

CATTLE FEEDING



*Cooperative Extension Service
The Ohio State University*

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CATTLE FEEDING

By

JAMES HUBERT WARNER

Beef Cattle Specialist—Extension Animal Science

What Contributes Most to Successful Cattle Feeding?

The human factor. The individual talent is the most variable factor of all, often the decisive factor. There is no set of rules sufficiently fool proof to replace exercise of judgment at all times.

Smart buying of feeder cattle. The old axiom, "cattle well bought are half sold," still holds. A smart buyer has in mind a complete feeding and marketing plan before his money goes to the seller of feeder cattle.

Decision making. Long time and daily decisions that include the know-how and skill of successful operators is a must.

When buying feeders. Bargaining on feeders involves price, weight, age, grade, weighing conditions, sex, and health. If you are inexperienced, it will pay to have someone bargain for you.

Feed conversion. By feed conversion, we mean the gains in live weight obtained from given amounts of feed. Also the pounds of beef produced from production of an acre of land.

Ration choice. Corn silage in large amounts is basic to lowest cost gains and maximum acre returns. Corn silage is easily fortified with grain and supplements.

The breeding of cattle. Quality feeds and correct feeding practices can not overcome the handicap of poor breeding. There is no substitute for size, vigor, natural rapid growth, desirable conform-

ation, and quality—other than a lower buying price.

Desirable cattle. The wisest feeder will concentrate on young cattle finished at 1,000 pounds or less and finished to the grade indicated by breeding.

Comfortable housing. Feeder cattle require only a small investment in buildings. Use an outside lot with solid footing to provide extra space. When building, concentrate first on space for storing and handling feed conveniently at low cost.

Wise selling of finished cattle. Making the best sale requires sound judgment on when, where, and how. Employ a maximum of **competitive selling** and a maximum of **competitive buying**. Usually the best time to sell is when the "cattle are ready."

Sufficient capital. Money is a major requirement. Have enough money or credit to operate the business on a flexible basis. Avoid being forced to buy or to sell cattle until you are ready to do so.

Mechanical feeding equipment. Handling both roughage and grain mechanically gains volume of business and reduces labor. The forage harvester, vertical silo, silo unloader, and mechanized feed bunk provide possibilities of new cattle feeding efficiencies. A larger number of cattle per feedlot handled with less labor provides volume advantage.



Open lots with solid footing are a must for cattle feeding. Feed and water outside for most efficiency.

New cattle feeding era at hand. A new era is at hand. It features improved mechanical feed handling, more accurately fabricated rations, refinement techniques in buying and selling cattle, management decisions based on records, cattle bred to improve both feedlot and carcass per-

formance, and a continuing expanding business. The new era will glorify the corn plant and more and larger silos. It will produce more and more farmer-family feeders of the 300-to 500-head volume.

The Part Feed Conversion Plays in Cattle Feeding and Profit

Why feed cattle instead of selling grain and forage?

There should be dollar profit in converting forage and grain into beef. But this is not always so. Additional overhead and investment costs must be considered the same as feed costs.

Although forage and some grain are not adaptable or desirable for human

consumption as such, they can be transformed into a delicious, nutritious food. Beef cattle utilize profitably millions of acres of pasture and millions of tons of roughage that otherwise would have less use and less value.

There is a bond between a husbandman and his cattle that cannot be measured by economics.

Think of feed conversion two ways:

The amount of feed required to produce 100 pounds of live weight gain on cattle.

The number of pounds of live cattle that can be produced per acre of land. The calculated amount of beef produced on a given amount of feed is a major measure of cattle feeding efficiency.

How much feed does it take to produce 100 pounds of live weight gain?

Average amounts of feed based on research reports are the most accurate.

There are many variables. Only a few comparative results are used in this bulletin. There are too many variables to analyze them all—variations in people, decisions, cattle, rations, quality of feed, environment, etc.

How many pounds of live cattle can be produced with feed from an acre of land?

The major factors involved are the choice of crops grown, the yields per acre of these crops and how the feed is processed and used.

The arithmetic used in this bulletin includes these factors in measuring final results.

The human factor, breeding of cattle and environmental factors are present and all influence results. To a degree, feed conversion is a partial measure of factors of production other than feed.

Pounds of live cattle produced per acre of land are a major measure of feed efficiency.

What combination of feeds will produce the most net profit?

Corn silage leads all other feeds in producing maximum pounds of beef per acre at low cost.

Corn in large amounts without silage produces the highest selling cattle and in the shortest period of time.

Some additional protein is required in all rations of heavy corn silage feeding or heavy corn feeding.

Hay can be a very desirable component of any fattening ration, from small to large amounts depending on several variables. Hay can reduce the amount of protein supplement required.

