animal so as to stimulate the appetite; for a healthy animal will increase in weight in proportion to the food consumed so long as digestion and assimilation are perfect. If a sheep eats only three pounds of hay per day, but will eat and digest, in addition, six pounds of sliced turnips or beets with a pound of bran sprinkled upon them, a manifest advantage is gained. In changing the hay for straw, ten pounds of turnips and one pound of bran or oil-cake meal can be consumed, the money value of the food may be reduced, and the sheep be equally well fed.

In estimating the amount of a sheep's food, it is necessary to take into consideration the age and condition of the animal: whether it be in a growing state or in a state of maturity; its weight, also the drain upon its vitality, as in the case of a ram serving a number of ewes daily; or a ewe in lamb, or suckling a lamb or pair of them. On this account, it is absolutely necessary to grade the flock and provide different quarters for those which need special feeding care.

## CHAPTER XIX.

### **The Care and Management of Sheep**

In handling sheep, just remember that they are naturally timid and of a nervous disposition. The highest success in sheep raising cannot be expected unless the flock keeper by his quiet manners and gentleness inspires confidence in them. A sudden disturbance of any kind, like the bark of a dog, will startle the whole flock and sometimes create a panic. Some shepherds make a habit of whistling or talking to the sheep as they approach them unexpectedly.

Whenever sheep are handled, gentleness and quietness should be insisted upon. This sort of training and custom is of especial value at lambing time. The shepherd with experience knows what this advice means, and if you will observe him as he works day in and day out, with rams, ewes and lambs, the wisdom of such attention will be seen and its force, in successful management, appreciated.

And then remember, too, that the lambing period is the most critical time in the life of a flock. Constant attendance during day and night is called for. If the lambing season occurs in cold weather, the lambs may become chilled before they are able to suck their mother. If twins are produced, the mother may give attention to only the stronger one. Here it is the shepherd's duty to see that the weaker one gets its full supply of nourishment.

If the young lamb is unable to suckle within a few minutes after birth, it should have help, and it

is often necessary to hold the ewe for this purpose. Sometimes the mother refuses to own her offspring. This trouble can be overcome by shutting her up in an individual pen out of the sight of other sheep and with only the lamb for company. You may even have to hold her a few days until she submits to the charge. Some shepherds sprinkle the mother's milk over the lambs, often with good results.

When a strange lamb is placed with another ewe, due to the death of her own offspring, many practices are resorted to in order to induce her to own the strange lamb. The common practice is to remove the skin of the dead lamb and to tie on to the lamb which is to be adopted. This is an old custom and generally satisfactory.

Should a lamb become chilled after birth, it can often be resuscitated by putting it into a pail of water as hot as it can stand. It should be covered entirely with water, leaving only the nose exposed. When the water becomes cool more warm water should be added. It may be necessary to do this two or three times if the lamb is chilled, after which the lamb should be rubbed dry with a towel and fed with warm milk heated to blood heat. In severe cases a few drops of whisky or brandy added to a teaspoonful of water have been given with good success and can be generally recommended.

After reviving, the lamb can be returned to the flock and will require no further attention. When lambs are two to six weeks old the tail should be cut off, using for the purpose a sharp jackknife. A stub about two inches long should be left. Some use a chisel for the purpose. The tail of the sheep is a useless appendage, difficult to shear and likely

to get besmeared and unsightly; consequently with farm flocks docking has been resorted to, and is now an universal custom.

### WEANING THE LAMBS

Every flockmaster realizes that the weaning of the lambs from the mother ewes is generally an



ALL THREE ARE FRIENDS

A case where the dog and sheep get on well together.

ordeal that is attended with a good deal of manifestation of displeasure in the way of bleating on the part of both the ewes and the lambs. From the time the lambs are dropped in the spring to the time they are taken from the flock, they are dependent on the mother ewes, first, for the milk which sustains them, and second, for the company or companionship.

When the lambs are taken from the ewes and compelled to suffer from hunger and lonesomeness, it is no wonder that they bewail their condition and shrink in flesh, and that a considerable time may be required to recover and start along maintaining themselves and improving in condition.

I have noticed that large, thrifty lambs, that are good eaters, make less ado when taken away from the flock than the weaker and unthrifty ones. I have also found that if the lamb's stomach is well filled with nutritious food, it stands the loss of companionship much better, and more readily adapts itself to the new conditions. A little extra pains taken to prepare for weaning will be paid in saving of loss of flesh, as well as a good deal of worry and bleating on the part of the ewes and lambs.

A little while before weaning time arrives it is a good plan to teach the lambs to eat some food that will take the place of the mother's milk better than the grass of the pasture. Get the flock into an inclosure, where they will be comfortable after they have filled on the grass in the morning and give them a light feeding of oats and wheat bran, equal parts, and then just at night feed them again and turn them out to pasture. The lambs will learn to eat the grain with the ewes.

*Taking Lambs from Mothers*—After they have learned to eat the grain the time can be set for separating the ewes from the lambs. On the morning of the day set, get the flock in earlier than usual, feed and hold until nearly time to turn out, when the ewes can be sorted out, the lambs fed and the ewes driven to a distant field out of hearing of the lambs. The lambs can be turned into

pasture where they will give their attention to feeding on the grass; and if taken in each day, fed a fairly liberal portion of grain, given access to all the water needed and plenty of grass to eat, they will make a constant growth at weaning time. If kept improving the wether lambs will soon be in condition to command a good price for the drover or feeder and the best ewes can be retained to increase the size of the breeding flock.

### SHEEP DURING THE LAMBING SEASON

It is greatly important that lambs be strong and vigorous at birth. When they come delicate, it is difficult to carry them on without loss, and the extra labor entailed is very great. That they will not come large and strong is a foregone conclusion, unless the ewes have been properly fed, properly housed and properly exercised.

*Food for Breeding Ewes*—In localities where the ground remains uncovered during much of the winter, fortunate are those flockmasters who have a pasture with a reasonably tough sod on which the sheep may graze. With grass in plentiful supply, even though partially dead, the ewes will need but little else until the approach of the lambing season.

Where the ground is deeply covered with snow, the best fodder that can be given to breeding ewes is clover or alfalfa hay. If this can be given only once a day, the other feed may consist of a good, finely grown corn stover, well-cured millet, or good oat straw. If hay or alfalfa are fed but once a day, it should be fed in the evening, as the sheep will eat the other fodder more readily in the morning when they are hungry. Pea straw, well saved,

is also an excellent fodder for them. The same is true of peas and oats or vetches and oats grown together.

When thus supplied with good fodder, they do not need much grain until toward the approach of the lambing season. They will be in better condition, however, at the lambing time if they have been fed a small quantity of grain previously. No grain is more suitable for them than whole oats fed alone, or, what is better, along with a little bran or oil cake. Both bran and oil cake are not necessary, but they will do no harm if both are present.

Field roots are excellent, but before the lambing season it is not necessary to feed more than two to three pounds a day. If roots cannot be had and corn silage can, it will be in order to feed silage at least once a day. When clover or alfalfa hay are fed either of these goes admirably with silage. The latter is a carbohydrate and the hay is a protein food. When straw is fed as one of the feeds, what is left over answers nicely for bedding. As a rule, the aim should be to clean out daily the racks on which sheep are fed their fodder.

*Suitable Shelter*—The housing for breeding ewes may be simple. It should possess two requisites. These are freedom from drafts and capability of protecting from storms. But in no instance should the quarters be confined. Usually the ewes should have perfect liberty of access to a protected yard on the sunny side of the shed. This yard ought to be well bedded. It is a fatal mistake to have sheep housed too warmly, even at night. They are not liable to suffer from the cold if protected from winds.

*Suitable Exercise*—Sheep will take ample exercise if they have the freedom of one or more fields

when the snow is not deep or entirely absent. It is when the snow is deep and they are unable to paw it off that they are in danger of becoming too sluggish. The more highly they are fed the more sluggish they are. To avoid this it may be necessary to put feed in a rack some distance away from the shed, and located, if possible, in a secluded and protected spot. If the snow is deep, clear away by using the snowplow and strew a little hay here



A PAIR OF HAMPSHIRE DOWNS

These healthy, vigorous sheep are looking into a bright future in this country. They are good feeders, possess good weight and give good account of themselves wherever placed.

and there along it. The ewes will soon find the way to the feed. They will make a pilgrimage to it daily if the food is enticing.

*Exercise Necessary*—When the ewes do not take ample exercise, the lambs are lacking in vigor when they are born. When this happens the task of caring for them while they are young is difficult and the losses that occur will probably prove serious. After the lambs are born and on their feet, the ewes may be fed grain with much freedom. A

mixture, as of oats and barley or oats, bran and barley, will furnish a good grain supplement. Roots also may be fed with the utmost freedom.

### BREEDING EWES IN WINTER

Every flock owner should carefully examine his flock in the fall, and if there are any lice or ticks on them, they should be dipped. Even if the weather is quite cold, dip them by all means. One can never afford to feed lice and ticks, and especially he cannot when sheep and feed are as valuable as they are this season. The water for dipping may be warmed some, then if the sheep are kept out of the wind in a reasonably warm place, they will not suffer.

*Some of the Best Feeds*—For their feed in the line of roughage, there is nothing better or cheaper than alfalfa or clover hay, bean straw and roots. If the ewes go into winter in good condition and have plenty of these feeds, they will need no grain until within a few weeks of lambing time. Even if one has only a fair amount of these feeds and gives them with corn stover and straw, the flock will usually do well.

When one has not enough alfalfa, clover or peavine hay or bean straw to supply at least one good feed a day, some grain should be given to furnish a fair amount of protein. The ewe must have a certain amount of this kind of feed to properly nourish the fœtus and grow her wool. Oats are splendid for this purpose, but in recent years they are very high in price. I have found gluten a very good feed to mix with silage or with the chopped roots. If one can get cull beans, a few of them are good.

It is very seldom with a fair sized flock that all the individuals feed well. Those that do not should be separated from the flock and be given special care.

*Keep Sheep Cool and Dry*—It is not necessary that the sheep pens should be warm; in fact, it is better that they should not be, at least until lambing time. Quarters that are cool, well lighted and ventilated—with special emphasis on the ventilated—and will keep the feet and back of the sheep dry, are ideal.

One of the greatest mistakes made with the breeding flock in the winter is that the sheep are not given enough exercise. I usually draw corn stover to a field that is to be plowed in the spring, and feed the sheep there at noon every day that is not stormy, or when the ground is soft. If you cannot feed this way, see that your ewes are exercised in some way. You cannot have good, vigorous sheep and lambs without it.

*Amount of Grain to Feed*—The amount of grain and the length of time the flock should be grained before lambing depends upon the condition of the ewes, and whether you are having early or late lambs. If the lambs are to come early, the ewes should be in the pink of condition, or they will not be able to keep the lambs growing well until grass comes. On the other hand, if the lambs are to come late, but a short time before the mother is to go out to grass, she will require not nearly so much grain.

*Start Grain Ration Gradually*—Whether they are to be fed little or much, great care should be taken in getting them on the grain ration. No farm animals are as apt to be injured by abrupt change of feed as are sheep. Feed small amounts

to begin with, and see to it that a few do not get the major portion of that. Increase the amount gradually and the sheep will be all right. Very many lambs are weakened before birth by the injudicious feeding of the mother.

Silage has been condemned by many as a feed for breeding ewes, but I am satisfied, after several years' experience, that if one commences by feeding very little and increases the amount slowly, it is not only a safe but a splendid food.

*Give Plenty of Water*—Sheep will get along and live a long time without water, but for them to do their best it is just as essential that they should be supplied with pure water, and have it as they want it, as for other animals. Feed is so scarce and high this season that many flocks will be underfed, their owners thinking that they are economizing by so doing. The results will be poor, light fleeces of wool, and a small, inferior lamb crop. Economy of this sort always makes men poorer instead of richer. Keep no more sheep than you can feed well.

## FEEDING PREGNANT EWES

It is very essential that the rations supplied the ewe flock possess the quality to assist rapid and thorough assimilation. A narrow ration of wither roughage or grain is more apt to cause a sluggish condition throughout the digestive tract and ultimately influence the development of the fœtus. Food that can be readily acted upon by the digestive secretions and made available for immediate use is very desirable in the composition of a ration for pregnant ewes. The greater the variance in

any well-balanced ration the more readily is it digested and transformed into available nourishment.

*Exclusive Roughage Ration Undesirable*—Pregnant ewes should never be confined to an exclusive roughage ration, though it may possess the necessary ingredients to comprise a well-balanced ration. Clover hay is one of the best roughages available for pregnant ewes, but under no conditions should they be limited to this one element of diet. If it is convenient, clover hay can be fed twice daily, say morning and evening, but for an intermediate feed, corn stover, bean pods or bright oat straw should be supplied. Under no conditions should wet, musty roughage of any kind be fed ewes in the advanced stage of pregnancy.

*Succulent Food*—It is very important in the composition of a roughage ration for the ewe flock at this time to include some succulent matter. Roots are beyond question the most succulent food available for sheep. Many flockmasters make it a point to grow a few tons of roots to feed during the advanced stage of pregnancy. However, the flockowner who has no roots at hand to feed must afford some other solution. Silage can be fed with excellent results at this time, although care must be exercised not to overfeed. I am feeding a part ration to my breeding ewes and they are doing finely. I remove the larger portion of the corn, thus reducing the danger of overfeeding on grain. It is not advisable to feed silage more than once daily to pregnant ewes.

*The Grain Food*—The grain ration should be selected with considerable precaution, so that the right proportions can be computed. Select as wide a ration as possible. Do not feed too heavily upon

corn. I have found that a grain ration composed of three pounds of oats, one of linseed or oil cake, one of wheat bran and from two to three pounds of corn meal, depending upon the flesh condition of the ewes, makes a very excellent grain ration. If the ewes are thin in flesh the corn proportion of the ration may be slightly increased, never to exceed the above proportion. The importance of plenty of clean, fresh water at this time cannot be overestimated, and salt should also be constantly before the flock.

### STOCK RAMS IN SUMMER

Where but a small flock of sheep is kept and but one ram, there are no serious objections to allowing the ram to graze with the flock when the pastures are good, but should the flock be large and the rams many, it is different. :

*Several Rams in Separate Pasture*—When several stock rams are kept they are given a small pasture by themselves. If they can be given a change of pasture occasionally, they are likely to do better, but this is frequently found impracticable. As stock rams are usually grained somewhat heavily at the mating season, and as they are generally given considerable grain food during the winter, the aim should be to bring them through a portion of the summer, at least, without grain.

This can usually be done when the grazing is plentiful, nutritious and succulent. The effect on the system is cooling. The digestion is less taxed, and the influence exerted is renovating. But when the season draws near for service, it may be necessary to feed grain to them again, that they may begin the season's service strong and vigorous.

*Sale Rams*—The management of sale rams, that is, of shearlings, may be different. With them growth is incomplete. It is necessary that they shall be in good flesh when sold. They should not only have good grazing, but it may be necessary to give them a certain proportion of grain through all the season. Of course, the amount should not be large nor the food stimulating and heating, as when corn is fed. There is probably no kind of grain better adapted for such feeding than oats, and, in some instances, the grazing may be so good that it is not necessary even to feed any grain. The feeding of the grain should be gauged by the condition of the rams and the nature of the pasture.

### SHEAR SHEEP EARLY

The season for shearing sheep is much affected by locality. There are climates in which two shearings would doubtless be better. The time for shearing in the northern states, say north of parallel 40 degrees, is April, as practiced now by the best shearers. Years ago, when washing preceded shearing, it was common to defer shearing to a later period. Sheep now are usually shorn without being washed. When the flock is much infested with ticks, the time of shearing should be advanced. But it may be necessary to confine shorn sheep when the shearing is done very early.

