1-1-1913

Dairying on cut-over pine lands

Eugene Beverly Ferris

Follow this and additional works at: https://scholarsjunction.msstate.edu/mafes-bulletins

Recommended Citation
https://scholarsjunction.msstate.edu/mafes-bulletins/355

This Article is brought to you for free and open access by the Mississippi Agricultural and Forestry Experiment Station (MAFES) at Scholars Junction. It has been accepted for inclusion in Bulletins by an authorized administrator of Scholars Junction. For more information, please contact scholcomm@msstate.libanswers.com.
Dairying on Cut-Over Pine Lands

By E. B. FERRIS.

AGRICULTURAL COLLEGE, MISSISSIPPI. 1913.
STATION STAFF

G. R. HIGHTOWER..................................................President
E. R. LLOYD..................................................Director and Animal Husbandman
W. F. HAND..................................................Chemist
W. N. LOGAN..................................................Geologist
J. S. MOORE..................................................Dairy Husbandman
A. B. MCKAY..................................................Horticulturist
R. W. HARNED..................................................Entomologist
DANIELS SCOATES...........................................Agricultural Engineer
H. B. BROWN..................................................Botanist
E. M. RANCK..................................................Veterinarian
J. R. RICKS..................................................Agronomist
C. F. BRISCOE..................................................Bacteriologist
E. C. EWING..................................................Cotton Breeding
E. P. CLAYTON..................................................Poultryman
A. G. HALL..................................................Drainage Engineer*
R. N. LOBDELL..................................................Assistant Entomologist
J. M. BEAL..................................................Assistant Botanist
MISS SIDNEY GAY.............................................Stenographer
E. B. FERRIS..................................................Assistant Director, McNeill Station
C. T. AMES..................................................Assistant Director, Holly Springs Station
G. B. WALKER..................................................Assistant Director, Delta Station

*In co-operation with U. S. Department of Agriculture.
Dairying on Cut-Over Pine Lands

Introduction.—In many respects South Mississippi offers superior advantages for dairying on its cut-over lands, but there are also some very serious disadvantages. It has a very mild climate and expensive barns for housing cattle are not necessary, thus enabling one to keep the cattle constantly in the open air where they are freer from disease and where the manure from them may be dropped directly on the land where it is to be used. The sandy nature of the soils of this section makes it possible to pen cattle on them even in the wettest weather without injury to the land, and experience of this kind here has convinced us that the tramping of the cattle may actually make the physical condition of the soils better. Parking cattle directly on the soil where the manure is to be used has been tried here pretty thoroughly with both beef and dairy cattle and it has been conclusively demonstrated that the theoretical feeding and fertilizing values may be obtained from any feed used. As cotton seed meal is the cheapest and best feed that can be used here and as the feeding and fertilizing values of this meal are about equal, it is easily seen that the intelligent dairyman on these cut-over soils may get two values for all the cotton seed meal fed.

The cut-over lands generally are blessed with an abundant supply of pure water both above ground and underground. It is difficult to go a mile in any direction through this country without coming in reach of a spring or running stream of some kind, and surface wells may usually be had at depths not exceeding fifty feet. Overflowing artesian wells may be had in nearly all the river and creek bottoms, while deep wells are to be had anywhere. On an enclosure of one hundred and sixty acres at this Station there are four different branches that never go dry, being fed by innumerable springs. On the same enclosure a six inch well one hundred feet deep furnishes ten thousand gallons of water from five hours pumping without in any way exhausting the supply. The country generally has an unusually heavy rainfall, especially that part of it lying nearest the Gulf Coast, and frequent light showers keep the pastures green during summer and fall when often in other sections they are parched from drought. While the frequent summer showers serve to keep the pastures fresh and green, a part of our precipitation comes in the winter and early spring as veritable floods which do a great deal of harm by washing and leaching the soil.
The sandy nature of the soil here gives a freedom from the mud and filth that are serious handicaps to sanitary dairying in many other parts of the State. It also renders it possible to graze the cattle on winter cover crops for the greater portion of the time. Such crops as oats, vetch, and rape, when sown in the fall on improved soils, furnish excellent grazing for dairy cattle during the winter months and may be utilized for the greater portion of the time with no injury to the soil and little to the crops. Several of the clovers have also furnished good winter grazing here, especially after the lands have become inoculated and have been built up with the manure from well-fed dairy cattle. A systematic effort is being made at the McNeill Station to grow the several kinds of clover and also alfalfa, as winter grazing crops for dairy cattle. While we believe some of them may finally be grown profitably, they have so far proven far less reliable than oats, vetch, and rape.

Another very decided advantage that this section offers for dairying is the high priced markets on which our products may be sold. While this territory was once known as the "cow counties" of Mississippi, the dairy cow at no time has entered largely into the farm economy and dairy products have always been at a premium. Even now a very small part of the dairy products consumed in South Mississippi proper are produced here, being shipped in largely from other parts of the State and sections of the country. The country generally is close enough to such places as New Orleans, Mobile, and Gulfport for dairymen living near the railroads entering these places to market sweet milk or cream at prices twice as great as the average Northern farmer gets for his butter. A very large per cent of the population of South Mississippi is composed of people who work in saw mills and kindred industries, nearly all of whom buy their milk and butter from without the country, and even this trade would consume the product of a large number of dairy cattle. One has only to watch the sale of condensed milk in the local stores and commissaries and the crop of cans that accumulate around the back yards to realize the amount of money that annually leaves the country to pay for dairy products that might easily be grown at home.