Corn silage and corn, supplemented as required with hay and/or supplement, offer a favorite profitable ration.

Note from the tables in this bulletin how land use and feed conversion go together.

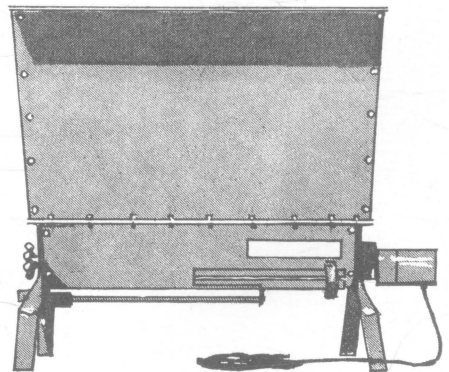
Cattle of similar breeding fed on different rations the same length of time or to the same weight may not have the same sale value.

Two cattlemen feeding similar cattle and the same ration may not finish with the same financial results.

What kind of cattle will convert a given amount of feed into the most money?

The difference in feed conversion between most grades of cattle is usually small and difficult to measure. The "kind of cattle" within grades is more important.

Feed conversion, as important as it is, may affect final profit results less than the buying and selling price of cattle.



Choose an accurate supplement meter to control feed proportioning.

Cattle bought too high and/or sold too low will reduce or eliminate any profit, regardless of efficient feed conversion.

How many pounds of beef can be produced from an acre of land?

Potentials are shown on the following pages for two weights of cattle and different rations.

The choice of crop grown for feed and the method of harvesting and processing make a difference.

The yield per acre of all the crops grown will largely determine beef produced per acre.

It makes no difference in feed conversion whether corn is \$1 per hundredweight or \$2 per hundredweight. The rate of feed conversion is the same.

It makes no difference in feed conversion whether cattle cost 15 cents or 25 cents per pound and sell at 15 cents or 25 cents per pound. Feed conversion may be the same.

There Is a Place for Much Arithmetic in Cattle Feeding

One purpose of this bulletin is to encourage more arithmetic and less guess in appraising cattle feeding results.

The important part that feed conversion plays in measuring the relative profitableness of different rations is emphasized in the following pages. Prices and weights of cattle and their importance are included.

Changes in method of operating should be based on the arithmetic that can be provided by detailed accurate records.

Emphasizing feed conversion in no way lessens the need to be alert to all other factors that contribute to success in the cattle feeding business.

The method used in this bulletin is to determine the amount of separate feeds required in a ration to produce 100 pounds live weight of cattle. Then, by arithmetic measure, the efficiency of this ration in terms of pounds of live weight that can be produced per acre of land.

Only the best combinations of feed



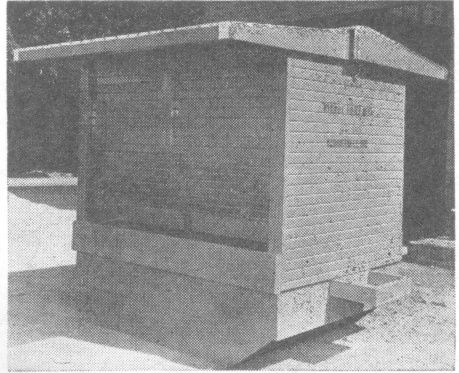
are compared. The arithmetic includes two weights of cattle—calves and yearlings.

The arithmetic begins with feed in storage and purposely avoids consideration of crop production costs and the effect of price changes of both feed and cattle.

Results shown have been attained and often surpassed by practical feeders. They are not the kind of figures used in stories.

Some rations are efficient so far as the combination of feeds required per hundredweight of gain are concerned but are less profitable than other rations because of low acre returns. The various methods of using a crop change the relative profitability of that crop. This is an important consideration when purchasing feed rather than raising it.

In order to make ration comparisons more meaningful, the arithmetic is standardized by using 400 pounds of live weight gain on yearling cattle and 400 and 600 pounds on calves.



Self-feeding grain fits special kinds of cattle management, including grain on grass and non-silage rations.

Dollar feed cost comparisons may be made by multiplying the average amounts of feed shown in any ration by the current market value at any time.

Dollar income comparisons may be made by multiplying the pounds of cattle produced per acre by the current value of any grade of cattle at any time.

The Buying Agreement Affects Feed Conversion and Profit

It is difficult to determine the “true weight” of a truck load of feeder cattle. The eyes are an unreliable substitute for scales. Scales will be misleading unless careful attention is given to the “total weighing conditions” prior to obtaining the scale weight.

Total weighing condition means everything that affects the weight of cattle. Total time involved, timing of various moves, speed, excitement, temperature, handling, amount and time of feeding or watering and everything that may affect the operation of the scales.