The sheep-shearing machine is fast superseding the shears. So much more quickly and neatly does it do the work that it will pay to invest in one of these machines, even for a small flock of sheep. It is usually practicable to harness various kinds of power so as to run these machines, but when this may not be practicable they may be run by hand,

one person shearing the sheep and the other furnishing the power.

The machines do excellent work. If any criticism is to be made of them on this score, it is to the effect that they leave the sheep, as it were, too bare. The danger of maiming the sheep by way of cutting the skin is less also than with the hand shears.

Of course, shearing will still be done to some extent with the shears. When so done, it is important that the shears be kept sharp. It is also important that they have a spring that works easily. Shears with a stiff spring work hard. Wherever done, the floor should be clean that the wool may be kept as free as possible from all admixture with dirt and filth.

When sheep and lambs are being fattened, it is important that the shearing be done early. The stimulating food that is being given to them causes more heat in the system than would otherwise be present. This becomes so serious as soon as the days become warm as to interfere with the gains of the sheep. The importance of promptness, therefore, in attending to this matter, is very considerable. Years ago, shearing was often deferred until some time in June. The suffering thus entailed must have been considerable. The sheep also frequently lost considerable quantities of wool through rubbing and in other ways. This, in a large flock, was a considerable item. There was also usually some loss from the soiling of the wool around the buttocks of the sheep when the pastures became succulent and abundant.

### HANDLING WOOL

As soon as the fleece is removed, it should be spread upon a folding box or table, the inside being

downward. The sides of this box fold inward, thus causing the sides of the fleece to overlap one another, and the ends likewise cause a similar lapping in the other direction. The strings which are to tie the fleece are put into place in grooves for them before the fleece is folded. When thus folded the strings are tied. The fleece is folded up and tied into a neat roll, the smooth side of the wool only showing outward. No filth or tags should be rolled up with the wool, as this will be found out in time and will seriously react against the seller. When no table is at hand, the fleece should be spread similarly on a clean surface. The sides should then be folded in and the wool rolled up in the opposite direction and similarly tied, using such twine as is made for the purpose.

### STORING WOOL

When the wool has been thus rolled up, it is next put into sacks awaiting shipment. The sacks are suspended so that they stand erect and the respective fleeces are dropped into this. They are then tramped down or pressed down into the sacks which are sewed at the mouth when full and are then stored in any dry place until ready to ship. Wool may be kept some time if necessary, but it is probably true that, taking one year with another, the price will average as much when the wool has first been removed as after it has been stored a while. The wool is sometimes stored in a warehouse built for the purpose, convenient to some place of shipment. Of course, there are certain charges, as a rule, for such storage.

*Store in Dry Place*—When the number of fleeces is small any dry place will answer in which to store

the wool, that is free from dust and dirt and protected from the same, and that is safe from injury by wild animals or rodents. Even when the number of fleeces is small, it may mean considerable to the owner to have them done up nicely and kept in good condition until sold.



LONG WOOL AND LOTS OF MUTTON

The mutton sheep is now claiming its own. The demand for mutton is on the increase and at satisfying prices to the man who produces it.

## RAISING SHEEP FOR WOOL ALONE

Sheep cannot be profitably grown for wool alone on high-priced agricultural lands when wool brings but 20 to 25 cents a pound. In large flocks, under western range conditions, where land is cheap and one man can handle from 2,000 to 4,000 sheep, there is often considerable profit in growing sheep for wool alone; but even under western conditions a very large number of ranchmen believe in growing

a general purpose sheep which will not only yield a good fleece, but also a good mutton carcass. Mutton growers in the eastern states frequently obtain as much money for their fleeces as those do who grow sheep for wool alone.

In years past Merino wool has been the chief wool on the American market. The medium and coarse grades, supplied largely by the mutton type of sheep, have been offered in very much smaller quantities, as a result of which better prices have been paid in recent years than for Merino wool. By far the larger proportion of woolen goods is manufactured from Merino wool; but for some purposes longer wools are superior and for one purpose or another every grade and length of wool can be used. For all grades of wool, however, there is apparently a bright future.

The wool of sheep grows continuously throughout the year. If the feed of the sheep is uniform and nutritious, a uniform quality of wool will be produced according to the breed of sheep. Anything which affects the health of the animal also affects the quality of the wool. During a period of sickness or scant rations, the wool may temporarily stop growing. When the animal recovers, or when better rations are fed, the wool begins growth again. As a result, however, of this interruption, a weak spot is produced in the wool, which greatly decreases its strength and value for manufacturing purposes.

*Yolk*—By yolk in the wool is meant the natural grease or oil secreted by the skin. Under normal conditions the yolk passes down through the fiber and escapes apparently at the end, where it gradually works its way back into the fleece, giving it a kind of creamy appearance. In healthy sheep the

yolk constitutes about one-third of the weight of the fleece. At the factory, the fleeces are scoured and the yolk washed out before the wool is used for manufacturing purposes.

We have seen that grain feeding or the feeding of nitrogenous rations contributed to the production of the yolk and consequently a heavier fleece. The feeding of foods rich in oil also seems to favor the secretion of yolk. The yolk is of great importance in the fleece, as it keeps it soft and compact, clean and bright on the inside, and is a protection to the sheep in turning water. It is a characteristic index of the healthfulness of the sheep, since in sheep underfed or unthrifty it may be nearly lacking, while if present in excessive quantities, indicated by accumulations in flakes, it may be taken as a sign of unthriftiness, due to overfeeding.

In examining the fleece on the sheep, it is first opened over the shoulder. This is the point where the finest and soundest wool of the fleece is likely to be found. In parting the wool, the hand should be used in a flat position. The poorest, coarsest wool of the fleece is found on the thigh, while the thinnest woolled portion is likely to be found on the belly. The more nearly the fleece approaches in length, thickness and fineness the wool on the shoulders, the greater is the value of the fleece. A dense fleece is especially desirable, as it affords greater protection to the sheep from cold and exposure to wind and rain, and protects the inner wool from dirt and dust.

*Shearing Sheep*—Sheep are sheared once a year in all portions of the United States, except the Southwest, where they are sheared twice a year, in

April or May, and again in October. The shearing is done either by hand or by machinery. Good shearers in the East can shear from 40 to 60 sheep a day on the average, and the price for shearing is from 8 to 10 cents a head.

*Hand Machines*—On small farms or where there are less than 400 or 500 sheep to shear, the use of sheep shearing machines is of very doubtful economy. On a small scale shearing machines are run by hand power, requiring one strong boy or man to turn the machine and another to handle the clippers. The clippers work on the principle of the sickle of a mowing machine; the knife moves very rapidly, the power being transmitted through a flexible shaft. Sheep cannot be sheared any faster by machine than by hand; with care, however, the wool can be cut closer and perhaps a little more fleece secured than by hand shearing. The extra man, however, required to run the machine more than offsets any greater value of the wool. Where, however, a man has a flock of 1,000 or more to shear, and can supply the power for running the machines by steam or gasoline, it may be found economical. In the hands of the novice a little better job can be done with the machine clippers, perhaps, than with hand shears, otherwise there is no advantage in them. A further disadvantage is that the knives must be returned to the factory for sharpening, oftentimes causing delay at a critical time in the shearing.

The time to shear sheep in the northern states is April or May. The earlier the sheep can be sheared in the season, without causing discomfort from cold to the sheep, the greater the weight of fleece is likely to be and the better the quality of the wool.

*Washing Sheep*—Some years ago, sheep were generally washed before shearing. This practice has almost entirely gone out of vogue. The washing in creeks or otherwise is entirely ineffective from the manufacturer's standpoint and practically as good prices are secured for unwashed wool now as for the so-called washed wool. Of course, if shearing is done in the latter part of April, washing is generally out of the question, as at that early time of the year it would endanger both the health of the sheep and the men employed to wash them.

When sheep are washed they are usually driven to some river or creek, where the water is waist deep, and taken one by one into the stream. When a sheep is thoroughly soaked, the fleece is shaken and squeezed so that the dirt is washed away. The head of the sheep should, of course, be held above water, and after they are washed they should be turned on a clean, grassy lot to dry. Oftentimes the fleece is so heavy with water that the sheep will need assistance in getting on their feet. Ewes in lamb must be handled with especial care, though in most flocks the washing will not take place until June, when the lambing season should be over.

*Clean Wool*—Great care must be taken in the winter feeding of sheep and housing to prevent the wool from becoming filled with chaff, burs, etc. The wool is valued always on the basis of its scoured weight, and the buyer always allows for whatever dirt may be present in it. The wool of sheep that have access to a straw stack in winter is likely to be filled with chaff and will not bring within two to five cents a pound as much as it would if the wool was free from chaff. Likewise wool which is full of sand or burs is docked by the

buyer. The dockage is not so much on account of the weight of the burs and chaff itself, as of the difficulty in separating these substances from the fleece. This is usually a very tedious and expensive process and cannot be done without more or less injury to the wool fiber. Racks should be provided for sheep, at which they may eat without getting their necks full of chaff, seeds and dust.

*Tying Wool*—Sheep should be sheared on a clean floor or bench free from dust, chaff or other litter in order that the fleece may be kept perfectly clean. If the wool is put in sacks or bales, no tying is required. Otherwise the sides of the fleeces should be turned in and the fleece rolled together inside out and tied with a light, strong string, using as little as possible to securely hold the fleece together. The use of common, heavy, large-sized sheep twine is especially objectionable, not so much because it increases the weight of the fleece two or three ounces, but because the fiber becomes mixed with the wool and must be combed out before the wool can be used for manufacturing. Mumford found that the lower price of Michigan wools as compared with Pennsylvania and Ohio wools was largely due to the old square method of doing up the fleece and the use of heavy, coarse twine in tying it.

The best twine to use is about No. 18 hemp or small linen. If the box is used to do up the fleece, it should be a little longer than usual and smaller and much less twine used.

The tags should be trimmed off the fleece and sold separately. They should never be done up in the fleece. When sheep die of natural causes the wool may be pulled off and sold. This pulled wool is not as valuable as sheared live wool, as it will

not take dye as well and should always be sold separately as pulled wool. Likewise the pelt of a dead sheep is much less valuable than from one that has been killed.

Paint marks on the wool represent so much loss to the manufacturer and consequently lower the price for the wool.

*Classification of Wool*—The grower will seldom be in a position to sort his wool in such a manner that it would be any benefit to the manufacturer. It should, however, be graded uniformly as regards fleeces of different breeds, putting those together of the same breed and character. Beyond this the grower will seldom be able to go. Wool is classified in several different ways and in order that the grower may interpret the market prices of these different grades, a brief account will be given of them.

In a broad way, wool is classified as Domestic, Territory and Carpet or Blanket wool. By Domestic wool is understood the kind of wool generally obtained from sheep grown under general farm conditions. It should be bright, free from sand, dirt, burs, etc. Should it contain these materials, it would fall into the Territory class.

The Territory wools are so called because they are produced most abundantly in the territories and are generally discolored and dirty with sand, burs, seed, etc. Where, however, range wool is clean, it falls into the Domestic class.

The Carpet or Blanket wool is composed of wools containing a large amount of hairy fiber and kemp. By kemp is meant the coarse, white hairs which are found mixed with the wool in greater or less quantity. Kemp is usually prominent in the

face, the forearm and inside of the flank. Whenever kemp is found in these latter places, it is likely to be more or less abundant throughout the whole breed. This kemp or hair does not take dye readily and on this account injures the fleece for manufacturing, except for the coarser grades of goods, like carpets and blankets. In breeding sheep for wool, those which exhibit kemp should be fattened for market.

The Domestic and Territory wool may be divided into three classes designated as clothing or carding wool, Delaine and combing wool. This classification is based entirely on the length, quality and strength of the wool. And each one of these classes may be graded as fine, medium or coarse.

Generally speaking, clothing wools are short wools of relatively fine quality and less than  $2\frac{1}{2}$  inches in length. The Delaine wools are also fine wools clipped from all varieties of Merinos, which grow a long, strong wool staple,  $2\frac{1}{2}$  to 3 inches in length, while combing wools are those over 3 inches in length which are sound. Nearly all of the coarser long wools are graded as combing wools. However, a wool which may be long enough for combing, if it be unsound, is classed as clothing or carding wool.

## CHAPTER XX.

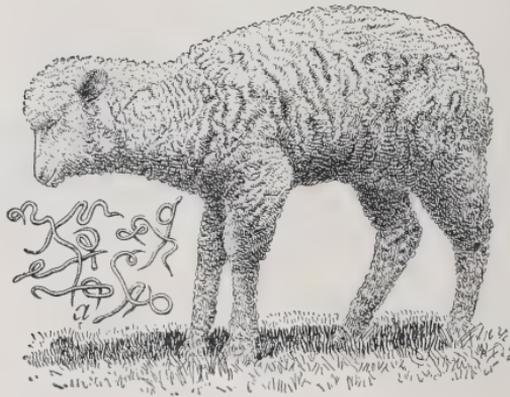
### **The Diseases of Sheep**

The diseases of sheep fall into two principal classes, those arising from exhaustion, run-down condition of the system and general debility; and those due to the presence of parasitic animals. There is no reasonable cause for the first class if the sheep have been properly fed, handled and cared for, but parasites are very common both on and in the sheep. Its thick wool and comparatively thin skin afford a most favorable lodging place and feeding ground for the class of vermin that dwell on the surface of the body; while of its internal organs, not only the stomach and the bowels, but the liver, brain and nostrils are the chosen habitat of various low forms of animal life.

### **SOME COMMON DISEASES**

*Colic*—This is a disease similar to bloating in cattle and is known by the swelling of the third stomach in the sheep by food, water or gases. The most frequent cause is due to feeding on green clover or alfalfa, especially when wet with rain or dew. It may arise, also, from indigestion or from musty food. The disease is readily recognized by the swelling of the belly on the left side, which appears while the animal is still feeding or shortly after. You will note, also, the oppressed condition of breathing, the bowels are constipated, and the eyes are anxious and wild and there is much

pain. Some shepherds are not specially concerned so long as this swelling is on the left side only, but when it reaches the right side, the animal is in imminent danger. About the only help now is to use a trocar, or sharp pointed penknife, making an opening to the point where the accumulation occurs. The penetration should be kept open by the use of a goose quill or some hollow



#### TWISTED STOMACH WORMS

A common attitude observed when sheep are afflicted with twisted stomach worms. The animal loses in flesh, and unless relief is found in time, dies. The parasite is shown in the illustration.

tube. Kneading with the hands the swollen stomach is also helpful.

*Foot Rot*—This is one of the most common diseases of American sheep and there have been few sections or few farms free from it. It is always contagious, due to a germ that harbors in the earth and grass.

The forefeet are usually first attacked. Lameness is there noticed and soon becomes complete; the appetite becomes poor; fever sets in and the

animal dies from general exhaustion. The offensive odor of the true foot rot is so characteristic that once experienced you can use it as a certain guide thereafter in recognizing the disease. The old practice has been to pare the hoof so as to rid it of all this diseased portion. This gives temporary relief only. The best sort of treatment is to keep no animals with diseased feet on the farm, to move the sheep from one pasture to another and to frequently till and cultivate so as to have the land pure and wholesome and free from the disease.

*Constipation in Lambs*—Lambs, especially those which are fed immoderately either on cow's milk or the milk of other ewes, are often liable to constipation. The bowels cease to act and the animal droops and after a while lies down. Once affected, there is little to do for the lamb. A change in food and some purgative or laxative are helpful.