The greatest handicaps to dairying in this section are a lack of people who have any ability or training to handle dairy cattle, the difficulty of getting dairy herds together that could be handled profitably anywhere; the high price of feed; and the extremely poor quality of grass that is furnished by the average range or pasture. The soils of this section are naturally extremely poor, being almost entirely deficient in phosphorus and very poorly sup-
plied with nitrogen, even though the lands are newly cleared. As a consequence, the grasses grown on them are not only small in quantity but also very poor in quality. Dairy cattle pastured on them will give almost no milk unless fed a highly nitrogenous ration in addition to the pasture. There is no way to overcome this deficiency of these soils in phosphorus except to supply it artificially with acid phosphate or raw phosphate rock. Nature, however, will quickly correct the deficiency in nitrogen if we will stop the annual fires and allow the great soil renovator, lespedeza, or Japan clover, to spread naturally over them. Twelve years ago when the McNeill Station was established, lespedeza was unknown to the people of this immediate neighborhood and one had to search diligently to find a sprig of it. Now, it grows well in all the pastures where fires are kept off and with small applications of raw phosphate rock to furnish phosphorus will soon give pastures rivaling those of the best grass lands of the State.

At best, however, these are not first-class grass lands; the lands cleared of pines frequently come up thickly to oak sprouts, which, if not removed, will choke out all grass; and numerous weeds make it necessary to mow the pastures frequently, a difficult operation if the land has not been freed of stumps. Even the best lands that have been set to bermuda grass and bur clover have to be mowed frequently in summer to keep down weeds.

The grasses grown on the ranges here will fatten cattle and we have frequently seen cattle that came through the winters as mere skeletons get fat enough for fair beef by May or June. While this is the case with beef animals, the dairy cow will give almost no milk under similar conditions unless fed cotton seed meal in addition. The native grass is largely of the sedge family, with an occasional patch of carpet grass where the seed have been introduced and conditions are favorable to its growth. The native grass quickly becomes coarse and stemmy. In this condition it is neither nutritious nor palatable and is annually burned off by the owners of cattle so that they may get the young tender sprouts in spring. Such pastures would hardly maintain more than one cow to eight or ten acres, but where the carpet grass is introduced will do very much better. Bermuda grass grows remarkably well on all these soils, particularly after they have been built up with the manure from dairy cattle grazed on them. On such land here, which is too rolling for cultivation, a field of two acres of bermuda grass has grown half knee high with thirty cows and calves penned on it every night and several horses during the day. In the winter time this same land grows bur clover that furnishes good grazing
during the latter part of winter and very early spring. Plowing up the bermuda in the fall and planting some winter crop like oats or the clovers will not destroy the stand, but the breaking of the turf only makes it grow the better during the following summer, when these crops are removed or grazed off by the cattle. Unless plowed up occasionally bermuda pastures here will run out and be replaced by other grasses or lespedeza, as the sandy nature of the soil causes the trampling of the cattle to kill out the grass.

Bermuda grass has been started here by planting the seed and by means of the stems. Uncleared lands have been taken and the most of the logs and tree tops removed, single turn plows used to break the land between and around the stumps, and these followed by harrows to smooth down the furrows. Three pounds of bermuda grass seed were then mixed with fifty pounds of cotton seed meal and sown over an acre of land and worked lightly into soil with a brush or light harrow. These seed require a long time to germinate and both times that the method was used here we despaired of getting them up, but were finally rewarded with enough plants to cover the land by midsummer. It is generally contended that bermuda grass will not mature seed in this latitude and doubtless most of the seed stems that it sends out in such large quantities do not develop seed, but an experience of twelve years with it here convinces us that a good many seed are matured and are finally scattered in manure and other ways. It is not a grass to be dreaded here, as it is in countries where stiffer lands prevail. The toughest sod here may be turned under easily with a two-horse plow in the fall and the following year will interfere very little with the cultivation of a crop like corn. One crop of velvet beans will shade it to death in a little while.

**Hay Crops.**—There are very few hay crops that have been successfully grown at McNeill with the exception of oats and cow-peas. Johnson grass and timothy have never been successfully grown; lespedeza and bermuda grass, while excellent for pastures, will grow high enough to cut only in exceptional cases; alfalfa has never been grown successfully here though repeatedly planted; it is doubtful if the clovers will prove profitable hay crops under average conditions; and while the velvet beans and soybeans grow to perfection, neither of them are well adapted to being saved as hay. Even if the country had a hay crop as pre-eminently suited to its soils as alfalfa is to certain parts of the West, we doubt if the growing of the same could be made profitable on account of the difficulty of saving dry forage in this section. Not only is the total annual rainfall of the section much heavier than that of the
northern and western parts of the State, but showers are much more frequent, particularly in the summer and early fall, and it is a very difficult matter to save dry forage at all in any quantity. Fall sown oats usually ripen in May, when conditions for saving hay are at their best, and it is usually possible to save a good quality of oat hay; so, too, peas planted in June after a crop of oats will be ready to cut after the middle of September when, ordinarily, weather conditions are favorable for saving hay. Even if planted as late as the middle of July, peas will have time to mature and will likely find better weather conditions for being saved as hay than those planted earlier. The saccharine and non-saccharine sorghums all do well here and will make an immense yield of coarse forage, but they are all very exhaustive to the land on which they grow, are stemmy and hard to dry out properly. While they will all make fair silage, we much prefer corn as a source of silage, and oats and cowpeas for hay.