There is bargaining know-how in agreeing on how cattle are to be weighed for the “payweight” as well as the price per hundredweight.

Astuteness in bargaining over cattle weights and price not only influences the amount of profit but can change the arithmetic of feed conversion.

Study the arithmetic in the following example. It illustrates the difference between **scale weights** and **true weights** and points up how cattle weight may change feed conversion or profit.

Example: A cattleman bought a truckload of feeder cattle that weighed 700 pounds on an average by the scale ticket. The **total weighing conditions** prior to weighing the cattle were favorable to **excessive shrink** rather than **desirable shrink** and, therefore, favorable to the buyer. The **true weight** of this truckload of cattle should have been an average



Shrinkage conditions can affect profit.

725 pounds. The buyer gained 25 pounds per head because of **excessive shrink** on the scale weight. Unless the seller protected his income by a higher selling price, he is operating at a disadvantage.

These cattle when placed in the feedlot would regain 25 pounds quickly and then gain at a normal rate. They would show a big gain at the end of the first 30 days and could retain this advantage until the cattle are sold.

Suppose the total gain on these cattle from pay weight to time of selling is 400 pounds per head. The gain is 25 pounds by reason of favorable weighing conditions and 375 pounds by converting a quantity of feed into live weight. This 25 pounds is $6\frac{1}{4}$ per cent of the total gain.

In this example the arithmetic of daily rate of gain, feed conversion, and profit were favorable to the feeder by reason of the **total weighing conditions** at the time of purchase.

Example continued: A neighbor cattleman buys a truckload of feeder cattle as comparable as possible except for the weighing conditions. His cattle weighed 700 pounds on an average by the scale ticket. The **total weighing conditions**

prior to weighing were very favorable to the seller. The true weight of this truckload of cattle should have been 675 pounds on an average. The buyer lost 25 pounds per head because of **excessive fill** above a **desirable fill**. The buyer has a money disadvantage unless he protected his investment by a lower price per hundredweight.

These cattle when placed in the feedlot must overcome the 25-pound **excessive fill** disadvantage before showing actual gain. This could require most or all of a 30-day feeding period and cost a quantity of feed. These cattle must gain 25 pounds plus 400 pounds normal gain, or a total of 425 pounds, to sell at a 400-pound pay weight gain. This is a $6\frac{1}{4}$ per cent performance disadvantage.

The **buying agreement** of these two cattlemen shows that the **total weighing conditions** at the time of purchase influenced the **scale weights** a difference of 50 pounds per head from the **true weights**. Based on 400 pounds of gain per head—by the scales—this is a total difference of $12\frac{1}{2}$ per cent.

This arithmetic shows that the daily rate of gain and the rate of feed conver-

sion is greatly influenced by the **total weighing conditions** prior to obtaining the scale weight. The amount of profit is likewise influenced unless a price adjustment offsets a part or all of the disadvantage of the weight conditions.

A "pencil change" in weight will change results obtained in figuring feed conversion. Sometimes the **pay weight** includes a given per cent "weight add on" or an "add-on pencil shrink" to the scale weight. This will affect profit unless a compensating price adjustment is made. This is a bargaining matter in lieu of knowing the **true weight**.

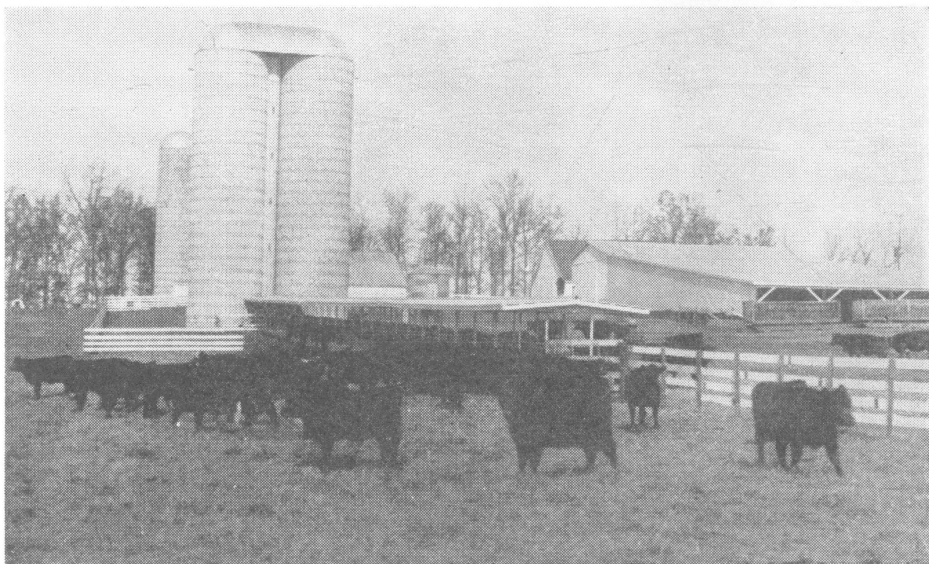
The first and fundamental basis of evaluating the total weighing conditions of feeder cattle should be humane treatment of cattle and health considerations. Then, adjust the price accordingly, rather than the weight.