*Diarrhoea in Lambs*—This disease frequently attacks whole flocks on first feeding on green grass. It is usually of no danger, but when individual cases call for attention, treat on general principles, because it may be more than a simple loose condition of the bowels. Real diarrhoea is often fatal and the lambs must receive the closest attention. It may be due to exposure, some sudden change in temperature, but is more likely due to improper food. The disease usually appears without warning, the lamb becomes languid, sad, keeping away from other lambs, and frequently lies down. The excrement is thin, whitish or greenish and in the later stages is quite watery and mixed with mucus and blood.

The first thing to do in treating this trouble is to change the food. It is not a bad idea to do that

even though the food does not seem to be the matter in fault. If the disease seems to be passing through the flock, it is wise to remove all the healthy individuals from the infested quarters, placing them elsewhere. An immediate remedy is the use of the white of an egg beaten in water, then mixed in warm milk and so given.

*Intestinal Worms*—Sheep are liable to be infested with a number of varieties of intestinal worms, such as tape worms, thread worms and round worms. The symptoms these produce are very obscure and not often manifest, for the most healthy looking sheep when slaughtered often show the presence of these parasites in the stomach and the intestines. But, of course, the best results cannot be secured when present, and if they can be gotten rid of, it ought to be done. In many cases, the sheep show a dizziness, often staggering and falling, and a general impairment of the sight. The best way is to consult your veterinarian for some treatment so that all trouble in this direction may be removed.

*Scab*—This is a contagious disease of the skin and is due to a parasite in or upon the skin. There are different forms of scab, but each kind causes itchiness—the most common symptom. Whenever you see an animal presenting a very ragged appearance, bare spots on the different parts of the body, with tufts of wool pulled out, and upon examination you find reddish pimples, you may feel pretty certain that the insect that causes the scab is present. Any sort of dip that is now on the market will remove this trouble. In the large sheep-growing districts, dipping plants are maintained by individual growers or by small stock companies. In this way frequent dipping is possible and takes

care of the work very rapidly. Even the small farm, with a few sheep, ought to have a small dipping plant. A little work, a little cement and boards for fencing purposes are all that are necessary.

*Head Scab*—The attacks of this mite are largely confined to the head. You will often notice the eyes, ears and neck affected also. The mites bore



SHEEP BOTS

The arrow shows location of grubs.

under the skin where not much hair is found, causing the formation of little scabs and blotches. The crusts may be removed by rubbing with oil and then applying any of the dips commonly used in the treatment of scab.

*Botfly*—This is a serious trouble and is due to the sheep botfly that lays its eggs in the ears and nostrils, which upon hatching, develop into grubs.

These penetrate deeply into the nasal cavity. When completing their life as a grub, they fall out, come out of the nose, go down into the ground for a short while, after which they come out as a botfly. Grubs are very disagreeable and painful when in the nostrils and sometimes go so far into the head that they never get out.

It is difficult to treat this trouble, the best way being to dislodge the grubs by the use of a feather dipped in turpentine and inserted into the nostrils. When tar is smeared up the nostrils of the sheep at the time the botfly is most active, the difficulty can be kept down to a minimum. Some sheep raisers bore holes in logs; these holes are smeared with tar and filled with salt. Sheep in getting the salt, therefore, keep their noses smeared with tar.

*The Stomach Worm*—This is a parasite that is found in the stomach and is a very serious disease in the eastern part of the country. Lambs are particularly troubled. When afflicted with stomach worms, they have digestive disturbances and diarrhœa. The remedy lies more in the nature of prevention than cure. Worms are harbored in moist pastures and in this way the animals take them into their stomachs. Many remedies are proposed and it is best to see your veterinarian for treating the disease.

*Lung Worms*—These attack the small air cells of the lungs, causing a sort of pneumonia. A hacking cough is an indication of the trouble. Of course, no medicinal treatment can be given. The way to prevent the disease is to seek new pastures that are free of the worms. Pastures that have not had sheep on them for two or three years are free. The old pasture should be plowed up so as to completely rid the land of the trouble.

## CHAPTER XXI.

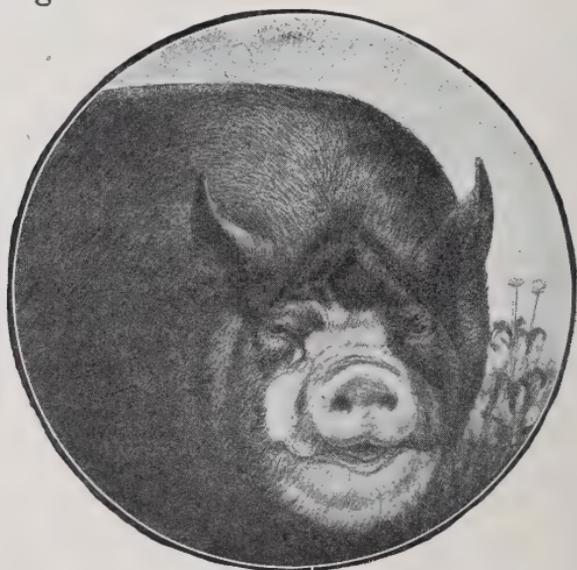
### Swine

The many breeds of hogs have all descended from the wild hog that once roamed over Europe, Asia and Africa. In evolving from the wild to the tame animal, many changes took place. The long snout gradually shortened, the skull widened between the eyes, the neck lost some of its sharpness and the legs became short and straight. But the most marvelous change was the laying on of meat and fat. There's where man came in and helped out. He found use for the meat and lard. He cultivated the tendency to develop these products and after a few centuries the modern hog was the result.

The wild hog possesses a head that is large, bony and coarse. The large jaw carries the heavy tusks that inflict the severest wounds. The neck is long and muscular and the loins broad and strong. In every way he is a foe fearful to combat when attacked by an enemy of any sort. He likes places that are moist, rather well concealed by brush growth, where he can get roots and fruits and succulent food, and even has a strong appetite for worms and snakes and flesh of any kind. Many of these characteristics have been lost in the modern domestic pig. Our present-day hogs may degenerate and become wild and fierce, yet they never, to the fullest extent, take to the habits of their ancestors.

*The Mortgage Lifter*—The hog has been called the "mortgage lifter." He reaches, when properly fed and managed, maturity at an early age. He

uses up a large quantity of food for which he makes good returns. He is at his best when plenty of green food, supplemented with various kinds of grains, is provided for his use. Clover or alfalfa and corn are the foods most desired by him, and when these are furnished he makes the best reckoning.



#### THE MODERN HOG

Just nose enough for breathing, ears enough for hearing, mouth enough for eating—and most of the rest is meat.

The hog is one of the most important animals on the farm for meat and money, and no farm is complete, be it large or small, unless there be a number of these animals to assist in the modern business of farming.

#### FILLING SWINE ORDERS BY MAIL

Swine are usually purchased when young if they have to be taken any distance. This is owing in part to the fact that they are usually carried by

express to avoid the hazard of disease. They are also very frequently ordered by mail, as the cost of a personal visit would be relatively more than the sum invested in the purchase would justify. When so ordered they are usually purchased when young, not later than the period of weaning, the object sought being to keep down the cost of transit. This is, under any conditions, costly when the transit is by express.

When ordering thus, the persons who order should be specific in stating the kind of animal wanted, the age at which it is to be shipped, the character of the pedigree, and the nature of the color markings when these are involved. Of course, first of all, the integrity of the breeder should be looked into. It would be safe with some men to allow the choice to rest with them when the knowledge possessed by the purchaser is limited.

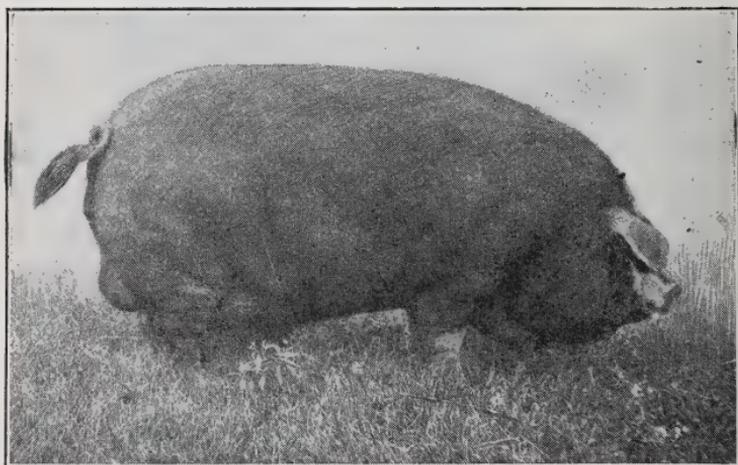
The person who receives the order should frankly say so if he cannot fill it. This would be vastly better than to send an animal inferior in any important particular. It might involve the loss of one sale, but that would be better than to run the hazard of losing many sales through shipping such an animal.

When the animal ordered arrives, the purchaser should be slow in passing judgment upon it. After a journey of some distance in transit, the first view is secured under unfavorable conditions. Nor should any blame be charged against the breeder should the animal show undesirable development later. This sometimes happens under the most favorable conditions for making a choice when the animals are young. Their subsequent development is frequently disappointing.

## CHAPTER XXII.

### Breeds of Swine

*Poland-China*—This hog originated in the Miami valley of Ohio, in Butler and Warren counties, from miscellaneous crosses of Big China, Poland, Byfield, Berkshire and Irish Grazier breeds on the common stock.



A WELL-BRED POLAND-CHINA BOAR

An Ohio invention to make pork. And in this connection let it be said there is no better money maker in all the world.

In the early days the breed was variously known under such names as Butler County, Warren County, Poland, Dick's Crick, Magie, Moore, etc., and it was not until the year 1872 that the name "Poland-China" was permanently adopted.

Further improvement of the breed occurred in Illinois and Iowa and they now constitute the most popular breed in the corn belt. The type is now firmly fixed and the breed undoubtedly pure. It is perhaps the best suited of all breeds to quickly convert corn into pork. It will stand close confinement and heavy feeding perhaps better than any other of the large breeds, but it is not as good a rustler and able to take care of itself as many other breeds. The sows are not as fertile as the Berkshire, though some strains are excellent breeders.

The Poland-China is a black hog, with six white points: feet, face, and tip of tail. The face is slightly dished and the ear broken about one-fourth to one-third from the tip. The breed is characterized by early maturity and nearly perfect form of the lard hog type, being very blocky and compact. Boars at two years of age should weigh 600 pounds and sows 500 pounds.

*Berkshire*—The Berkshire breed is of English origin and stands next to the Poland-China in popularity in America. It was first brought to this country about 1830. It is a black hog with six white points, marked much like the Poland-China, white on feet, face, and tip of tail. The face is dished, ears short and erect or slightly inclined forward, the neck very short and the back arched. The Berkshire breed in England is largely used for bacon; under American influences it has developed into the lard hog type. The hogs are of about the same size as the Poland-Chinas and possess about the same qualities. Good hogs weigh 240 to 300 pounds nine to 12 months of age, and mature hogs, 500 to 600 pounds. The specially good points in regard to the Berkshire are its early maturity, good grazing qualities, adaptability and



A BERKSHIRE SOW

The Berkshire is found in all parts of the country; she mixes well with dairy cows in the East, is at home with peanuts and sweet potatoes in the South and revels on corn and alfalfa in the West.

excellent carcass. It is one of the most popular breeds in the South.

*Duroc-Jersey*—This is an American developed breed. Its origin, however, is not positively known. Red hogs were known to exist in New York as early as 1823 and in Connecticut in 1830. Red hogs were imported into New Jersey from Spain in 1832 and in 1850 into Kentucky from either Spain or Portugal. In New Jersey they were first advertised in 1870 as Jersey Reds. In New York the breed was called Duroc, after a noted stallion,



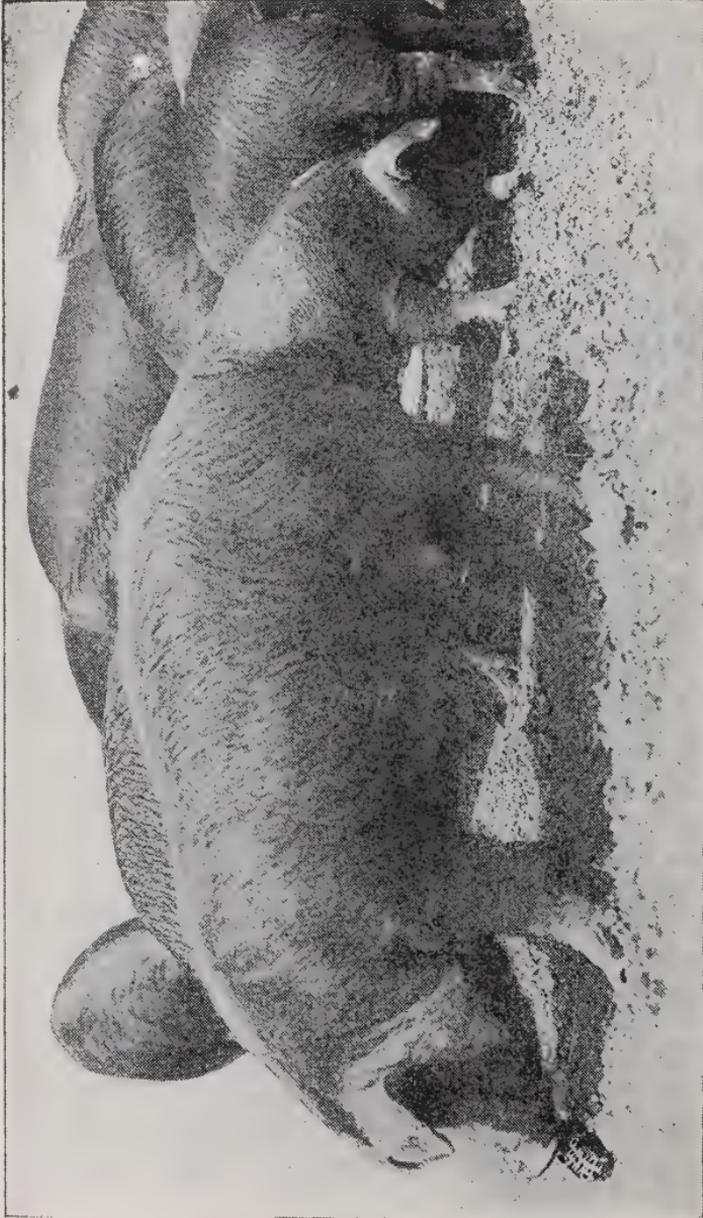
DUROC-JERSEY BOAR

A living factory that makes pork, lard and bacon.

as early as 1823. These two families of hogs possessed like characteristics and were undoubtedly of the same origin.

In form, the Duroc-Jerseys closely resemble the Poland-Chinas, but are red in color. The standard is a cherry red without spots. It is a coarser breed than either the Poland-China or Berkshire, with lop ears and numerous wrinkles and creases about the back and hind quarters.

The breed is chiefly noted for its great fecundity and remarkably good grazing powers. At six

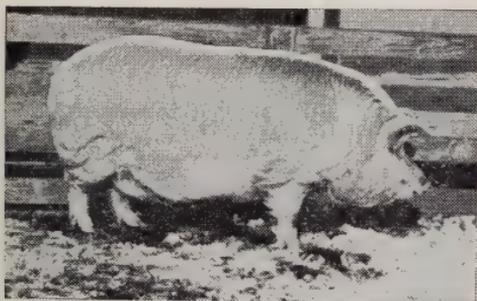


#### A BUNCH OF DUROC-JERSEYS

In the northern and eastern states the Duroc-Jersey is very popular. The large frame, moderate maturing qualities and remarkable prolificacy of these hogs have secured for them innumerable friends wherever hogs are raised.

months of age, good specimens of the breed should weigh 150 pounds, and at eight or nine months, the average should be 275 pounds. Mature hogs in good condition average 500 to 600 pounds in weight. The breed is of a quiet disposition, easily handled, have vigorous appetites and fatten rapidly.