Japanese sugar cane grows to perfection all over the pine belt, is much more resistant to cold than the regular kinds of cane, and will occupy the land several years from a single planting of the cane. It makes an immense tonnage of a very succulent feed which may be used as silage or the stalks may be cut before frost and put in large piles, preferably under the drip of the roof to the barn nearest where it is to be fed. Rough walls should be built around this pile so as to keep the cane stalks together and straw or fodder should be packed around and over it to prevent freezing. The water from the roof falling on the butts of cane will prevent its drying out and the stalks will keep fresh through the winter. They may be fed to horses, hogs, or cattle either as the whole stalks, or, preferably, after it has been run through a shredder or corn cutter. Some have advocated the growing of this cane to be cut up and kiln dried and the writer has seen some very excellent dry forage made from it in this way, but does not know whether the drying can be done economically. The recently introduced Guinea, Sudan and Para grasses have been grown here with marked success, all yielding enormous quantities of rather coarse hay. These grasses and the sorghums and sugar cane could be used to great advantage as soiling crops to be cut green and fed to dairy cattle.

Corn is one of the most reliable crops that can be grown here, and on good land makes a large yield of grain and a very heavy growth of stalks, much heavier than corn making a similar yield of grain would make when grown farther north. Repeated efforts have been made to save these corn stalks as dry forage, but rains
are so frequent that it is almost impossible to dry the corn and shock it without its getting wet, and even when shocked in good shape the climate is so damp that the stalks and ears nearly always mold in the shock. Fully half the value of corn grown here is represented in the stalk. This makes it very important that these be saved in some way. The only way to get the full value of this corn crop here is to save it as silage, which can be done to perfection regardless of the frequent showers, which only serve to make it keep the better. So while silage is a valuable feed anywhere, it is doubly so here, where dry forage is so hard to save. In a country so full of saw mills as this is, silos should be as common as corn cribs, for the material to make them can be had at minimum cost and the government is maintaining a man in South Mississippi to furnish plans and superintend the building of silos, absolutely free to the people. A fifty ton silo can be built at a cost not exceeding seventy-five dollars and will house much more feed than a well constructed barn costing the same money, for in the silo the feed is packed so closely that air is practically excluded, whereas a good sized barn will soon be filled with the dry stalks from a very few acres of corn. Another great advantage of the silo in this country is that here the weevils destroy a large per cent of the corn stored while the rats, too, get a goodly share, and both are entirely eliminated with the silo. Corn stalks saved as stover and well shredded will only be partially eaten by the cattle, whereas every shred of the silage will be greedily devoured. This Station has a stave silo which holds about forty-eight tons and cost about seventy-five dollars exclusive of the top, which is not necessary; a combination hand and power machine is used to cut up this silage and cost thirty-five dollars; a four horse power gasoline engine runs the cutter and pulls an improvised carrier which elevates the feed to the top of the silo; such an engine may be had from the department houses for less than one hundred dollars. We would, however, advise the use of an eight horse power engine with a slightly larger feed cutter and a blower instead of a carrier. There is absolutely no experiment about saving silage as so many of our people believe. Four successive crops have been saved here and have kept perfectly. Silage has been made here from peavines, several varieties of sorghum (saccharine and non-saccharine), soybeans, and Florida beggar weed. None of these make a silage comparable to that made from corn. Since corn does so well here, we can see no reason for wanting a substitute for it.

One of the most valuable feeds for dairy or beef cattle that can be grown in this country is the velvet bean. It is perfectly
adapted to conditions here, and may be grown on our poorest soils with little fertilizer, which cannot be said of the cowpea. It is best grown as a catch crop in corn, the stalks of which support the vines and cause them not only to fruit better but also to keep the beans off the ground so that they will remain in the field all winter without injury. When planted early enough to make a maximum crop of beans, they interfere some with the development of the corn, but chiefly with the gathering of it, as the vines completely envelop the stalks and ears, frequently pulling the ears to the ground, and so entwine themselves on stalks and other vines as to make it difficult to find the ears or to get through the vines to gather and haul out the corn. The most popular method of

VELVET BEANS.

growing these beans here is to lay off the field into three-foot rows, planting alternate rows to corn as early in March as possible, and about the first of May plant the rows left to beans. This difference in the time of planting will give the corn sufficient lead to complete the pollenization of the ears before the vines cover them and prevent this. A common practice here is to go through the fields just after the ears are dry and turn down the stalks just below the ear, which lessens the leverage of the bean vines and prevents their pulling many stalks flat on the ground. Instead of doing this, we gather the corn as soon as it is dry enough, and do not let it remain in the fields until frost. After frost falls on these vines, they quickly shrink up and interfere very little with the gathering of the corn, but weevils are so destructive here that corn
left so long in the field will frequently be badly damaged by them. A method used here also is to plant every row to corn and later to plant velvet beans about a foot apart in the corn drills. These beans do not grow off so rapidly, and interfere less with the development of the corn, but of course make fewer beans. When planted thus the corn shades the vines and they make no very great growth until after the corn leaves die when they grow off rapidly and will finally mature a good crop of beans. Grown by the two methods beans have been grazed off here by dairy cattle after frost and have been worth from eight to twelve dollars an acre as feed for these cattle. Even when grazed off by cattle they leave an immense quantity of vegetable matter on the land and will increase its productiveness faster than any other restorative crop.