"Buy early and cheapen the cattle on

grass or stubble" is a guide sometimes offered as sound advice and smart management. But is it? Using non-valued feed to cheapen cattle is not selling the feed at all, neither is it correct cattle feeding arithmetic. Such feed should add weight and value to cattle. Cattle placed directly in the feedlot, with the feed **not counted** for 30 days or more, could produce the same **cheaper cattle** results. Better buy the cattle at a cheaper price to start so that the grass or stubble does actually have value.

Market quotations alone may not reflect the true price of cattle by \$1 or more per hundredweight because of the weighing conditions or because of the fleshing of the cattle, or both.

It makes no difference in feed conversion whether a steer costs 15 cents a pound or 25 cents a pound. It does make a difference in the profit potential.



A dirt lot adjacent to shelter and paved area for use in dry weather or when ground is frozen gives many flexible management advantages.

The Selling Procedure Affects Feed Conversion and Profit

Agreements on price and the total weighing conditions, when selling finished cattle, are matters of bargaining and are factors in feed conversion as well as profit.

Sale weights vary because of different methods of handling, loading, and conditioning cattle; variations in timing feed and water; different hauling distances; different timing of all activities from feedlot to scales; and the effect of weather.

The condition of the scales is most important.

Some cattlemen give away weight in various ways, knowingly or unknowingly, to gain the reputation of a higher selling price. Other feeders fill or try to fill cattle, to gain a weight advantage. Any handling practice that influences pay weight also influences feed conversion.

A pencil shrink, in addition to all other weighing conditions, in an attempt to gain a higher selling price changes feed conversion.

Example: Cattle started on feed at 700 pounds weighed 1100 pounds on an average by the official pay weight ticket when sold. Their true weight should have been 1075 pounds on an average. Because of favorable total weighing conditions, that included excessive fill, this cattleman gained an average of 25 pounds per head by the scales. This represents a gain by

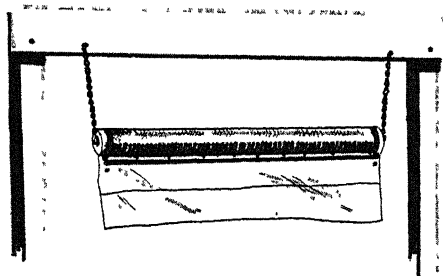
the scale weight of $6\frac{1}{4}$ per cent based on a total gain of 400 pounds each. Unless the buyer protected his investment by a compensating lower price per hundred-weight, he is operating at a disadvantage. The excessive fill, therefore, is favorable to increasing the calculated daily rate of gain and falsely improving the record of feed conversion. If the buyer protected his investment by a lower price, the cattleman's profit may be the same; yet feed conversion was made to appear more favorable than it actually was.

Example continued: The neighbor's cattle weighed 1,100 pounds on the average by the official pay weight ticket. The true weight should have averaged 1,125 pounds. This cattleman lost an average of 25 pounds per head because of excessive shrink over a desirable shrink, or $6\frac{1}{4}$ per cent based on a gain of 400 pounds each. Unless the seller protected his income by obtaining a higher selling price, he is operating at a disadvantage. Excessive shrink will tend to lower the daily rate of gain and change the arithmetic of feed conversion.

Example comparison: In comparing the sale results of these two cattlemen, one gained 25 pounds and the other lost 25 pounds—or there is a difference of 50 pounds per head due to the difference in total weighing conditions at the time or selling. This is $12\frac{1}{2}$ per cent of the total gain considered. The arithmetic shows the first cattleman had 400 pounds gain between pay weights and only 350 pounds according to the true weights or a favorable difference of $12\frac{1}{2}$ per cent.

The neighbor had a 400-pound gain between pay weights by the scale weights and yet actually had 450 pounds of gain by the true weights—an unfavorable difference of $12\frac{1}{2}$ per cent.

Comparing the results of feeding by



Use an oiler of some type to aid in external parasite control.

these two cattlemen, shows a difference of 100 pounds of weight gain, or 25 per cent of the total gain. In this example the weight differences are due to **total weighing conditions**. A pencil shrink or pencil add on would change this comparison accordingly.