They are one of the best of all breeds for the South, as they never sun scald. The breed is most popular in New Jersey, Pennsylvania and New



A MODERN CHESTER WHITE

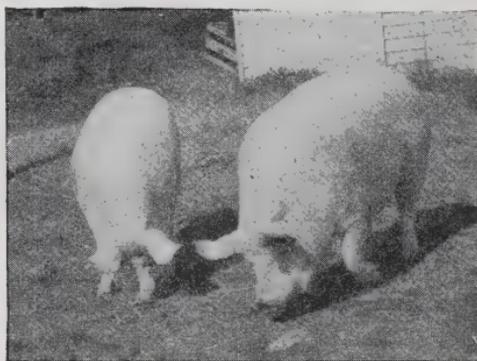
The Chester White has held its own throughout all the past years. It is a very popular breed in the eastern states.

York, and is rapidly gaining favor throughout the South and West.

*Chester White*—This breed originated in Chester county, Pennsylvania. It appears that a sea captain, James Jefferies by name, imported a pair of white hogs from Bedfordshire, England, in 1811. This stock, in connection with some Big Chinas, was used on the native stock of the country, mostly descendants of the Large Yorkshire breed, and formed the foundation stock of the present Chester White breed. This hog is the most popular of the white breeds, and its blood makes up a large

portion of the mixed black and white grades seen throughout the country.

The breed is white and the hogs among the largest, if not the largest, in the country, weighing at maturity 600 to 700 pounds and dressing 175 to 256 pounds when eight to nine months old. The hogs are of a quiet disposition, easy fatteners, with good grazing qualities. The sows are prolific, but are inclined to a sullen disposition at pigging time. Like all other white breeds, the Chesters



TWO AVERAGE YORKSHIRES

While an old breed, the Yorkshire is not well known in this country. It is, however, especially esteemed for its bacon qualities.

are not well adapted to southern conditions because of injury from sun scalds, mange and other troubles. The Chester White, while a large hog, has strong, fine bones and a big, lengthy body. The face is slightly dished, snout fine and long, the ears pendant, jowl rather light, neck short and deep.

*The Ohio, or Todd's Improved Chester White,* has for its foundation Chester County White hogs, crossed with a hog owned by S. H. Todd, which

traced its ancestry back to the Norfolk Thin breeds, mixed with Normandy blood. In 1865 this hog was crossed with Chester Whites from which spring the Improved Chester White.

*Yorkshire*—This is an old English white breed. Its blood has entered into the formation of practically all modern breeds either of English or American origin. There are three breeds, the Improved Large Yorkshires, or the Large Whites, the Medium Yorkshires or Medium Whites, and the Small Yorkshires or Small Whites.

These differ chiefly in matter of size. The Small Yorkshires owe their refinement to a cross with a Chinese hog, while the Medium Yorkshire is the outcome of the cross between the Large and Small Yorkshire. The old Yorkshire is long in head; body and legs large, with coarse, erect ears, with a strong coat of white hair. There are usually a few pale blue spots in the skin, but the hair on these is white. They are prolific, but slow in maturing.

This old type has been considerably improved, and the new form, under the name of Large Yorkshires, has been recently imported into Canada and the United States in comparatively large numbers; Large Yorkshires of the old type have existed in the United States for nearly a hundred years.

*The Large Improved Yorkshire* is fully as large as the Chester White, and represents the longest breed of hogs we have, though they are not as broad as the Chester Whites and do not generally grow to such heavy weights. They are especially suitable for the production of bacon, have good, strong legs, are excellent rustlers, impart a vigorous constitution to their offspring and are of great

value in crossing on over-refined stock. The sows are prolific and good mothers, being probably superior in these respects to the Chester Whites.

As compared with the Chester Whites, they have somewhat longer heads, with face dished, more pronounced jowl, longer sides, with less girth in proportion to length, and are slightly larger in limb, and rather more active.



SMALL YORKSHIRE SOW AND LITTER

This breed, while not well known, is highly prized by those who know it best. It has a place in American farming.

*The Small Yorkshire* is finer in quality than the Improved, presents greater symmetry and is much more compact in form; they mature much earlier, but do not attain as heavy weight as the Large Yorkshires.

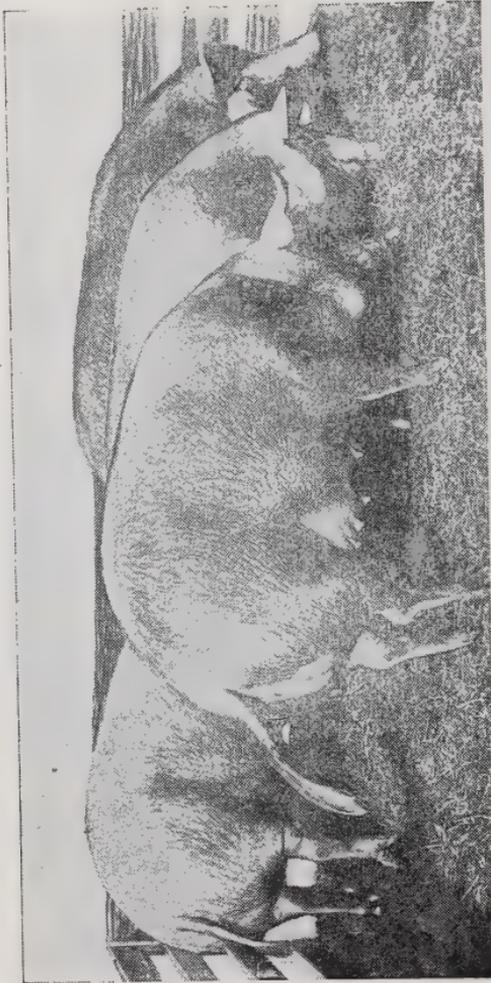
*Tamworth*—These pigs originated in England, and have been bred for many years, being one of the oldest and purest breeds of Britain. The blood

of other breeds has been used to but very little extent in the improvement of the Tamworth. The Tamworth resembles the Large Improved Yorkshire, being practically equal to it in size.

They are a long-bodied, long-legged hog, of a red or chestnut color, and especially suitable for the production of bacon. They possess great vigor and stamina, and impart these characteristics when crossed upon other breeds. They mature fully as rapidly as the larger breed of lard hogs when heavily fed. They are the equal of any breeds in grazing qualities and give good results under a forced feeding. The proportion of lean to fat meat in this breed is unusually high, which makes the pork and bacon produced of superior quality. No breed surpasses them in prolificacy.

*Cheshire*—This white breed of swine originated in Jefferson county, New York. It is the outcome of crosses between Large Improved Yorkshires and Suffolk breeds upon native white hogs. They are smaller than any of the breeds described above, and possess early maturing qualities in a marked degree. They have fair grazing qualities, are docile, rank high among the medium breeds as bacon producers, and are valuable in crossing upon the more slowly maturing breeds for the purpose of refining the bone and increasing early maturity. They considerably resemble the Berkshire in general appearance except that they are white, are not quite so heavy, and are more refined in frame and bone. The ears are small, fine, and erect and in old animals point slightly forward.

*Hampshire or Thin-Rind*—This hog traces its origin to Hampshire, England. It was introduced in Kentucky as early as 1825, where it has been carefully bred ever since. These hogs are black



A PEN OF TAMWORTHS

While not known nearly so well as many other breeds, the Tamworth is finding a place on many American farms. The breed is especially prized for its bacon-making qualities. It will never be, however, a rival of the old standard pork and lard breeds.

in color, with a band 4 to 12 inches wide encircling the body and including the front legs, which are also white. This gives the breed a striking appearance. The head is small, ears of medium length, slightly inclined forward, light jowls, broad back of nearly uniform width, heavy hams, legs well set apart, active and muscular. The sows are prolific and uniformly good mothers. The breed has excellent grazing qualities and easily attains a weight of 300 pounds at 12 months of age.

In crossing, they transmit their qualities and markings with great uniformity. The breed is comparatively new, but owing to its handsome appearance and other good qualities is very likely to increase in popularity.

*Suffolk*—The hog known as the Suffolk is a black hog, while the hog called Suffolk in America refers to a white breed. Good authorities, however, consider the American strain of white pig as merely the Little Yorkshire under another name. The Black Suffolk is one of the smaller breed of hogs. The head is short, snout turned up similar to that of the Small Yorkshires, body deep, ribs well sprung, with short, small bones and legs. The breed possess early maturing qualities in a marked degree, is medium in size, lays on fat rapidly and dresses out a high percentage of meat.

What is known as the American or White Suffolk is a hog somewhat similar in general appearance except that the color is yellowish white, perfectly free from spots or other colors. In general, it may be described as a short-legged pig, with a moderately long body, but wide and deep, and a much-dished head. It is adapted to intensive conditions where grazing lands are scarce and expensive and for producing a good quality of quickly grown pork.



A QUARTET OF HAMPSHIRE SWINE

This old English breed is gaining friends every day in America. The white band is an indication of purity of blood.

*Essex*—The Essex is another representative of the smaller black breeds of England, originating in Essex. As bred in America, they attain a weight of 250 to 400 pounds at maturity. They have a fine head, short nose, nicely dished face, thin, erect ears, short jowl, with a short, firm-boned leg. Especially good results have been reported with this breed in the South, but in the northern states, it will never be a serious competitor of the larger breeds like the Poland-Chinas or Berkshires.

*Razor-Back*—The hog, commonly known as the Razor-Back, is a representative of the unimproved breed in this country and is confined almost entirely to the more southern states. This breed is a long-bodied, long-legged, thin, long-nosed hog, exceedingly hardy, and with remarkably good foraging powers, but too slow in maturing and too light in weight to compare with the improved breeds of swine. It has no place in modern agriculture.

*Breeds to Grow*—Under present conditions in the United States, farmers will find it most generally profitable to grow the larger breeds of hogs, since they gain as rapidly as the smaller breeds up to the marketable weight of 180 to 250 pounds, and if not marketed at this time will continue to grow, while the smaller breeds will reach their limit at about this weight.

Some idea of the popularity of the different breeds can be obtained from the number of purebred animals registered in the different associations and which are now alive. In 1905 the figures for the Poland-Chinas were 113,000; for Berkshires, 30,000; Duroc-Jerseys, 20,040; Chester Whites, 8,400; Yorkshires, 4,600; Essex, 1,300;

Tamworths, 1,200; Cheshires, 1,000; Hampshires, 500.

These figures indicate that the Poland-Chinas are much in the lead, followed by the Berkshires, the Duroc-Jerseys and Chester Whites. The Poland-Chinas are particularly satisfactory to hog growers in the corn belt. Outside of this region they are no more popular than a number of other breeds. In the South, the Berkshires are probably most popular and numerous.

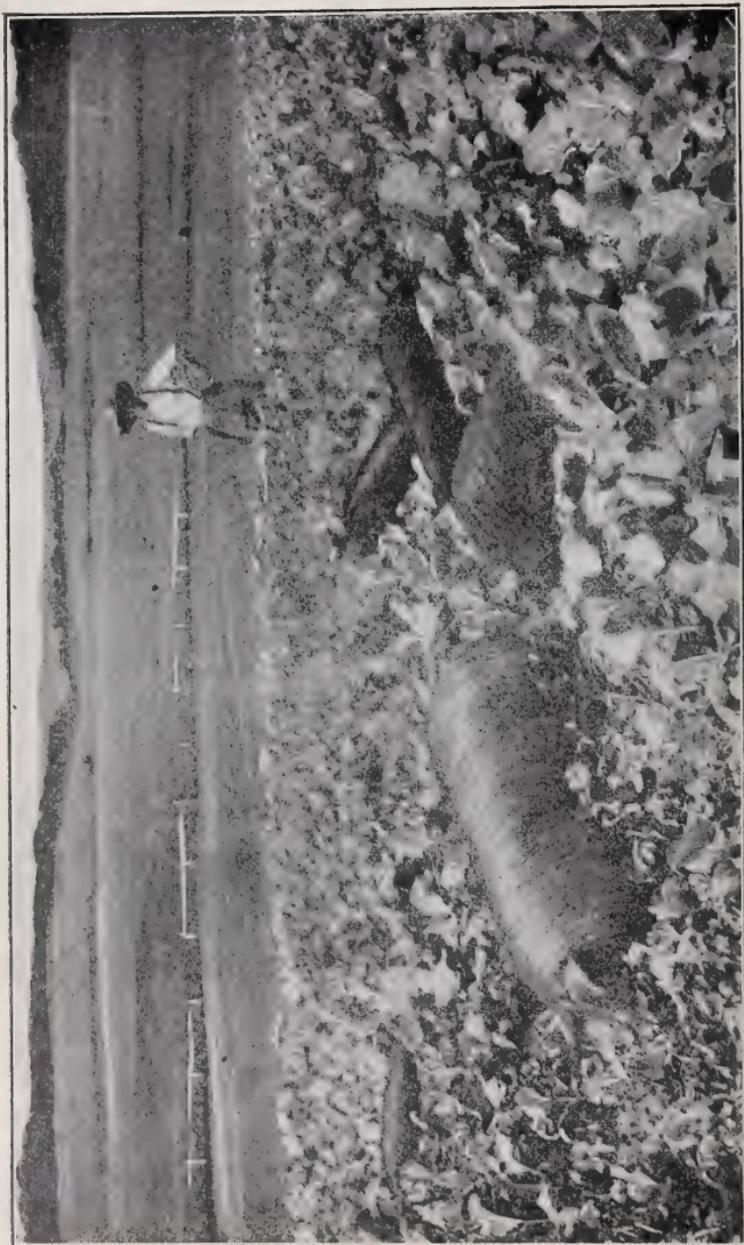
So far as can be learned, there is no special market and no special demand by packers in this country for bacon breeds of hogs like the Tamworths and Yorkshires. These breeds sell as well on the market as any other, but do not bring any higher price at present. Owing, however, to the large proportion of lean to fat in the carcasses of these hogs, the pork is superior and these breeds are likely to increase in popularity.

## CHAPTER XXIII

### Feeding Hogs

The first food of the pig is milk. After a short time, additional food will be advisable in order to secure the most rapid growth. The best gains are always secured in the early life of the animal; therefore, skimmed milk, kitchen slops and grain should be given as soon as young pigs can be induced to eat. This ought to be continued as long as available, even until fattening, if possible. Milk is naturally a nitrogenous food. It contains a large quantity of the muscle-making materials in proportion to the fat-making materials. As the pig grows older, its rations should be widened, until the protein in proportion to the food and carbohydrates is about one to six or seven. Corn is a great finishing food and it has a nutritive ratio of about one to nine. From this it will be seen that there is too much of the fat elements in proportion to the muscle elements; consequently even during the fattening period, some additional nitrogenous food is advisable. Feeding in early life should be for the purpose of developing bones, muscles and vital organs. This gives a foundation for profitable forcing later.

Many feeding experiments have been made in all parts of the country that show that an exclusive grain ration made up of corn is never satisfactory. Not only are the gains not so good as when mixed ration is fed, but the carcass is less desirable because of the large amount of fat located in all edible parts of the body.



MAKING PORK FROM RAPE

This forage crop is gradually extending its boundaries, and, while useful for all stock, is especially prized as a green pasture for hogs.