Soybeans grow here perfectly, but are very stemmy and make a very coarse hay, the leaves of which shed badly and the stalks of which are not eaten by stock. These beans fruit abundantly and but for their tendency to pop open when ripe and the extreme uncertainty of the weather when they are ready to harvest, they might be profitably grown for the beans alone. The beans would readily take the place of cotton seed meal in a ration for dairy cattle, and with corn silage would enable the dairymen of this section to raise all their feed at home. These soybeans are the richest natural vegetable products known and approach cotton seed meal, a manufactured article, in their content of protein and fat. While the soybean makes a very dark and slimy silage when used alone, it can doubtless be mixed with corn when cut and put into the silo and make a good silage, the richness of which will be greatly increased by their use. We have never tested out this mixture, but feel sure it will prove a practical one with the proportion of two parts corn to one of soybeans. The soybean is very superior to the cowpea here in fruiting qualities. The latter seldom makes any peas of consequence except on newly cleared lands or when the seasons are exceptionally dry. Cowpeas do make a good growth of vines and when planted so as to mature in the late fall may nearly always be harvested in dry weather. Cowpeas do not grow anything like so well as a catch crop in corn as do the velvet beans, but where the corn is to be cut for silage the bean has to be discarded and cowpeas used.

A number of winter grains have been tested here as grazing crops for dairy cows during the winter. Nearly all varieties of oats, wheat, rye, and barley have given fairly good grazing during the winter, but all except the rust proof oats have succumbed to rust with the approach of hot weather. As the rust proof oats
furnish practically as good grazing as the others during the winter and will then make good yields of hay or grain in the spring, we, of course, recommend them over any of the above mentioned winter grains or cover crops.

Dwarf Essex rape has been repeatedly grown here as a winter grazing crop for hogs and cattle, and in our opinion surpasses all other crops for this purpose. It is a member of the cabbage family and like all of the members of this family requires a rich soil. On such a soil it makes a large quantity of succulent and nutritious feed of which the cattle are very fond. This rape has a tendency to give the milk of cattle fed on it a peculiar taste which to some people is not agreeable, but in grazing it here we have taken the precaution to turn the cattle on it in late afternoon just after they have been milked and have taken them off after two hours grazing and it has left no bad odor in the milk. Fed in this way rape has been worth here ten dollars an acre for the first grazing. When the cattle were removed until it sprouted out again from the same roots, it was then worth, perhaps, 50 per cent of the value of the first crop, though no accurate figures were kept the second time. This rape is an even better crop for hogs than for cattle and we have found it excellent feed for young calves. The seed are inexpensive, particularly when it is planted in drills, which we have found advisable on all except the richest land.

Mention has already been made of the scarcity in this section of crops suitable for hay and of the difficulty of saving the most of the ones that are suitable, due to our extremely wet weather. There is a crop practically indigenous to these soils that comes up as a volunteer on cultivated lands, and particularly in corn after it is laid by, that makes an excellent dry forage. It ripens at a time when the weather is usually dry and it can be saved to great advantage. This is the crop commonly known as Mexican clover, which, in fact, is not a true clover nor anything akin to it. It is a very valuable crop to the country and on good land will give a yield of two tons of excellent hay after a crop of corn. Its scientific name is "Richardsonia scabra." We do not know that the seed of this plant are regularly on the market, but they accumulate in considerable quantities in wagon bodies in which the hay is hauled and around places where it is being stacked, baled, or stored in the barn and may usually be had from farmers in this section.

Benefits of Dairying.—It is generally conceded that no agricultural country can economically maintain its native productive-ness for long periods of time without the aid of live stock of some kind. This is due primarily to the fact that more plant food is
sold from the land where crops are sold directly than where they are sold through animals, and secondarily to the fact that proper systems of rotation, including the growth of restorative crops, cannot be carried on so economically without live stock as with them. This fact has not as yet been given serious attention by the farmers of Mississippi because the lands that have been in cultivation longest have been naturally so well supplied with plant food that the question of their losing this fertility has been largely disregarded. South Mississippi cut-over lands are, however, seriously deficient in plant food to begin with, and the owners of them will have to resort to every known means of building them up and of maintaining their productiveness. A good dairy cow is the most economical producer of digestible nutrients for the animal body of any form of live stock. In addition to this there is sold from the farm in butter or cream practically no plant food, which is left on the farm in the form of manure and skimmed milk, the last of which can be fed to the next most economical producer of human food, the young pig.

COW THAT GAVE FORTY POUNDS OF MILK PER DAY.

Dairy cattle give constant employment throughout the year to the entire household. This we mention as being a thing in their favor, but which a great many of our people look upon as being decidedly against them. With modern barns and milk rooms to be had here at a minimum cost dairying loses much of its drudgery,
because with concrete floors on which to milk and to work with the milk, and with a convenient supply of water with which to keep things clean, there is nothing to shock the most delicate sensibility in dairy work and it cannot be considered in any way more laborious than the average work of the farm. Concretes construction can be done in this country very cheaply, because supplies both of sand and of gravel are everywhere abundant. A proper water supply is a no more serious question than that of sinking a six inch pipe with a few feet of strainer on the bottom to a depth of one hundred feet or less in the ground. The same engine used for pumping this water may be used for running the silage cutter and blower, the grinding of the corn, or the turning of the churn and separator. Indeed, it may be used to wash the clothes and to furnish power for electric lighting in connection with storage batteries.