Bargaining is equally important on price and weighing conditions. Dollar profit is greatly changed in this example, unless price adjustments offset poor weighing conditions. The rate of feed conversion is greatly changed by the weighing conditions.

This example points up the fact that cattle performance in converting feed into weight increase might be good or bad and the results hidden by "price and weight bargaining."

There is a recognized lack of uniformity in reporting prices from various cattle markets which may vary \$1 to \$1.50 and more per hundredweight because of non-uniformity in weighing conditions.

Many individual cattlemen should give more attention to the total weighing con-

ditions than is commonly practiced. Acquiring a favorable reputation in regard to weights will usually be helpful price-wise. Agreeing on weighing conditions favorable for the buyer to achieve higher carcass yields, based on live cattle pay weights, makes the total weighing conditions a tough bargaining point.

If a cattle feeder does not know how to take care of himself in buying and selling cattle, someone will take care of him.

Weight gained from purchase weight to sale weight under desirable total weighing conditions and the total amount of feed to produce the weight should provide correct arithmetic for calculating feed conversion.

It does not make any difference in feed conversion whether a steer sells for 15 cents per pound or 25 cents per pound. It does make a difference in the profit potential.

It is apparent that "reputation dealing," involving both cattle feeder and cattle buyer, will become increasingly important.

Acre Yields Based on Productive Corn Land

Following are the yield levels used in calculating the "beef per acre" potential in this bulletin. Note that the recognized potential of oats compared to corn is less than one third in terms of pounds; also each pound is worth less.

Corn	100 Bu.	6,800 lbs.	Meadow Silage	12 Ton	24,000 lbs.
Oats	70 Bu.	2,240 lbs.	Soybeans	35 Bu.	2,100 lbs.
Corn Silage	20 Ton	40,000 lbs.	Soybean Meal	2,100 lbs.	1,722 lbs.
Mixed Hay	2.5 Ton	5,000 lbs.			

Check and use your own crop yield in evaluating your own potential or your own efficiency. Many achieve higher yields than those above.

The best land use potential over a period of years is a prime requirement in the choice of crop, continuous corn would be the ultimate. As best land use may shift from corn to crops with less potential, the amount of beef potential per acre goes down accordingly.

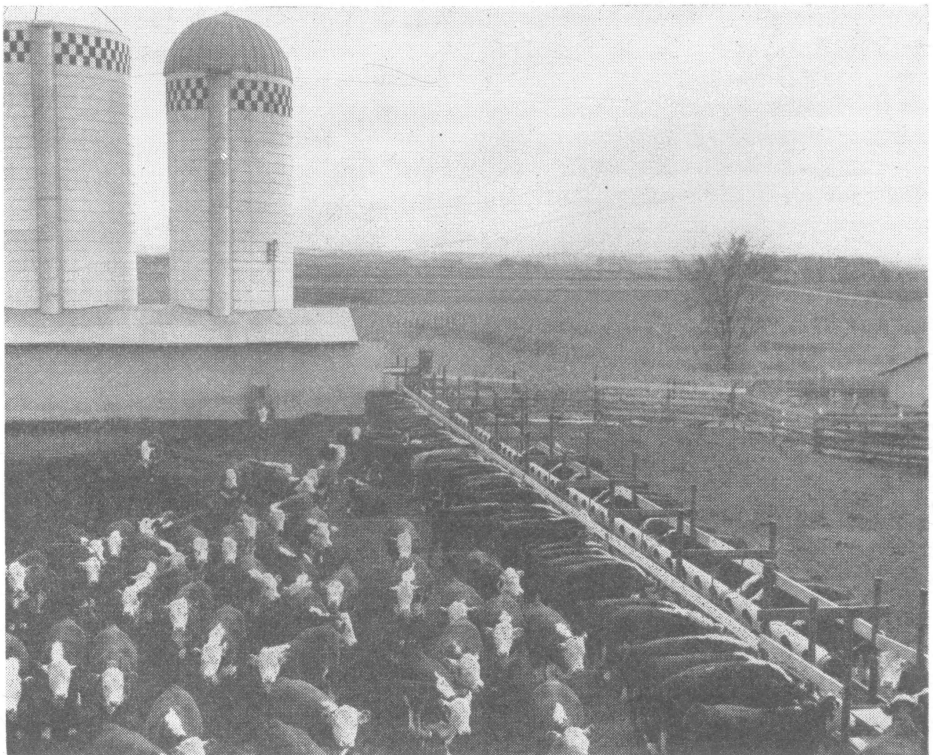
It is not possible to resolve all the variables in determining comparable yields of a corn crop from year to year; naturally as corn yield goes up or down, beef potential per acre goes up or down.