*Pasture for Pigs*—In the early stages of pig feeding, milk is very desirable and should be included whenever possible. Where milk is not available, slops made of middlings and shorts are to be preferred to most other milk products. But the great opportunity for making a profit out of pigs, especially when prices are low and grain products are high, is through the use of clover and alfalfa pasture crops. As the subject of pig feeding is studied, more conclusive becomes the evidence that alfalfa and clover pasturage go hand in hand with pork production.

It should be the swine raiser's aim as much to grow these two wonderful forage crops as it is to grow the hog itself; consequently in the great alfalfa regions where alfalfa has come into its own, it is so greatly appreciated that thousands of acres are annually being given over to this crop. In the eastern sections of the country, alfalfa is less popular and less known because of the difficulty in securing a stand and subsequent success with the crop. The fault, however, does not lie with the alfalfa crop. It is due to the fact that the farmer has not yet learned how to grow alfalfa on his particular soil in his immediate section and under his climatic conditions. Therefore, experimentation is in order for him so that he may learn the essential steps to take to get a successful stand.

Hogs can be turned into the alfalfa field early in the spring, and if the acreage is large in proportion to the number, they can be continued in the alfalfa throughout the season until frost comes again. The tramping will not hurt the crop nor will the feeding of swine impair the feeding quality of the alfalfa when made into hay. When the hogs are pastured in a large field, a small part of

the field can be cut, to be followed a week later by another part, and so on until the field has been cut over. In this way there is a new growth of alfalfa on at all times, giving the pigs just the sort of pasture they desire. But alfalfa is rich in protein, or nitrogenous elements, and hence the addition of corn while running on the pasture is advisable, especially if early maturity is desired. By turning young pigs early on alfalfa, supplying them with a daily small feed of corn will bring them within six or seven months to weigh 250 pounds.

With corn at 50 cents a bushel and hogs at four cents per pound, live weight, considerable profit is secured where alfalfa, corn and pigs are combined as a phase of the farm business

The alfalfa pasture is just the right sort of food for brood sows, stock hogs and other store stock. During the winter season, alfalfa hay or clover hay can be used in the dried stage as furnishing a large part of the ration and providing those elements essential for growth, thrift and lean meat.

The abundant supply of wood ashes and salt to which hogs may have constant access is an essential in hog raising that should never be neglected. Ground bone, charcoal, soft coal, are also desirable, and their use in hog feeding should not be denied. Where ground bone and ashes are constantly at hand, pigs mature better, have stronger bones and better health. This fact has been brought out by frequent tests and is now a part of good swine management over every part of the country.

*Cooked and Uncooked Food*—Much has been said as to the value of cooked feeds, but the fact remains that cooking is expensive and in those cases where better results have been secured, as

a result of cooking, the cost and expense have been greater than the increase would warrant. Consequently, the greater number of hogs will be raised and fattened without having received cooked feeds.

*Whole and Ground Grains*—While grinding increases the value of the common mass of feed, such as corn, peas and other grains, it still remains a question whether grinding shall be practiced, because of the extra expense. In round numbers, from 10 to 15 per cent cheaper gains will be made from ground food than from unground food. If a farmer owns his own grinding mill, he can ordinarily grind his feed at a cost that will be less than the extra returns through the use of ground food. Hence, it will be to his advantage to feed ground corn. If, however, he is obliged to haul his corn some distance to the mill, pay toll for the grinding, then return it to his farm, it is a question if the extra cost will not more than use up the additional returns. It is very likely that, all things considered, a great part of the feed will continue to be used in the unground state.

*Wet or Dry Feed*—The facts as to the feeding of grain either wet or dry are still conflicting. Many tests have been made, in some cases in favor of the wet feed and in others of dry feed. The weight of evidence seems, however, to be that it is desirable and advantageous to soak grains for hogs, but not to cook them. On the average, this advantage is from 5 to 10 per cent.

*Different Feeds*—Among the roughage materials may be mentioned alfalfa and clover, first. After them come oats and peas, sorghum, cowpeas, soy beans and green corn. The growing practice of hogging-off corn fields is warranted by the facts. Tests show that there are not only as good

gains made by hogging-off as when fed the corn husked or snapped, but there is a saving of the labor in cutting and husking the corn. In my judgment, a larger and larger area will each year be given over to hogs to hog-off. The practice extends now from Ohio to Minnesota and the repetition of the tests, especially by practical farmers, warrant the conclusion that this practice has come to stay.

The leading grains used in feeding hogs may be mentioned as follows:

*Corn*—Of course, this is the cheapest and most satisfactory grain to be fed. It is universally used for finishing off hogs. As has been pointed out, it should not be fed, however, to young and growing hogs except in connection with other foods, like tankage, middlings, shorts or some other nitrogenous feeding stuff.

*Middlings and Shorts* are largely used for mixing with other hog feeds and one or both is commonly employed for the purpose of making swill or slops.

*Tankage* is growing into favor, not only to be used for feeding young and growing hogs, but in fattening pigs as well. About one part of tankage to eight or ten parts of corn seems to be the right proportion to give. Many tests have been made and they invariably show not only greater gains when tankage is fed in conjunction with corn, but that these gains have been made at a far less cost than on the exclusive corn diet.

Almost every kind of grain feed finds favor in the hog lot. In the South, peanuts prove satisfactory when used as a pasture crop, especially when sweet potatoes or some more carbonaceous food is fed in connection with them.

*Peas* are a very desirable food, but their feeding value is hardly in keeping with the commercial price.

*Cottonseed Meal* has been fed to pigs, but with poor success. For some unexplained reason, it is injurious. While tests have been made showing that cottonseed meal may be fed with profit and satisfaction, still in the great majority of cases, death sooner or later comes; consequently at this stage of feeding-knowledge, cottonseed meal is not to be recommended as a suitable food for swine.

*Linseed Meal*, on the other hand, can be fed with impunity and profit. It should be fed, however, in connection with other grains. One part of linseed meal to ten parts of corn makes a very desirable food.

*Wheat, Rye and Barley* are all satisfactory hog foods, but on account of price, they do not often fall into the class of economical hog foods. There are so many other foodstuffs unavailable for use by man as to throw these grains out of the feeds available for hogs.

All the by-products of the dairy are valuable for hogs, such as skimmed milk, buttermilk and whey; fed in connection with the grains and alfalfa and clover, the greatest profit and ease are secured in the feeding and management of this class of live stock.

## CHAPTER XXIV

### **The Care and Management of Swine**

While the hog is accustomed to bad treatment, he will be a far better money-making help on the farm if he receives such attention as is given to other farm stock. There is just as much reason for tidiness in hog pens as in the houses and barns of other live stock. It is not stating the case too strongly to say that the many infectious diseases, now so fatal to hogs, are in most cases due to unsanitary quarters. Care and attention in this direction will bring better returns than when applied elsewhere.

The small pens ought to be abandoned as much as possible, and where necessary, cement floors be provided, or else open pens outside of the barns that they may be easily plowed and seeded to some cultivated or forage crop.

The practice of having many small run lots—a rod or two up to any width and long enough to be tilled by means of horse power—has solved the problem very satisfactorily to the health of the animal and to the owner, because of the additional profit secured by rapid growth and the minimizing of labor and expense.

As to general care, let the hog be provided with water, clean quarters and shelter from cold or heat. In the management of the hog in general, let good pasturage be considered as essential, in conjunction with which should be given grain foods that maturity may be reached at the earliest possible age. Slops and grain food are not enough for

the most economical production of pork. Hogs need green food; they need a variety of foods; they need fresh water and sanitary quarters, just as other stock of the farm.

### WHEN THE SOW HAS PIGS

When possible, provision should be made during

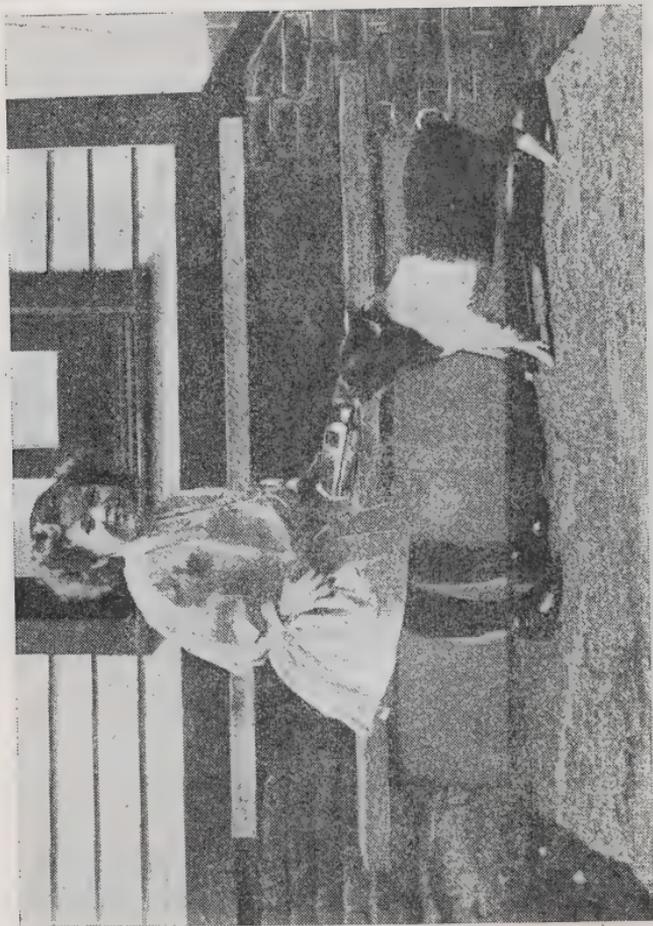


THE INTERIOR OF A MODERN HOG BARN

Iron and cement are now taking the place of mud and filth in housing hogs. Everything about this hog barn is cleanly and wholesome. If rightly cared for, there is no show for disease.

the summer to give the sow the run of a small grass plot or field where she will be free from annoyance from other farm stock. In the winter and early spring, the barnyard may be used for this purpose, when the cows and horses are not at liberty.

The sow, while nursing, requires liberal feeding, as the rearing of a large litter is a severe drain on the system. The following foods are especially good: skim milk, buttermilk, bran and shorts,



**HE LIKES HIS BOTTLE, TOO**

The runt pig, if separated from its mates and given the right sort of food, often becomes the biggest of the lot when fattened.

ground oats, wheat and barley, with a liberal supply of boiled roots and a grass run if possible.

*Teach Little Pigs to Drink*—With a little care and attention the little pigs can be taught to drink a little at from two to three weeks old and thus lessen the demand on the dam. The best method is to put a shallow, flat-bottomed trough or dish in a small inclosure in one corner of the pen, allowing the young pigs access to it at will, but where the sow cannot reach it. For the first day or two a little fresh milk might be used, afterward changing to sweet skim milk warmed to blood heat.

Good sows are often ruined at weaning time by the pigs being suddenly taken away while there is still a large flow of milk. This will tend to produce inflammation or garget, and a number of blind teats may be the result. The plan of removing all the pigs with the exception of one or two is also objectionable. It is a sudden check to the ones removed and the remainder will not, as a rule, take all the milk, besides running the risk of spoiling the sow.

Feed the sow a spare diet, giving such foods as a little dry grain, raw potatoes, etc., which will tend to arrest the secretion of milk.

### WEANING PIGS

The weaning season is more or less critical with young swine. In many instances they receive a setback at that time, which means loss in growth. The manner of the weaning is important, as well as the time of the same. When young pigs have learned to take slop freely, made of shorts and skim milk, they are being made ready for weaning without a serious check to their growth. Such pigs may be weaned, if necessary, at the age of eight weeks.

If they cannot be given skim milk, it is better for the pigs if they can remain longer on the dam. In such instances, they will fare better if they can take nourishment from the dam until ten weeks old. In no case should they be weaned until they can take food freely apart from the dam. Much care should be exercised to furnish them with those kinds of food that will promote good growth.

### PIGS FROM WEANING UNTIL FATTENING

As soon as young pigs are weaned, they must be kept entirely away from the dam until she ceases to secrete milk, but not necessarily for a longer period. Give them access to a good pasture in the day, and meal in addition, morning and evening, until the fattening period arrives. The amount of meal fed will, to some extent, depend upon the character of the pasture, but it should be enough to secure good growth. The meal portion of the ration should be of a nitrogenous character. When fed in connection with milk, a less quantity can be given and the meal can be more of the carbonaceous feed like corn.

*Pastures for Store Pigs* include rye, blue grass, alfalfa, clover, barley and oats, rape and soy beans. Winter rye is ready before any other kind of pasture, and it may be made to last a long time when cropped closely. Bluegrass, nearly as early as rye, furnishes good pasture, but soon gets too dry and woody. Alfalfa, where it grows well, will furnish pasture for swine during the greater portion of the growing season. Common red clover is ready fourth in point of time, and when properly managed will furnish good pasture much of the season. In the absence of clover, barley and oats, or peas

and oats, will furnish a good pasture. The Dwarf Essex rape, sown early and eaten off when fairly grown, will furnish excellent pasture for store pigs from the middle of June until freezing-up season, but to accomplish this it must be sown at successive periods. Soy beans and cowpeas furnish grazing when the grain is nearing maturity and somewhat later in the season.



CHESTER WHITES IN A PORTABLE PEN

This breed makes good use of pastures, is especially popular when dressed and sold in local markets. The portable pen for outside feeding should take the place of the stationary, filthy feeding lot.

*Green Foods*—In addition to pastures, certain green crops may be grown with much advantage for store pigs, such as peas, sweet corn, squashes and mangels. They are to be fed to supplement the pastures and also the meal part of the ration. Store pigs will make a substantial growth when gleaning among wheat stubbles, for a time at least,

providing they have been given access to the stubbles soon after the wheat has been cut. When thus engaged they do not require much additional food. If clover has been sown in the spring, no grain will be required.

When store pigs are to be reared in the winter, the aim should be to have them farrowed early in the season, that they may be considerably advanced in growth when the winter sets in. The pens must be warm, well lighted and dry, and the pigs should be allowed some exercise on fine days. The food may be essentially the same as that given in summer, except that roots only, or clover, or alfalfa can be given in lieu of the green food of summer. When practicable, the food should be steamed, hence it can be, and should be, fed warm. The pigs usually bring a better price when sold before the season for grass pasturing. For various reasons there is more hazard in rearing autumn than spring litters, but with due preparation and due care such litters may be profitably reared.

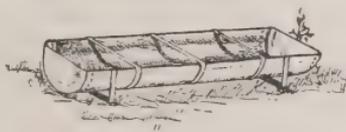
### CARE OF SOW AND PIGS

Sows should be mated ten months to a year old, according to growth. Breeders differ with regard to the length of time the boar and sow should be together, but I prefer to leave them in each other's society about a day.

The hog house should be of sufficient height to clear the sow's back and necessitate short turning. If the period of birth occurs in the winter, the house cannot be made too warm. If possible, have a yard for the sow outside the pen. It will not only give her contentment, but exercise, thereby preventing the accumulation of flesh, which is a detriment to

the coming brood. It also develops bone and muscle and imparts to the offspring vigorous constitutions. Feed at this period with light, tasty food, such as middlings, bran and stale bread.

*Care at the Time of Birth*—If the sow's house is comfortable this is about the only precaution necessary. Give just bedding enough to lie upon. It is a good plan to chop it up in the fodder cutter. The sow is inclined to form her bed for her nest, just her own size. The tottering little fellows fall under her as she rises. When she again lies down they are crushed. The best of mothers are liable to do this. After keeping the bed level for two or



A GOOD HOG TROUGH

A feeding place like this provides cleanliness, stability; and the trough is unbreakable.

three days, the pigs get strength and this danger passes away.