Dairying furnishes a steady income which may be accurately determined every day and if, perchance, it should not prove profitable, it can be known at once and one does not have to go a year or a series of years to find he is losing money. This is not often the case. There is less variation in income due to seasons and good or bad weather conditions with dairying than with any other form of agriculture, and it enables one to do business on a cash rather than on a credit basis. Dairy cattle furnish a market for nearly every thing grown on the farm and can be made to pay a better price for grains, hays, and forage crops than these would bring on the markets, besides leaving the fertility contained in them on the farm. They serve also as scavengers for cleaning out the fields of much that without them would be wasted and enable the farmer to grow and market many restorative crops, such as velvet beans and other legumes for which there is ordinarily no regular market. Dairying and trucking should always be carried on together, because they are naturally companion industries and the same advantages that contribute to the success of one have a like share in affecting the success of the other. A farmer with a number of dairy cows should at least have the satisfaction of knowing that his land is growing better instead of poorer each year and even if he merely breaks even with the sale of dairy products proper, the increase in his herd and the increased productiveness of his soils may amount to more than the net profits of other lines where crops are simply grown and sold directly from the soil.

As an example of what can be done here with dairy cattle, the McNeill Station four years ago began work with a few dairy cows. The first thing done was to get a water supply, which we did by
sinking a six inch pipe with forty-three feet of strainer on the bottom to a depth of one hundred feet. The water rose to within forty-three feet of the surface in this well and is pumped out and into a tank so elevated as to distribute it over the farm. This done, a thirty-cow barn with concrete troughs and floor and iron stalls and stanchions was built in connection with a commodious feed barn. Close by the two a fifty ton silo was built so that the feed from it could be fed without getting out of shelter. A separate milk room was built some distance from the barn. One room of this was built over the well and houses the engine, pump, and necessary belts and shaftings. This engine can be used to run the churn and separator at the same time that it does the pumping and is also made to cut up the silage, though it has to be moved for this.

An average of about eighteen cows have been milked since this work began and there has never been a day when we have had the least trouble in disposing of the product as milk or cream. The average sales from this herd winter and summer have been between $150.00 and $200.00 per month and at the same time we have raised the heifer calves and in the summer have had skim milk to feed to pigs. During the summer months the product of this herd has been sold as cream to ice cream manufacturers in either Laurel or Hattiesburg and during the winter time to milk companies in New Orleans. The price has been about four cents per point of butter fat in summer and five cents per point in winter, or, expressed in price per gallon for the milk as it came from the herd, about twenty cents in summer and twenty-five cents in winter. It has never been necessary to make any butter except from an occasional lot of milk that would sour.

These cows have been penned every night both winter and summer on paddocks near the barn so as to get the manure where it was wanted and it has had a wonderful effect in increasing the productiveness of these soils. The cows have been made to glean over all the different paddocks and fields as the crops have been removed from them and have in this way enabled us to convert into money a number of restorative crops like velvet beans, soybeans, cowpeas, beggar weed, and some winter legumes like vetch and several clovers. Some trucking has always been carried on here. There is always a part of every truck crop that it does not pay to ship. These cattle have consumed such of these as cabbage, snap beans, beets, and turnips, paying therefor a small price but much more than they would be worth as a fertilizer. These cows are made to eat up the cotton leaves, stalks, and faulty bolls when the
picking is over and thus obviate the necessity of pulling, piling and burning these to destroy the boll weevil. During the past winter these cattle grazed a field of oats and these with silage gave a better milk flow than we get in spring and summer.

**Starting the Herd.**—The most important point in dairying anywhere is the selection of good stock and so mating the cows with good bulls as to make each generation a little better than the one that preceded. The selection of good cows will be more difficult here than in regular dairy sections because the majority of native cattle have been bred on the ranges with no regard whatever to milking qualities. In selecting cattle for the Station dairy we found it best to go to North Mississippi, in a section where cattle had been bred for generations with a view to improving their milking capacity. It will be impossible for the average farmer or dairyman to buy pure bred cows to begin with and we would hardly think it advisable to do this anyway. These pure bred cattle are always much more expensive than grades and except for breeding purposes they are not one bit better, for the average high grade cow will stand more rough treatment than the registered animal and give practically as much milk and butter. With the experience and facilities necessary to handle registered animals, we would much prefer to own them and would always work with the aim in view of finally having only registered cattle, but it costs more to handle them, both in money and in care, and one would have to look to increased income largely from the growing of calves.

So far as calves are concerned the bull represents half the herd. If the cows are grades and the bull a pure bred animal descended from animals of pronounced breed characteristics, he will represent something more than one-half of the herd because of the greater power such well bred animals have of stamping their breed characteristics on their offspring. This being the case one can easily see the importance of getting none but the best bred bulls. There are several things to consider when selecting a bull of good dairy type. One is that he should have the conformation as an individual that characterizes the best animals of the breed; another most important thing is to know what the immediate ancestors of the animal in question have done as producers of milk and butter and particularly what his dam and paternal grandam have produced at the pail. The simple fact that an animal is registered or subject to registration means very little, for there are very many registered animals that are veritable scrubs so far as being producers is concerned and a bull calf from such animals is
worse than worthless. The best dairymen are coming more and more to keeping accurate records of the production of their herds and these records are frequently supervised and certified to by their experiment stations, so that it is easily possible now to get bull calves at reasonable prices that are out of cows whose records are known, sired by bulls of like good breeding.

The majority of bulls bought and sold are very young animals and we can only judge their future usefulness by the past performances of their sires and dams, but the surest way of selecting a first-class bull is to get an animal old enough to have sired heifers who have given milk and have themselves proven the worth of their sires. While old bulls are more likely to prove vicious than young ones, in all other respects they give better satisfaction, and to select an old bull with good daughters is the only absolutely sure way of getting what you want. If bulls are carefully handled, there is no reason why they should not remain useful as long as cows, but when allowed to run with the herd, they are apt to over-work themselves and become practically useless before they reach middle age.