It is not possible to resolve all the variables in determining comparable yield levels of other crops to corn yield when they are grown on the same land.

Comparatively high crop yields are used because most Ohio cattle feeding is done on the more productive land accompanied with heavy application of fertilizer.

Calculating Corn Silage Yield from Corn Yield

Ear Corn	yield	times	1.8 = tonnage of silage from ears
Corn Stalk	yield	times	3.5 = tonnage of silage from stalks
For Example:			
Ear Corn	3.8 tons	×	1.8 = 6.84 tons
Corn Stalk	3.8 tons	×	3.5 = 13.30 tons
			<u>20.14 tons of silage</u>



Large open lots are most desirable. Plan the feedbunk to be roofed in the future, if not when first built.

Calculating Meadow Crop Silage Yields from Hay Yield

$3 \times \text{the hay yield} + \text{a little} = \text{meadow crop silage tonnage}$
 $3 \times 4 + .25 = 12.25 \text{ tons meadow silage}$
 Plus a "little" because of less loss when harvested for silage

Clover and grass or alfalfa and grass mixed meadow will vary in yield of meadow crop silage, depending on the number of times cut. Alfalfa and grass mixed meadows may be cut more often than clover and grass mixed and may be expected to yield more meadow crop silage.

Calculate the yield of soybean meal by taking 82 per cent of the yield of soybeans.

A smart cattle feeder will check crop yields accurately not only to determine the efficiency of his crop production but as a first step to correctly calculate the efficiency of his cattle operation. Large yields of corn and corn silage have contributed greatly to off-setting other costs in the total operation.

Allow for an average loss and shrinkage of up to 10 per cent with corn silage between harvest field and feed bunk and an average loss and shrinkage of up to 20 per cent with meadow silage; and smaller percentages with good management in upright silos.

Small grains are not included in the ration comparisons because of their low potential in feed production and acre returns. Small grains may be necessary to provide a nurse crop for new seedings—especially on many farms in some areas of Ohio.

Corn and Cob Meal—Full Fed

Yearling steers—675 to 1075 pounds. Daily gain—1.8 to 2.25 pounds.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	100 Bu. Corn Level	
			Acres Per Cwt. of Gain	Acres 400 Lbs. on 100 Cattle
Corn and Cob Meal	16.0	760	.1118	44.72
Mixed Hay	3.7	175	.0350	14.00
Soybean Meal	1.5	70	.0407	16.28
Totals	21.2	1005	.1875	75.00
Pounds live cattle per acre			533	

The above feed conversion is based on 400 pounds gain on each of 100 cattle.

Note that the 760 pounds or 11.2 bushels of corn contribute to 100 pounds of gain. This is at the rate of 910 pounds per acre, if corn is given all the credit. Note too that it requires about 65% as much land to grow the hay and meal as it does the corn.

This simple ration makes maximum use of corn as grain. This ration can be self-fed to save labor and provide convenience without loss of efficiency and perhaps some gain.

A high proportion of corn in the ration will tend to shorten the feeding period.

This corn ration will produce fast gains and high finish on live cattle.

Corn contributes more in producing cattle that yield high and more valuable carcasses than any other feed.

Corn will be best if processed through a roller mill or a new type burr mill. This crushes or grinds to a texture that cracks all the kernels, and the cob is crushed fine enough to prevent sorting by the cattle. Avoid extreme fineness.

The difference between good hand feeding and self-feeding is difficult to measure. Labor, convenience, other costs, and other management reasons will more often be the deciding factor than any difference in feed efficiency gained either way.

Corn-fed cattle are easiest to sell—at top market price—on any price level.

There is greater feed efficiency and generally more profit in feeding a large number of light weight cattle to a choice grade than in feeding a fewer number of cattle to heavy weights and a prime grade.

Note in the arithmetic that pounds of live cattle per acre include all the acres in the ration and all the credit does not go to corn acres.

Note also that it requires more acres to provide the corn than both the hay and the supplement.

A cattle feeder on more productive land has a decided competitive advantage because of higher crop yields.

There are many reasons why cattle fed this ration do not all sell at the top of the market. Inferior breeding, too little corn, too short a feeding period, and general poor management are important ones.

One-Half Corn and Cob Meal and One-Half Corn Silage

Yearling steers—675 to 1075 pounds. Daily gain—1.9 to 2.3 pounds.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	100 Bu. Corn Level	
			Acres Per Cwt. of Gain	Acres 400 Lbs. on 100 Cattle
Corn Silage	22.0	1100	.0275	11.00
Corn and Cob Meal	8.0	360	.0529	21.16
Mixed Hay	3.0	150	.0300	12.00
Soybean Meal	1.5	70	.0407	16.28
Totals	34.5	1680	.1511	60.44
Pounds live cattle per acre				662

The above feed conversion is based on 400 pounds gain on each of 100 cattle.