*Food and Care After Birth*—Feed moderately with tasty food for two or three days, when the milk will come in full flow. Then gradually open your grain bins and cribs and give her a variety of heavy feed, accompanied by milk if possible, watching all the time for signs of clogging. At the first symptoms restrict the feed. Do not forget to give some whole corn, as she will nibble at that at odd times.

*Care of Pigs*—The pigs will not need much care for about a week or ten days. At the end of that time they will begin to emerge from the pen. At that time place some tasty food, milk and broken

crackers at their door, sheltered from dogs and cats, and you will be surprised how soon they will sample it. In a few days they will come out at your approach. By feeding from that time on until selling time, you will increase their weight about one-third and they will sell all around your neighbors' who do not "bother."

### FEEDING SKIM MILK

The feeding of skim milk to swine is but imperfectly understood by many of those who feed it. The following may be said with reference thereto: The aim should be to feed the milk as soon as it is possible to do so after it has been obtained, as, especially in cold weather, it is a distinct advantage to feed it with the animal heat in it. No better food can be given to young swine, aside from the milk of the dam, while they are yet unweaned. At such a time they will turn to good advantage all the skim milk that they will consume.

Subsequently to the growing period they will turn to the best advantage not more than, say, four pounds of skim milk to one pound of grain, when they do not have any grazing. When furnished with grazing and grain, not more than three pounds would be needed to one pound of grain. Much more may be fed, but the relative profit will not be so great. Not more than four or five pounds to one pound of grain should be fed to swine that are being fattened. Brood sows can turn to good account large quantities of skim milk, but not to such good account as the young swine that nurse them. It is correct to say that the younger the swine to which the skim milk is fed, the better will be the return from feeding it.

## FEEDING BROOD SOWS

In feeding brood sows, three points should be constantly borne in mind: First, to supply the nutrients necessary for the proper nourishment of the sow and the litter she is carrying; second, to make the ration bulky enough to keep the system open and in good condition; and third, to make it as cheap as possible. During the growing season such a ration can be supplied at a minimum expense by feeding about two per cent of the sow's weight of three parts of corn and one part bran or middlings, soy beans or cowpeas; the remainder of the ration being supplied by allowing the sow to run on clover, alfalfa or some other leguminous pastures.

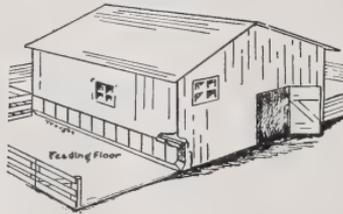
*Clover and Alfalfa Desirable*—In winter, cut clover or alfalfa hay mixed with grain, together with a sugar beet or two, or mangels, will make a good substitute for the pasture. The sows, as well as the boar, should have abundant exercise, and in placing the houses in the lot where the pigs are confined, care should be taken to have the feeding place as far from the sleeping quarters as conditions will allow, so as to enforce exercise in cold weather.

## BROOD SOWS IN WINTER

The management of brood sows in winter has more influence in determining what the swine crop for the season will be than any other single influence which bears upon the question. When sows are wintered properly from start to finish, let the season be what it may, the return in progeny is likely to prove satisfactory. It should not, at least,

prove disappointing. Sows, to produce good litters, must have proper food and exercise, and also proper shelter during their period of pregnancy:

A diet all carbonaceous or mainly so is very unsuitable for brood sows. Such is corn. Barley is not so highly carbonaceous, but it should not be fed alone. Such a diet does not properly sustain the foetus in uterus. The young pigs when born, if born alive, will be small. In some instances they will be deficient in hair. The sows are likely to be excessively fat if fed liberally, and may also have trouble in bringing forth their young.



HOG HOUSE AND FEEDING FLOOR

This convenient hog house is inexpensive and the feeding floor at the side insures cleanliness and thorough sanitary conditions. A sanitary hog house should be one of the chief improvements of the farm.

A diet all nitrogenous or mainly so is just as unsatisfactory. Blend the two groups and get a mixture. Use grasses, clovers, alfalfa and field roots with the grain.

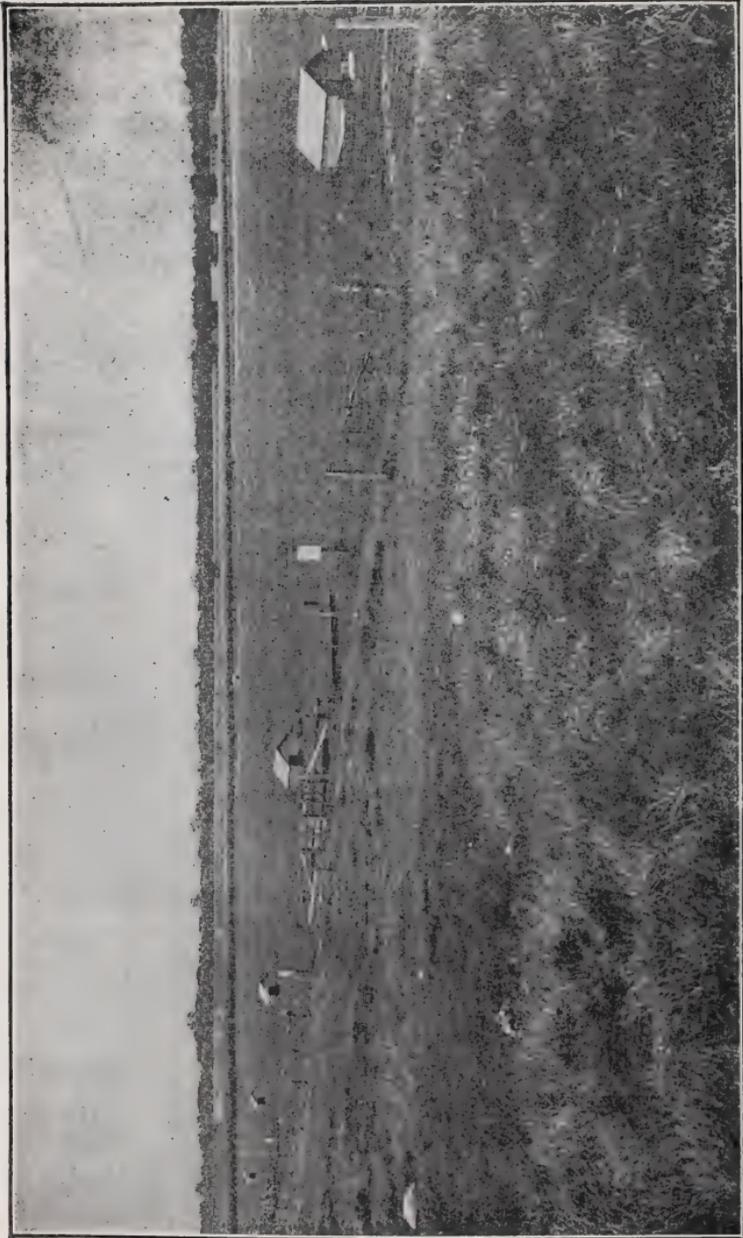
*Use Home-Grown Feeds*—The rations used should depend upon the readiness with which they may be grown in the locality. The list is a long one, and it may be made to include the following: Ground corn, barley or rye and wheat bran, fed in equal proportions by weight of one of the grains and two of the shorts; equal parts ground oats and shorts by weight; any kind of field roots fed so

freely as to furnish the bulk of the ration with some corn added in the ear, or, in its absence, a little grain of any of the kinds named above; potatoes, grain and skim milk; cowpeas and corn in the proportions of two and one parts respectively; and cassava and cowpeas in the proportions of three and two parts by weight.

Well-cured clover hay, if cut early, may be freely fed with profit and the same is true of alfalfa. These go along with a diet considerably carbonaceous. Sorghum, well grown, may also be used similarly, but along with a nitrogenous diet. The proper blending of the foods is greatly important with brood sows, so unless the diet fed is at least approximately correct, the young litters will be proportionately disappointing.

*Exercise for Brood Sows*—The question of exercise need not give any serious concern to those who live in climates so mild that they can pasture more or less during the winter. If they can be set to work to dig artichokes or peanuts, so much the better for the progeny. They will come strong and vigorous. But where brood sows have not the opportunity to dig thus for their food, and where the winters are of such a character that they cannot get to the fields to glean, it is very different. When the days are cold they are much inclined to lie in their sleeping quarters, and thus take little or no exercise.

This can usually be most readily remedied by allowing them free access to a barnyard, where they will have opportunity to root amid the litter in search for stray heads or kernels of grain. Some strewn purposely now and then will encourage them to take more exercise and the more of this they can be made to take the better will be the results. One



WHERE HOGS ARE WELL CARED FOR

The illustration shows several individual hog houses with pasture runs for each. Exercise, succulent food, good air and freedom from disease are possible whenever this scheme is adopted.

objection to having been in a barnyard is that they may run into apartments where the doors may be opened, while the animals within are being cared for. In this way they may become a positive nuisance, but this matter may be regulated by allowing them access to the barnyard when other work, such as has been referred to, is not going on. The fear that they will be injured with other live stock need not be felt. In a few instances this may happen, but such instances will be rare.

*Shelter for Brood Sows*—Whatever the character of the shelter, it should possess sufficient ventilation, dryness and warmth to keep the animals comfortable. With these requisites it matters not, so far as the health of the sows is concerned, how these have been secured. Even in cold climates they may be secured in an old straw stack which stands on dry ground. Brood sows have thus come through the winter in good shape in stack bottoms built adjacent to the yards. But, of course, when the farrowing season draws near, they should have quarters that are more accessible, hence, when a number of brood sows are kept in winter, there should be apartments for them in which they can farrow separately, and be kept there with their young for a sufficient period. Dampness in winter quarters is particularly prejudicial, as it tends to produce lung and rheumatic troubles, both of which may prove disastrous even in the case of the dams, to say nothing of the litters. The necessity, therefore, for attention to keeping the bedding dry is imperative.

*Keep Brood Sows Apart*—While sows may lie a number together for a time, after they become pregnant, this should not be allowed in the advanced stages of pregnancy. To allow it may result in

injury to the young and also to the dams. They should not be allowed to sleep on concrete or cement floors in winter, unless they are overlaid with boards, or they may lead to rheumatic affections in the sows. Where they cannot have access to barnyards, they must be encouraged to take exercise by giving them a part of their food in any open place where the ground is dry and bare. Such grain food should be thinly strewn. They will then take more time in which to gather it. But in really cold and stormy weather such exercise should not be insisted on.

### SELECTING AND CARING FOR STOCK BOARS

The more important considerations in selecting a stock boar include lineage, general individual qualities, and characteristics as to form. As with cattle and sheep, it is essential that the boar be purely bred and descended from an ancestry on the side of the sire and dam possessed of requisite qualities. These qualities include constitutional vigor and the ability to give good returns in meat for the food fed. His size should be medium to large of the breed represented, his bone medium to strong and his body of a compact type and smooth, and covered with a good coat of strong but not coarse hair and possess a clean, smooth skin; and he should also have decided masculinity. In addition his head should be medium to strong; the neck broad and deep, varying in length and depth with the breed. He should be evenly wide at the shoulders, sides and hams, and deep top and bottom lines parallel, except that the top line should be a little arched in some breeds.

*Do Not Select Too Early*—The selection of a stock boar should not be made at too early a period, as modifications in form take place with the gradual development of the animal, hence selection, when possible, should be deferred until after the weaning season. Boars from early spring litters should be given the preference, as they can be used to some extent in service the same year. The food, until ready for service, may consist largely of shorts or oats and corn meal, in the proportions of, say, two to one part; with green food added. More complete development can be secured when the boars are fed apart or in small lots after they have been selected for breeding. They should not be allowed to remain with the sows beyond the age of four or five months.

*Amount of Service*—A boar should not be used in service until eight or nine months old. Until one year old he should only be used to a limited extent. Soon after one year old he should be used with much freedom in service, but, if possible, not more frequently than every other day. The duration of service will depend, to some extent, upon the disposition of the animal, upon the extent to which he has been used in service, and upon his prepotency. Vicious animals and indifferent brooders cannot go too soon to the block, while superior breeding animals may be kept as long as they are markedly useful. It is not usual to keep boars beyond the age of five years. But remember that excessive service always leads to physical degeneracy, small animals and lack of vigor in the young pigs.

*Isolation and Exercise*—It should be the aim to keep the boar in quarters quite away from sows, but this may not be practicable, especially in winter.

It is advisable, however, to have the fence surrounding his yard close rather than open and both summer and winter he should be encouraged to take exercise.

*Summer Management*—The meal portion of the ration may include shorts and corn meal or ground barley or ground peas in the proportions of two and one parts respectively; wheat bran, shorts and corn meal or barley, equal parts; ground oats and ground corn or ground barley or ground peas, in the proportions of one and two parts respectively. Green food may be added, such as bluegrass, alfalfa,



HOG HOUSE FOR A SINGLE INDIVIDUAL

The corn stover set about the wooden house gives good protection in cold weather.

clover, green peas, rape, sweet corn, squashes, pumpkins and weeds from the garden.

*Winter Management*—During this season the boar should be given warm quarters with frequent changes of litter, access to yard, and where practicable, access to a barnyard, during a part of the day. The food may be substantially the same as in the summer, as far as the meal factors are concerned, taking care to use more relatively of the carbonaceous foods. Green food may be and should be applied in the form of field roots.

*Disposing of the Aged Boar*—When not wanted longer for service the boar should be castrated,

preferably in the spring of the year. He may then be allowed to run through the summer on pasture and other food. When fattened and slaughtered in the autumn, he may be turned into lard and sold as such, if so desired.

### PASTURE CHEAP FEED FOR SWINE

It would be correct to say that in no other way can a pound of pork be made so cheaply as when it is made on pasture. As a rule, however, other food more concentrated should be fed while the swine are on pasture, to supplement the same. The amount of supplemental food will depend upon the nature of the grazing.

The most valuable grazing is that which is leguminous in character, as clover in any of its varieties, alfalfa and peanuts. Other grazing, however, may be very excellent that is not leguminous. Such is Dwarf Essex rape and some other plants.

In the northern states the following plants may be used to provide grazing for swine: Winter rye, barley, alfalfa, clover in nearly all its varieties, vetches, rape and artichokes. The grains that may be harvested by the swine when mature include rye, bald barley, corn and the Canada field pea.

In the eastern states the same foods may be grown as in those north. The Canada pea may not grow so satisfactorily, but the crimson clover could be added to the list, also certain varieties of cowpeas and soy beans. The sand vetch would also furnish pasturage.

In the southern states the list of pastures would include: Winter rye, winter oats and winter barley, the common vetch and the sand vetch. All of these would be sown in the fall. In the line of



#### MAKING PORK OUT OF CORN AND ALFALFA

The combination of these two feeds forms a well-balanced ration and secures the most economical production of pork on the farm. The hog raiser should exert every effort to get a patch of alfalfa growing on his farm.

other grazing, the list would include crimson clover, Japan clover, burr clover and Bermuda grass. In the line of roots it would include artichokes, sweet potatoes and peanuts. The two latter, however, would only be used thus when of coarse-growing varieties, as when, for instance, they were too coarse for market uses. Cowpeas and soy beans would also furnish good grazing.

In the western states, especially in the mountain states, alfalfa will be the outstanding swine pasture. This does not mean, however, that many other pastures, as winter rye, bald barley and Canada field peas, will not be used. In the states just west of the Mississippi, sorghum is frequently grown for swine pasture.

Since pasture is so easily grown for swine, and since the list of plants suitable is so large, it should be easily possible to provide pasture for swine in any part of the United States in which swine are kept.