Raising Calves.—The success of our efforts at dairying will depend more largely on the quality of the cows owned than on any one thing. While it is possible to buy some good cows, it is next to impossible to get a herd that will not have to be severely culled in order to get best results. Raising calves sired by good bulls and out of the best cows is the only way to get the most dependable milk stock. While this is both expensive and troublesome, we would advise every dairymen to do it. The calves must be raised apart from their dams and we prefer under ordinary circumstances to take them from the cows as soon as they are born and before they ever nurse at all, for in this way they learn to drink much more quickly from the bucket than when they are allowed to nurse their dams a few days. These young calves should be kept in a well ventilated shelter for a few days and should be fed on the mother's milk while it is still warm. Care should be taken to have the buckets out of which they are fed kept scrupulously clean and while it is preferable to feed the calves three times a day, we have always had good results from feeding them four to five pounds of milk twice a day at the regular time for milking the cows. The calf should have whole milk until it is past two weeks old when a little skim milk may be gradually added, bringing the calf to a purely skim milk diet when about four weeks old. As the whole milk is decreased and the skim milk increased, a substitute for the fat must be added. Corn meal is, perhaps, the best and cheapest
thing that can be used. About two tablespoonfuls should be added to each feed of skim milk and the feeding should be done while this milk is still warm.

In addition to the skim milk and corn meal the young calves should be taught early to eat a mixture of wheat bran and oats, and they should have the run of a good pasture and plenty of pure water. Grown in this way the calves should not cost over ten dollars at six months old and if from good parents should be worth much more than this to the owner. We do not think that it pays to raise male calves in this way, and usually kill them or give them away as soon as they are born.

Unless great care is taken to keep things clean around these young calves, scours will likely be introduced and give all sorts of trouble. We have found a Government publication issued by the Bureau of Animal Industry, U. S. Department of Agriculture, entitled, "Diseases of Cattle," almost indispensable here and would advise every dairyman to get one of these books by requesting it from his congressman or senator. It tells in simple language all about how to handle the common diseases of cows and calves, and gives remedies that the ordinary farmer can get and apply.

Selection of Breed.—There is no one best breed of cattle for dairy purposes, just as there is no one best breed for beef purposes, nor one best breed of hogs, or sheep, or poultry. Conditions and surroundings usually determine the breed best suited to particular cases. We are of the opinion that it is nearly always best when
going into dairying to select a purely dairy type of cattle and not dual purpose animals. Dairy animals, of whatever breed, have been selected and bred for many generations back with a view of improving the one characteristic of producing milk or butter economically. It is natural to suppose that with equal ability on the part of the breeders, one quality could be more firmly fixed than two or more. There are several breeds of cattle distinguished alone for dairy performances, notably the Jerseys, Guernseys, Holsteins, and Ayrshires, also several other breeds little known in the United States and practically unknown in Mississippi. There is some characteristic of each breed that peculiarly fits it for certain purposes and conditions. The Holsteins, for instance, are very large cattle that give a big flow of milk rather poor in butter fat. They are peculiarly suited to sections of the country where the soils are rich and where milk is sold, rather than butter. The Jersey cattle are the smallest of the milk breeds but give the richest milk and would naturally be suited better to poorer soils where butter or cream is marketed rather than the milk as it comes from the cow. Really, the time is fast approaching when milk will no longer be sold by the gallon, but on its content of butter fat, and the volume of milk will then count for very little. Every pound of milk that has been sold from the dairy herd here during the four years we have kept cattle has been sold on a butter fat basis, the buyers having taken the milk from a number of herds, and after Pasteurizing have standardized the whole to meet the requirements of the market on which it was sold. Jerseys and Holsteins are the only purely milk breeds represented in any quantity in Mississippi. Of these two the Jerseys outnumber the Holsteins possibly one hundred to one, or more. On account of this fact we greatly prefer the Jersey, because it would be practically impossible to start a grade Holstein herd without going out of the State for cows. In South Mississippi, even if we chose to begin with native cattle as milkers, we would have trouble in getting Holstein bulls except from the North. These would not be acclimated and would very likely die of tick fever.

It is always best in breeding any kind of live stock, when once a certain breed is started, to continue it and not introduce other breeds. For instance, where we have Jerseys or grade Jerseys, it is best to continue the use of Jersey males rather than change to other kinds. Many people are of the impression that by mixing breeds we get the good qualities of both accentuated in the offspring, but experience has shown that we are just as apt, possibly a little more apt, to get the bad qualities intensified, particularly
in the later crosses. There are good and poor animals in every breed and the aim should be to select some one breed that has given satisfaction under the conditions to which they will be subjected. Then by the use of the best bulls of this breed and the selection of heifer calves from the best cows only, a herd of well selected and well bred individuals can be gradually built up. A good individual scrub cow is far better than a poor pure bred Jersey or Holstein, but the percentage of good animals among scrubs is far smaller than among the well bred animals and life is too short and time too dear for any dairyman or breeder to start with scrubs and attempt to build up a herd of good cattle entirely from them.