Note that it requires more acres to produce the hay or soybean meal than it does the corn silage. Note also that the ratio of corn silage acres to corn producing acres is near 1 to 2. Eliminating hay production in favor of corn silage provides great potential for increasing cattle numbers. At the same time it eliminates hay equipment overhead.

Note also that the same potential exists to grow more corn instead of soybeans. A potential more favorable than growing soybeans to trade for soybean meal.

This type ration will produce maximum dollar income per acre. Full feed the corn silage. Limit corn to fit the finish of the cattle desired and time of selling. Limit hay as available or eliminate entirely. Decrease the amount of soybean meal if the hay is of good quality.

Corn silage even in small amounts has a stimulating effect on the appetite of cattle and improves their general condition.

Corn silage fed cattle will show only slightly less finish than cattle fed all corn at any given time. It will require a little more time to produce the same finish. A larger amount of feed will be sold. It should tend to increase the profit.

This ration favorably combines rate of gain, cost of gain, and quality of product. The cattle should be fat enough to provide carcass acceptance without excessive trim.

Cattle fed this ration will finish to choice and low prime according to breeding and length of feeding.

The feeding period will shorten in corn silage rations as the corn is increased from none to nearly a full feed. Pounds of live weight per acre will decrease accordingly. It should not be necessary, or the most profitable, to feed more than half ration of corn and cob meal with corn silage.

Plan to feed corn silage until cattle go to market—if only 10 pounds or less per head daily. The cattle will do better.

Some buyers try to take advantage of producers in buying corn silage fed cattle. Protect your income by knowing and using the facts.

Cattle properly fed corn silage with some corn should sell for no more than 50 cents per hundredweight less than straight corn fed cattle. They will often sell at the same price.

Corn silage helps to keep cattle on feed by keeping the digestive tract in good tone.

Feeding a proportionally large amount of corn silage at the start of the feeding period then shifting to no silage and a full feed of corn the last 30 to 60 days may please a cattle buyer but will not give best results in feed conversion or net dollars to the producer.

Cattle eating a small amount of corn silage and a full feed of corn and cob meal will often take no more corn and cob meal after the silage is discontinued than formerly. Sometimes they will eat less corn.



Corn and corn silage are king and queen of cattle feeds.

Corn Silage—Full Fed

Yearling steers—675 to 1075 pounds average. Daily gain—1.8 to 2.1 pounds.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	100 Bu. Corn Level	
			Acres Per Cwt. of Gain	Acres 400 Lbs. on 100 Cattle
Corn Silage	42.0	2200	.0550	22.00
Mixed Hay	3.0	160	.0320	12.80
Soybean Meal	1.5	80	.0464	18.56
Totals	46.5	2440	.1334	53.36
Pounds live cattle per acre				750

The above feed conversion is based on 400 pounds gain on each of 100 cattle.

Note that 2,200 pounds of corn silage contributed to 100 pounds of gain, or about 90 pounds of gain per ton of corn silage. This is at the rate of 1,800 pounds of gain per acre if corn silage is given all the credit. Note, too, that it requires about 84 per cent as much land to grow the meal as it does the corn, and about 58 per cent as much land to grow the hay.

The potential to gain volume of business by growing a maximum of corn for silage rather than soybeans or hay is quite evident. Note how acres devoted to hay and soybean reduce the potential pounds of beef per acre.

Corn silage is the most profitable cattle feed used in Ohio. This ration demonstrates the value of corn silage but not necessarily its most profitable use. Corn silage is seldom practical or most profitable without added grain.

Corn silage captures stalk nutrients at a time and in a form to give maximum gain. About $\frac{1}{3}$ of the total nutrients in corn plant are in the stalk. Let's use all the nutrients.

Corn silage contains an average of about 350 pounds, or about 5 bushels, of ear corn per ton.

The ration above provides the equivalent of $7\frac{1}{4}$ pounds of corn and cob meal daily. Silage can be harvested, stored, and fed cheaply and conveniently.

Making corn silage occasionally provides a method of salvaging a corn crop that otherwise might be partially or a total loss. This point should not be overlooked in total management.

Cattle full fed corn silage will grade lower, sell lower, and yield less than cattle full fed corn and cob meal, if fed the same length of time. It will pay to feed some corn in addition.

Corn silage is a good feed for all grades of cattle. Larger amounts of silage are especially well suited for cattle bred to yield the grade "good" and lower than good grade carcasses.

Bloat is very rare with any ration containing corn silage. If bloat does occur, it is most likely to be caused by some factor other than silage.