### ALFALFA HAY FOR HOGS

Can alfalfa hay be substituted for corn during winter feeding? It can. In the alfalfa sections, both green and dry alfalfa enter very largely into the maintenance and fattening rations of hogs. It is not uncommon to winter hogs on alfalfa alone.

The objection to this practice lies in the fact that alfalfa is too valuable to be used without other feed going with it. Alfalfa, you know, is rich in the proteids. It runs to one extreme just as corn runs to the other. It is the mixture of the two, of proteids and carbohydrates, that makes the ideal ration for any class of live stock. When alfalfa enters into the pork production, let this plan be followed:

*Beginning with the Shotes*—In early spring let the shotes, stock hogs and brood sows run in the alfalfa field. This will carry them for several months. Many feeders like to give, even while on alfalfa pasturage, some corn also. As the feeding period advances, and the shotes reach maturity and approach the fattening period, increase the amount of corn constantly until you take the hogs from the pasture altogether, at the same time giving corn almost wholly.

If pen fed, a little alfalfa hay will not be out of place. Alfalfa meal is often substituted for alfalfa hay in the feed pen, but from the standpoint of price, alfalfa meal is out of reach. Tankage, one part being used to ten of corn, makes quite an ideal addition to the usual finishing food. The last two or three weeks of feeding, corn may be used alone.

In feeding during the winter time, if you have plenty of alfalfa, give the hogs free use of alfalfa hay, cut or uncut, as the case may be, and a little less of corn than your usual custom. When alfalfa hay is used, of course other feeds, like middlings and shorts, need not be used.

*Pasturing Cattle on Alfalfa*—What is said here about hogs, in the most part, is true of cattle, with this exception: The greatest caution must be used in pasturing, especially in the spring. I know many cattle raisers who pasture cattle on alfalfa, but they make it a point always to have bluegrass and timothy available, and old stocks of hay scattered throughout the field, or old hay fed from racks or the load.

Alfalfa is a coming crop for the older middle states. In the future it will enter more largely into the production of pork, beef and dairy products than any other forage crop, corn excepted.

## HOGGING OFF CORN

Some hold the idea that hogging off corn is a shiftless way of farming. This is based neither on facts nor good judgment. As a method of economical feeding, the practice of hogging off corn has been growing in favor during the past few years, and seems to be a practicable and economical way of feeding hogs several weeks during the fall.

A two years' investigation into this subject was made at the Minnesota station. Comparisons were made with other methods of feeding corn and letters of inquiry were sent to many farmers who had experimented with this plan. As a result, the station is strong in its recommendation of this plan, viewed from an economical standpoint brought about by the reduced bill for labor. High prices for labor, together with low prices for corn, warrant economy in labor, even though it may lead to a slight waste of corn.

*What the Experiment Shows*—The following conclusions were arrived at after a thorough investigation of this interesting subject:

Pork was produced with less grain by hogging off corn than by feeding ear or snapped corn in yards. Hogs fed in fields gained nearly one-third more rapidly than those fed in yards. The cost of fencing corn fields may be from \$1.00 to \$2.50 less per acre than the cost of husking corn. It requires no more labor to prepare for subsequent crops, fields that have been hogged off than those that have been treated by the ordinary methods of harvesting. Hogs waste no more corn in fields than when fed in yards. They pick the corn as clean as most men do in husking. Labor in caring for

hogs is not increased by hogging off corn, but may be decreased, if systematic methods are employed.

*How to Obtain Best Results*—The variety of corn usually grown in a locality is the proper kind to grow for hogging off purposes, since it is probably best adapted to the locality and gives the largest yield. However, getting an early start in the fattening process is very advantageous, and it sometimes happens when pasture supplies are short, or the early sale of hogs is desirable, that such a variety does not mature early enough.

To be prepared for such conditions, it is well to grow a sufficient amount of sweet corn or early maturing flint corn to tide over until the field corn is ready for use. No more than is sufficient for early fall seeding should be grown, since it costs just as much to grow these varieties as it does the dent, and they yield much less. Flint corn is preferable to sweet corn for hogs, and field feeding of flint corn gives better results than where husked and fed after the corn has hardened.

*Size of Pigs to Use*—Pigs weighing from 100 to 140 pounds are best suited for field feeding, since they have at that weight formed a good amount of bone and muscle for framework, and are in a condition to fatten rather than to grow. Those that have been grown on pasture are better fitted for the work than those that have been confined in pens, as they are more active, and have had more experience in gathering food for themselves. They, therefore, eat corn more readily and require less amounts of expensive mill feed. Shoters of this weight may be expected to gain at the start about 1.4 pounds daily. In 60 to 70 days of feeding they should gain approximately 92 pounds.

Old brood sows that are thin in flesh fatten up very quickly when turned into a field. A few weeks on early varieties of corn will usually permit such sows to be marketed early, or before it would be possible following the common method of feeding.

*Much Water Needed*—While eating corn in the field, hogs require a great deal of clear water. They grow and thrive better when they have it, and some means of supplying it to them fresh and in large quantities must be provided. When in the field, hogs do not come up and drink in droves, as they do in the yards. Therefore, it is necessary to keep water before them continually.

When fields adjacent to the farmstead are used, hogs can be brought up to the yards and watered or fed slop as usual. Where fields remote from the farmstead are used, the simplest way is to fill several barrels or casks with water, and haul them by team on a stoneboat or other conveyance to the field. Enough can thus be taken out at a time to last two or three days.

When a plentiful water supply is assured, sloping does not require such careful attention. Many feeders do not slop at all, but better results are undoubtedly obtained by supplying some sort of bone and muscle-producing feed to pigs weighing under 140 pounds. Old hogs do not need it, but young ones do. In the early fall, when on a rape or clover crop, or when green feeds of any sort are plentiful, once a day is all that is necessary to slop the hogs, but as the season advances, they should be sloped at least twice a day.

Shorts, middlings, or oilcake and shorts combined are good growing foods, and hence are good material for slops. Experiments have not yet

been carried on to determine the extent to which slops should be used, but careful observation and experience warrant the above remarks.

Even though it may be safe to turn hogs into the corn fields early, it might not be wise, for a smaller amount of feed is obtained when the corn is not allowed to ripen first, and the pigs are likely to tear it all down before it matures. When to turn in, will, therefore, depend upon the amount of available pasture and the nature of the pigs as well as upon the development of the corn. It is safe to begin hogging off the field corn about the time it is dented.

### PASTURE FOR HOGS

It is probable that in no way can pork be made more cheaply than with grain on pasture, provided the grain and pasture are of the right kind. Experiments at a number of different stations have shown that it requires one-fifth to one-third less grain to produce 100 pounds of pork with pasture than without it. While this is no doubt true, care should be taken not to overdo the matter of pasture, especially with young pigs. Young pigs need more protein than older ones, because they are growing, rather than fattening.

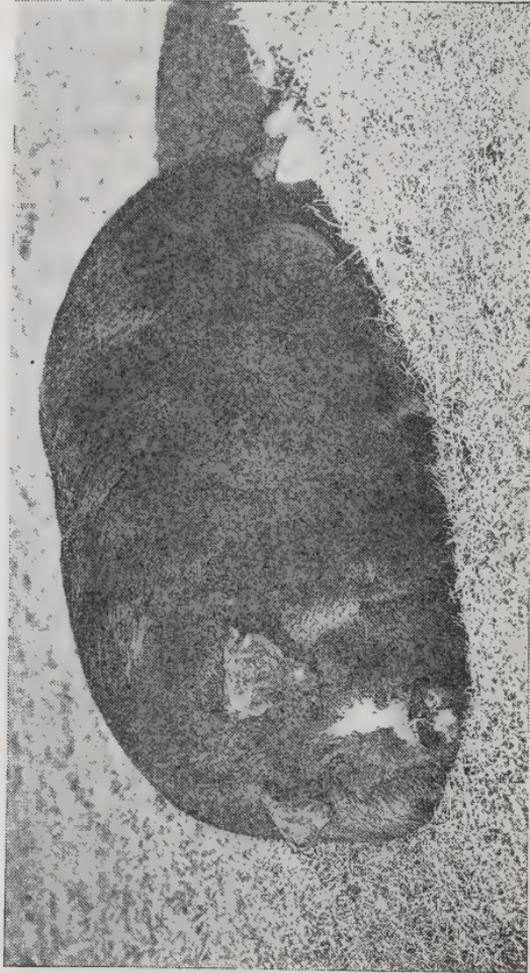
In consequence, the young pig should receive for some time after being weaned, a ration equivalent to two parts of corn meal and one of middlings, with perhaps little tankage aside from access to good clover, alfalfa, oats and peas, or cowpea pasture, from which he will get considerable protein. On this sort of pasture, as the pigs grow larger, the proportion of corn may be increased until they have attained the weight of about 100 pounds, when

corn alone may be economically fed, unless, perchance, corn may be high and protein feed proportionately low in price. Under usual conditions, however, the nitrogenous feeds are so high that, although their use undoubtedly would make more rapid gains, they are obtained at such an increased cost as to render their use unadvisable.

*Work for Steady Growth*—Pigs should be so fed that they will gain a half-pound a day from the time they are three weeks old until they are marketed. It is impossible to make anything like this gain on pasture alone, but, on the other hand, it is possible to feed more grain than is necessary to make the maximum gains. It seems, too, that in order to get the best results from the pasture, it is essential that the pigs be allowed to graze rather than to have the green feed cut and brought to them. Whole grain feed on pasture should be ground or soaked, with the possible exception of corn, which may be fed on the cob or shelled. It will pay, however, to soak old corn before it is fed, as soaking is equivalent to grinding and is much cheaper.

It requires considerable skill and forethought to arrange to have desirable pasture available during the greater part of the growing season. Assuming that the land devoted to pig pasture is fairly fertile, the following plan will probably yield satisfactory results under average Pennsylvania and other eastern conditions where alfalfa is not as yet a certain crop.

*Some Good Pastures*—The earliest pasture that can be had is rye, and although its food value may not be great, it will serve to tone up the system and induce better appetite and faster growth. Hairy



A POLAND-CHINA READY FOR MARKET

This barrow shows the remarkable pork qualities of the Poland-China breed. The short nose, broad back, deep sides, together with ease of fattening, are strong points in the favor of this hog and explain much of the popularity of the breed.

vetch, red clover, alfalfa, oats and peas, rape, sorghum, soy beans and cowpeas may follow each other. Climate, soil and other conditions will probably serve to exclude some of these crops. It is quite certain, however, that from this list a rotation may be had that will give anywhere a succession of suitable pasture for hogs. The great advantage in supplying such a course of pasture is that many of them supply, in a very cheap manner, protein which is needed for rapid and economical gains.

### THE POPULAR TYPE OF HOGS

The popular demand at the present time is for a class of hogs that are prolific. It does not cost any more to winter sows that farrow ten pigs at a litter than it does those that farrow about four or five. Early maturing hogs are demanded, for it does not pay to keep pigs more than eight or nine months of age to reach the popular weight, which is from 200 to 250 pounds each. Pigs kept growing right along from time of birth to that age make pork cheaper than they will if kept longer, and it will be of better quality than if the hogs are fed slowly at first and then fattened up for the market, as was the custom in times past.

*Lean Meat Demanded*—Another point is the fact that people demand bacon and hams that have a large percentage of lean meat. The muscles that make the lean meat are formed largely during the time that the pigs are growing. Therefore, it is essential that pigs be well fed while growing, and at the same time be given an opportunity for exercise to develop muscle.

The waste points, like the long nose and long legs, should be eliminated from the hogs in order to

get the most desirable meat possible in the carcass. It seems to be the impression that the bacon hogs must, of necessity, have long, sharp noses in order to get the bacon sides. The impression is an erroneous one. By selection and following the proper variations a type of hogs with short faces and legs and deep sides can be developed. This same class also carry good hams, which add to the value of the carcass. It is certainly worth while to give more attention to the type of hog that will be most profitable to keep on the farm than was given a generation ago.

### FEEDING HOGS FOR PROFIT

Raising hogs for profit is one thing and letting them grow on the farm and make what they will is another. If we expect to profit from our hogs we must give them care and attention. They need comfortable quarters in winter, protection from the sun in summer, clean pens at all seasons, regular feeding, a clean place to eat, food properly prepared and some space in which to root, with no rings in their noses. Death comes to many hogs because we deprive them of that inborn desire to root, to find their medicine and restore themselves to health when sick. The hog knows why he roots, but we do not. Careful experiments have shown that each bushel of corn fed hogs will produce on the average about ten pounds of pork. When ready to fatten divide your hogs into lots of 20 or 25 each. Too many hogs together will certainly invite contagion. Keep your hogs at all seasons in good growing condition, and never allow more than 60 days to have your hogs round and plump and ready for the highest market.

*To Fatten Is Not Difficult*—There is no trouble in putting fat on a well-kept hog. When ready to fatten hitch the horses to the feed grinder and crush and grind 50 bushels of corn, cob and all, into coarse meal. Put this corn and cob meal in a dry place, in barrels or boxes. Then fill three or four extra barrels about half full of this corn and cob meal. Pour boiling water into these barrels until they are about three-fourths full; this water may include milk and other slops from the kitchen. Now stir this mixture and let it stand two or three days till it begins to ferment. This process will soon fill the barrels to overflowing. Feeding now begins sparingly at first till the hogs get used to it, then give them all they will eat three times a day. This preparation of soft mush makes an excellent laxative diet, allays the tendency to a feverish condition of the hog's bowels, hastens digestion, gives the hog a good appetite, promotes health and puts on fat and flesh with exceeding rapidity.

*Pasture as Long as Possible*—Let your fatters run on grass until the snow falls, then house them and bed with sweet clover hay. It is often necessary to renew the bed every two or three days, as the hogs eat the bed when they can't get grass from the pasture. They are very fond of sweet clover hay. There is no waste of hay, for clover is a muscle producer and promotes the health of the hogs. The soft mush produced by scalding the corn and cob meal should be fed in long troughs on a regular feeding floor, so as to keep the food clean. This is very important. Keep a trough in one corner of the feeding floor filled with charcoal and salt for the hogs to eat just when they want it. This is a fine preventive of cholera and purges the bowels of impurities. In 60 days from

the time of beginning this special feeding your hogs are ready to sell. About eight bushels corn for each hog will be required; and each hog will gain on an average 160 pounds in the 60 days. Now let us count the profit: 50 hogs gained 8000 pounds, at 5 cents per pound, is \$400; 400 bushels corn, 45 cents per bushel, is \$180, leaving a net gain of \$220. To these figures add 7000 pounds, the weight before fattening and you have the total valuation.

## CHAPTER XXV

### The Diseases of Swine

The hog is such a small and unimportant animal when considered singly that to treat him when he is slightly indisposed is scarcely to be thought of. It is when certain diseases that are contagious play damage to the entire herd or spread throughout the community that treatment is sought. With



#### THEY ARE DOING THEIR OWN DIPPING

A simple contrivance for hog disinfectants. You can make it yourself and your hogs will like it.

a few possible exceptions, the hog is not afflicted in any great way by infectious or contagious diseases. Naturally the short time that he dwells on the farm removes some of the difficulties in this way.

The chief cause of whatever diseases do bother him is filth and unsanitary conditions under which he is placed. The most undesirable quarters about

the farm are given the hog. Who does not recall in his community some small pen where one or more hogs are quartered for weeks or months with scarcely ever any additional bedding and constant exposure to all kinds of weather? The pen soon becomes a mud hole, requiring the inmate to both eat and sleep in filth.

Now the hog is not naturally filthy or uncleanly. He likes to lie in water and moist places, but he prefers these to be cleanly and healthy. No farm animal is more careful in seeking cleanly quarters if left to himself.