Selection of Good Animals.—There are a number of outward indications that serve to show the value of a cow for milk or butter production and the average dairyman knows these points, perhaps, without being able to point them out, or to say why he regards a certain animal as being a better producer than another. All such indications are valuable, but the surest and best way to tell a good dairy cow is to keep books against her and regularly weigh the milk she gives and occasionally determine the amount of fat in this milk by the Babcock test. To do this is quite a simple thing, adds practically nothing to the cost of production, and enables the dairyman at all times to know if his milkers are doing their duty or the cows theirs. By the use of uniform weight buckets and simple scales made for the purpose each cow's milk can be weighed and set down on a milk sheet just about as quickly as it could be poured into the can without the recording, and the dairyman who uses these scales for the first time will nearly always find that his profits are coming from a few of his best cows and that some of them are mere boarders and worse than worthless as dairy animals. The Federal and State governments are maintaining men in Mississippi at this time to travel from one dairy to another to help their owners inaugurate systems of accurate bookkeeping with their herds. These men will furnish free of charge milk sheets on which to keep the records and will even do all the additions and calculations at the end of each month and year, furnishing the owners with lists of their good and poor cows. Whether we avail ourselves of the government assistance or not, this is the only way to tell positively whether a cow is good, bad, or indifferent. It matters not how many of the best markings of a good dairy cow she may have, if the scales and milk tester show her deficient after a fair trial, she had best be discarded, for actual production is the final test.
The outward indications of a good milker are as follows:

1. The dairy cow may be likened to a machine used for taking in large quantities of rather coarse materials such as grasses and hays and converting them into products of less volume and higher value such as milk, cream, or butter. In order to do this well the best dairy cow should have the capacity for taking in this material, of chewing and digesting it well, and of converting as much of it to milk and as little of it to flesh as possible. The outward indications of this capacity are a large, wide mouth so as to gather the food quickly; long, strong jaws so as to masticate it thoroughly; and a large body that is long, wide, and deep for housing a capacious digestive system. The best milk cows will fatten but little when in full flow of milk, no matter how well they are fed, which shows that they are converting this feed into milk rather than into flesh.

2. The food when digested must be carried through the circulatory system into the heart, lungs, and udder, where it is finally converted into milk. In order to do this well, the animal must have well developed veins and arteries. This is indicated outwardly by the size and length of the milk veins that come out from the udder and run along the belly until they enter the body through the "milk wells." The size of these is said to indicate the ability of the cow.

3. A large lung capacity is necessary in the dairy cow to enable her to throw off the wastes of the blood and to take in the required oxygen for the body. This is indicated by large nostrils, a deep, wide chest and well sprung ribs to give room for lung expansion.

4. The size and shape of the udder is one of the best indications of the ability of the cow. The udder contains the glands which take the materials brought to them by the blood and convert them into milk. It should be wide and deep and extend well to the front and rear. It should be soft and pliable, and, when the milk is taken from it, it should be flabby. A fleshy udder indicates that glandular space is taken up by fat. The teats should be evenly placed, of fairly even size, and large enough to be grasped easily by the hand. The udder should not be cut up with grooves separating the quarters. The ease with which the milk may be taken from the udder is also an important consideration.

5. The production of milk is closely associated with nerve force, and the highly developed milk cow is quite the most nervous animal of our acquaintance. A strong nervous system is indicated by large, clear eyes, a broad forehead, and a long, straight back
with a long tail. A good dairy cow should have a strong nerve force but should exhibit as little nervousness as possible, though as a matter of fact the best of them will have the flow of milk seriously affected by excitement of any kind.

6. The value of a dairy cow is influenced by her ability to have good healthy calves and this is indicated by broad hips and well developed reproductive organs. She should be strongly feminine in appearance with well developed maternal organs.

With all these she should have quality and this is a thing hard to describe or indicate and is best judged of at a glance by the experienced dairyman. It is indicated by the glossy appearance of the hair and all other points combined.

Feeds for Dairy Cows.—Grass is, of course, the cheapest feed for any kind of live stock, but in no place and at no season can it be depended upon entirely for the best results with milk cows, particularly on the naturally poor soils of this section. In order to give best results every cow must have a properly balanced ration in which is furnished a definite number of pounds of digestible proteids, fats, and carbohydrates. The proteids are those substances in the feed which contain nitrogen and correspond roughly to the lean meat in human food. Protein is the most expensive part of the feed. It is usually furnished in this country by cotton seed meal and leguminous pasture or hay crops like alfalfa, lespedeza, velvet beans, soybeans, and cowpeas. These same crops also furnish carbohydrates and fats, but they are particularly rich in proteids and are especially good to balance up the natural pasture grasses and forage crops of this section. Protein enters very largely into the composition of the milk, blood, muscle, hair, and even the nerves, and more is required for dairy cows than for beef animals, though it is absolutely essential to both. It is due to a lack of protein in our range grasses that they prove so poor for producing milk, but will cause a cow to put on fat. A knowledge of this impresses upon us the importance of getting lespedeza started on all the pastures and ranges of this section.

The carbohydrates include the sugars, starches, gums, and fiber of feeds and form by far the largest part of all vegetable foods. The decomposition or burning of such substances in the animal body furnishes the greater part of the heat and energy that sustain the body. The carbohydrates are also converted into fat. The natural pasture grasses and forage crops of this section furnish carbohydrates in sufficient quantity to meet the needs of the animal body, but need to be supplemented, mainly with proteids, for milk production.
Fat includes the fat, wax, and green coloring matter of plants. It serves practically the same purposes in the animal body as do the carbohydrates, but has heating value estimated to be 2.25 times as great.

Balanced Ration.—It has been determined by numerous feeding trials that a milk cow weighing from 800 to 1000 pounds and giving between two and one-half and three gallons of milk per day will require about thirty pounds of dry matter in twenty-four hours, this to contain 2.5 pounds of digestible protein, 13 pounds of digestible carbohydrates, and one-half pound of digestible fat. This would give what is called a balanced ration and would be furnished by any one of the following combinations of feeds common to this section:

Ration 1.—Mexican clover hay, 15 pounds; cotton seed hulls, 15 pounds; cotton seed meal, 3 pounds; wheat bran, 4 pounds.