### CORRECTIVES FOR SWINE

Under some conditions swine show a decided craving for such substances as charcoal, charred corn cobs, soft coal, wood ashes, soft sandstone, soft brick, bits of mortar, rotten wood and soapsuds, also earth. Such a craving, when markedly present, is evidence that the swine are not getting in the food all the elements that they need. In order to meet this need, it is recommended that some, at least, of these substances shall be given to them artificially. Those most commonly recommended are charcoal, charred corn cobs and wood ashes. These are put in self-feeders and are made accessible to the swine.

The following was a favorite of Theodore Low's, now gone to his rest: Six bushels charred corn cobs, three bushels charcoal, three bushels wood ashes, eight pounds salt and  $1\frac{1}{2}$  pounds copperas. The charcoal was broken and all the other ingredients added and mixed by shoveling them over. The copperas was then dissolved in hot water and sprinkled over the mass, which was then

shoveled over again. The old man used this formula during nearly all his years of farming.

Some authorities recommend that all swine be given access to some such preparation. This I cannot endorse in its entirety. My contention is that when swine are largely developed on pastures mixed in character, and especially when not much corn is fed, they will not need such correctives.



AN ATTACK OF CHOLERA

One of the familiar attitudes assumed when the hog is affected with cholera. When this far along, not many cases of recovery are observed.

Where bacon is grown in food form these correctives are but little in evidence. The reason is that the food that produces good bacon will also maintain that condition of health in which the craving referred to will be but little present.

### IMPORTANT DISEASES LARGELY INFECTIOUS

*Hog Cholera*—The farmer is, therefore, concerned more with the infectious diseases which are also the important ones that attack the hog.

Chief among these is hog cholera. No disease is known that destroys more animals than hog cholera. So far the prevention and curing of the disease have baffled all scientific attempts, although at the present time a method of inoculation has been perfected by the United States Department of Agriculture. The preliminary demonstrations of this test have been very favorable and may lead to far-reaching results. In brief, this remedy is an inoculating fluid secured from the horse after inoculation with hog-cholera germs. Of course, hogs that have hog cholera already in their system could not be expected to be helped very materially by this treatment. The discoverers mean to use the preparation for healthy hogs as a means of prevention when once the disease breaks out in the community or state.

The hog-cholera bacillus locates in the intestines, giving rise to this infectious as well as malignant disease. Among the first things noted are loss of appetite, high fever, a discharge from the eyes and a spotted discoloration of the skin. At first constipation is noted, followed very quickly by profuse diarrhœa, which persists until the animal is dead. Hogs affected with hog cholera are dull and seek quietness in some corner of the pen or yard. The mortality is very great, being from 80 to 90 per cent. When of any acute nature, two or three days are all that are required to bring death to the individual.

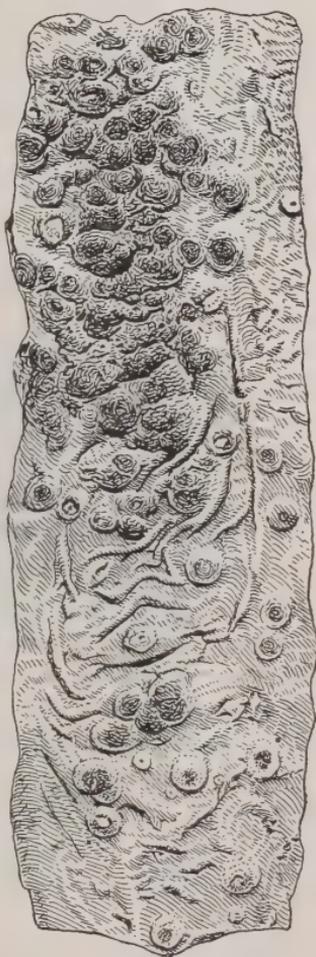
*Prevention the Best Cure*—In some sections some farmers are constantly afflicted with this disease in their herds, while others seemingly are free of it. Since it is a germ disease, it is readily carried from one farm to another by dogs, birds, or on the shoes of people. It is quite essential, therefore,

that there should be no interchange between farms when hog cholera is prevalent. The most careful sanitation is necessary also. The sleeping quarters should be frequently sprayed with disinfectants and lime scattered all about that the germ may have little or no chance of gaining headway if it were to secure lodging.

To keep hogs healthy, vigorous and fast growing, good food of the right kind, nutritious and wholesome, will do much; it will aid in building up the system so as to withstand infection. Consequently on farms where an abundance of pasturage like alfalfa and clover are to be found, fewer cases of hog cholera will result.

Hogs that are fed largely on corn seem to be the first ones attacked. The lack of protein and mineral material in their food keeps the system in a run-down condition and the animal is not so able to resist disease.

If the disease once breaks out in your herd, the first thing to do is to separate the sick hogs from the well hogs, give both kinds new quarters at once and make



THE RESULT OF HOG  
CHOLERA

A post-mortem of a hog dying from cholera will show ulcers like those pictured here. Look for them in the large intestine.

their separation as complete as possible. Divide the well hogs into as many groups as possible, so that your entire herd may not be affected. Be careful in feeding that the same attendant does not go from the sick hogs to the well hogs. It is so easy to carry the germs from one place to the other that it is reasonably certain that in this way the disease will be transmitted.

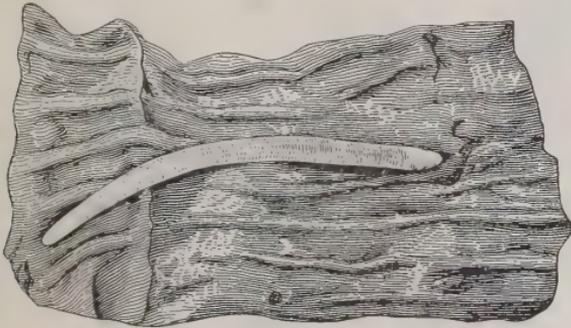
If the disease has broken out in your herd and a large part of your animals die, let those that survive be kept for breeding purposes rather than be sold. You are reasonably sure that these are immune to the disease and will be more likely to withstand future attacks. In this way you have some good brood sows and service boars that you can reasonably well count on should another attack occur. You thus are not confronted with the risk of losing your entire herd.

*Swine Plague* is closely allied to hog cholera and is usually confused with it, but the two are not one and the same disease. In swine plague the lungs are found to be in a heavy and congested condition, much as is the case when attacked with pneumonia.

In hog cholera, the seat is in the intestines, but in swine plague the seat is in the lungs, so in the latter disease, some pulmonary trouble is nearly always the direct cause of death. The swine plague infection takes place through the air passages, while in hog cholera infection occurs through the water or food.

*Tuberculosis*—This is a disease of swine just as it is of cattle or sheep or man. There is a larger percentage of tuberculosis among hogs than is generally supposed. Its cause is by direct infection and by the use of milk from tuberculous cows. Of course, no method of treatment is advisable, even

if possible. The hog is worth too little money to receive much treatment for so important a disease as tuberculosis. The best way to do if tuberculosis has gained a foothold in your herd is to slaughter your animals and start over again by getting new stock entirely free of the disease. All feeding and running lots should be destroyed for both tuberculosis and hog cholera and the ground plowed and put to some crop that the germ may be entirely killed and eradicated. If the fences are of a painted nature, see that they are covered with whitewash and all litter of every nature is destroyed.



ONE OF THE PARASITES OF THE HOG

The thorn-headed worm attached to the anterior part of the small intestine often causes death. Not more than five or six are usually found in a single animal.

*Trichinosis*—This disease is caused by a minute worm that lodges in the flesh of the animal. So great and troublesome is this disease that fresh pork is not considered safe in some parts of the world. Man becomes affected with this disease by eating raw or undercooked pork. The trichinæ are killed either by cooking or by the usual process of salt pickled and cured pork products. Hogs usually get the disease by eating offal and rats that frequent slaughter houses. Where hogs are given



ALL HOGS ARE NOT MEAN

One college girl upon graduating went back to the farm and raised white pigs. She not only has a very delightful life work, but is making a great deal of money.

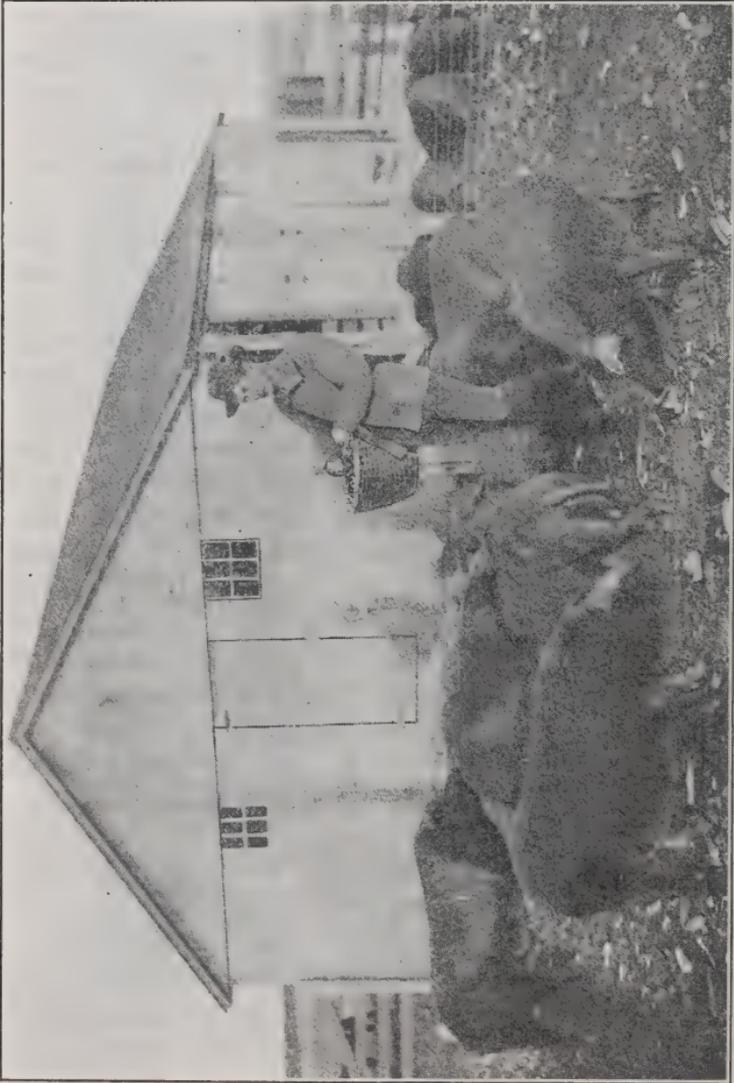
wholesome quarters out on the farm, free from this filth and unwholesome food, it is quite unlikely that they will be afflicted in this way.

*Worms*—Young pigs are often afflicted with worms. Of course, infected quarters are back of the trouble. When kept on land or lots annually plowed and cultivated and for the most part kept on pastures, worms do not often trouble hogs. Worms may be expelled from infected hogs by giving turpentine in doses of one teaspoonful in milk. Repeat this dose daily for three or four days.

*Mange*—A parasitic mite is the cause of this common disease. This little fellow appears first near the eyes and ears and on the inside of the forelegs. Later on it spreads over the entire body. Scabs are formed by this mite and are white and dry in nature. The hair falls off in patches. Infected animals should be isolated and the skin washed with soft soap, after which apply a mixture containing one pound of white arsenic and 12 pounds of alum in 25 gallons of water. This will be sufficient, but the pig pens or other quarters should be sprayed and disinfected.

*Lice*—The lice have been known to produce death in hogs by worrying the life out of them and bringing them into a very unthrifty condition. Lice bite the skin and suck blood and thus produce much irritation. They come from filthy quarters. A good remedy is to pour kerosene over the back and shoulders. Fitting up a rubbing post smeared with kerosene is a good way. The hogs soon find this post, work up to it and do the rubbing themselves.

*Thumps*—This is known as spasms of the diaphragm and is rather common in pigs. Overfeeding or some other digestive trouble is back of this disease. The irregular, jerking movement of the



THE MATRONS OF A FARM HERD

flanks indicate what the trouble is. Some cathartic like raw linseed oil, together with a dose of about ten drops of tincture of opium, is a satisfactory kind of treatment. To turn pigs out on pasture will usually bring about desired results.

### WHERE IMPROVEMENT IS NEEDED

From this discussion, it will be noticed that most of the important diseases attacking swine are due to filth and unsanitary quarters. Good farming calls for as close attention to be paid to the living needs of hogs as of other animals of the farm. Give them frequent change of quarters. Let their lots be annually turned over to some crop. Let them be given good, wholesome food and pure, clean water. Give them the right sort of bedding and housing and treat them with the consideration that their importance merits, and the troubles and ills of the hog will be reduced to a minimum. While an important money-maker, he will, with better treatment, respond with greater enthusiasm and more profit to his keeper.

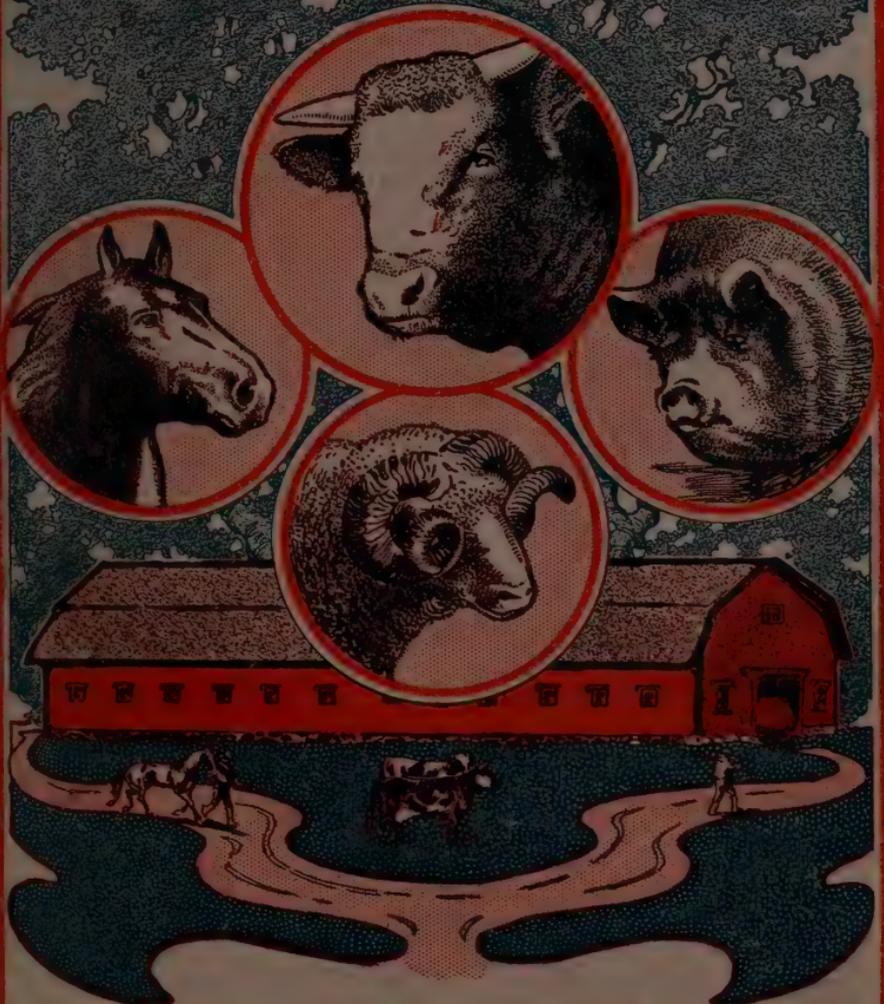


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# FARM STOCK



BY CHARLES WM. BURKETT













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