Ration 2.—Cowpea hay, 15 pounds; corn silage, 40 pounds; wheat bran, 5 pounds.

Ration 3.—Cotton seed hulls, 20 pounds; cotton seed meal, 4 pounds; wheat bran, 5 pounds.

Ration 4.—Cowpea hay, 10 pounds; cotton seed hulls, 15 pounds; cotton seed meal, 3 pounds.

Ration 5.—Cowpea hay, 15 pounds; corn stover, 10 pounds; cotton seed meal, 4 pounds; corn meal, 6 pounds.

Ration 6.—Sorghum hay, 20 pounds; cowpea hay, 10 pounds; cotton seed meal, 3 pounds.

Ration 7.—Crab grass hay, 15 pounds; cowpea hay, 12 pounds; cotton seed meal, 3.5 pounds.

The digestive organs of the cow are so made that a certain amount of bulk must be had with all feeds and it would not do to get the required amount of digestible nutrients in too small a volume, because in this event she would not be able to digest it. In this section there are very few days in the year when it would be necessary to feed all of any one of the above mentioned rations because the animals can usually get the most of the bulky feed (consisting largely of carbohydrates) from the pastures in summer and the gleanings of the fields in winter. When given the run of velvet bean fields here in winter, they will get almost a perfectly balanced feed from these alone, but this should usually be supplemented by about two pounds each of cotton seed meal and corn and cob meal.

During the spring, summer, and fall we usually find it best to feed here about four pounds each of cotton seed meal and corn and cob meal and as many cotton seed hulls as the cow will eat, in ad-
dition to pasture. For the rest of the year about four pounds of cotton seed meal and forty pounds of corn silage is necessary in addition to the gleanings from the fields and pastures and the grazing from such crops as oats, rape, vetch, and the clovers (the latter as yet having proven almost worthless). When the weather is too bad to permit of grazing or pasturing, they are given additional feed in the form of hay. To the extent that it can be used with safety, cotton seed meal is the cheapest feed that can be used here, but it is dangerous to feed it for considerable lengths of time in quantities greater than four pounds per day per cow. Bad effects from feeding greater quantities are manifested in frequent udder troubles as well as other ways, such as abortion and premature calving.

Results of feeding tests in this State have gone to show that one pound of cotton seed meal is equal in feeding value to two pounds of corn and cob meal, so that even at the highest price at which cotton seed meal sells, it still remains the cheapest feed that can be used. Cotton seed meal has a fertilizing value as great as its feeding value and other tests that were made in this State in which the writer assisted as an analytical chemist have gone to show that from 75 to 90 per cent of the fertilizing value of cotton seed meal fed to cattle can be recovered in the manure, the animals retaining only a very small per cent of the nitrogen, phosphorus, and potassium for use in producing bone, flesh, or milk.

One of the first tests made at the McNeill Station was to determine what part of the theoretical value of the plant food left in the manure could be actually recovered in the shape of crops. Thirty steers were fed here in the winter of 1902-03 over five acres of land on cotton seed meal and hulls and the troughs were frequently moved so as to cause them to distribute the manure evenly over the surface of the field. The ground was broken several times during the one hundred-day feeding period so as to prevent the manure washing off over the surface. For ten years after this records were kept of the increased yields of corn and cotton grown on this land over the same crops treated in the same way and grown on the natural soil. These records go to show that we have recovered in this time from the manure left by these cattle as much as the cotton seed meal and hulls cost when they were fed.

The soils of this section are more responsive to commercial fertilizers than any other type of soils in the State, yet there seems to be something about the effectiveness of animal manures that commercial fertilizers cannot approach. Plats of land set side here years ago for permanent tests with commercial fertilizers have been
fertilized liberally for ten years, yet they have increased very little in crop producing power, but the same class of soils have received animal manures, particularly where dairy or beef cattle have been penned on them at night, have received benefits that show for years.

An experience of twelve years with these soils convinces the writer that only the exceptional man will succeed in farming here who does not handle live stock in some form, either horses, cattle, sheep, or hogs, as conditions demand or the tastes of the individual farmer may lead him to select. This statement is almost true anywhere, but is doubly true here, where, when we clear the land and get it into first-class physical condition, we have little natural fertility but simply a good place to convert cheap products like fertilizers, manures, and restorative crops into higher priced products such as fruits and vegetables, cotton and corn. These soils cannot be mined even for a few years and the farmer who succeeds on them will have to be a manufacturer from the start. As is the case with all manufacturing the more skill we put into the manufactured article the higher will be the profits. Not only is the manufacturing process extended when we convert our cotton seed products, corn, etc., into milk, butter, or cream, but considerable skill is added as well.

Dairying is certainly not a lazy man’s job, for it means work every day and Sunday throughout the year. While continuous, the work is not hard, nor should it be uncleanly. If not now, the demands of the trade will soon compel the production of milk on strictly sanitary principles. When we comply with the regulations of the city boards of health, dairying will lose much of the filthiness that now makes it distasteful to persons of refined sensibilities. The general introduction of concrete construction has done more than any other one thing to make dairying cleanly. With concrete barns and milk houses, a convenient water supply so easily to be had here, and a soil that makes little mud even in the wettest weather, we can see no reason why dairying should be considered as other than a gentleman’s job. If properly conducted here, it will at least enable us to be gentlemen enough to pay our debts, which in the good old days was one of the prime requisites for putting one in this class.