Contrary to some buyer and some seller opinions, cattle full fed corn silage do not necessarily have larger, wastier middles than cattle full fed other rations.

Older heavier cattle fed this ration will tend to finish more readily than lighter younger cattle. A longer feed period will improve the sale value and produce a higher slaughter grade.

Rather than grow soybeans to exchange for soybean meal, grow more corn and buy the meal.

Corn and Cob Meal—Full Fed

Steer calves—450 to 850 pounds or to 1050 pounds. Daily gain—2.1 to 2.3 pounds.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	100 Bu. Corn Level	
			Acres Per Cwt. of Gain	Acres 400 Lbs. on 100 Cattle
Corn and Cob Meal	12.0	560	.0823	32.92
Mixed Hay	3.0	160	.0320	12.80
Soybean Meal	1.5	70	.0406	16.24
Sub-Totals	16.5	790	.1549	61.96
Pounds live cattle per acre				646

TO ADD 200 POUNDS MORE PER STEER—on the above

Corn and Cob Meal	17.5	875	.1286	25.72
Mixed Hay	3.5	175	.0350	7.00
Soybean Meal	1.5	75	.0435	8.70
Sub-Totals	22.5	1125	.2071	41.42
Pounds live cattle per acre				483

TO ADD A TOTAL OF 600 POUNDS GAIN

Both Periods—Average	18.5	901	.1723	103.38
Both Periods—Lbs. per Acre				580

Feed conversion based on 400 or 600 pounds gain on each of 100 calves.

Note that 560 pounds or 8.2 bushels of corn contributes to 100 pounds of gain, or at the rate of 1,220 pounds per acre, if corn is given all the credit.

Note that it requires 875 pounds or 12.9 bushels of corn to help make 100 pounds of gain when the weight gain is between 850 to 1050 pounds. An increase of about 50 per cent.

Calves are more efficient than yearlings in converting feed into live weight.

Calves of the weight above gain nearly as fast daily as do yearlings.

Four hundred pounds increase on steer calves may be too little to produce a satisfactory grade, and they may not sell to best advantage. Heifers will perform better at this weight.

Steer calves require a longer feeding period than yearlings to grade as high.

Margin of income on yearling steers may be larger on steer calves on a per-head basis but may be no larger than steer calves on a per-hundredweight basis.

There is less income risk with calves than yearlings; however, there is more health risk with calves.

There is greater flexibility in choosing a time to sell finished calves than finished yearlings.

Light-weight finished cattle fed this ration will sell for top market prices on any Ohio market.

Note the increase in daily ration and feed per hundredweight of gain to add the additional 200 pounds of weight. Also, the difference in results of adding 600 pounds of weight instead of 400 pounds of weight to the same cattle.

Feeding cattle to heavier weights requires a price increase to offset the decrease of efficiency in feed conversion.

Corn Silage and Corn and Cob Meal

Steer calves—450 to 850 pounds or to 1050 pounds Daily gain—1.9 to 2.3 pounds.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	100 Bu. Corn Level	
			Acres Per Cwt. of Gain	Acres 400 Lbs. on 100 Cattle
Corn Silage	20.0	1000	.0250	10.00
Corn and Cob Meal	6.0	280	.0412	16.48
Mixed Hay	3.0	150	.0300	12.00
Soybean Meal	1.5	70	.0407	16.28
Sub-Totals	30.5	1500	.1369	54.76
Pounds live cattle per acre				730
TO ADD 200 POUNDS MORE PER STEER				
Corn Silage	24.0	1200	.0300	6.00
Corn and Cob Meal	10.0	500	.0735	14.70
Mixed Hay	3.0	150	.0300	6.00
Soybean Meal	1.5	70	.0407	8.14
Sub-Totals	38.5	1920	.1742	34.84
Pounds live cattle per acre				574
TO ADD A TOTAL OF 600 POUNDS GAIN				
Both periods—Average	33.1	1640	.1492	89.60
Both periods—Lbs. per acre				670

The above feed conversion is based on 400 or 600 pounds gain on each of 100 calves.

Calves started on feed at the above weight or lighter will not actually eat 3 pounds of hay daily. There is considerable waste when hay is self-fed. There is no practicable way to feed hay to large numbers of cattle.

Calves are not capable of consuming enough silage and hay to provide the desired energy level. Therefore the amount of corn at the start of the feeding period should be relatively high. Up to 4 pounds the first 4 to 6 weeks.

Choice calves will produce the most "net dollars" on an average over a period of years.

Steer calves of this weight on this ration, if sold after 400 pounds gain, will not carry enough finish to sell to the best advantage. Heifer calves at this weight should be ready for market.

A corn silage ration will require a little longer feeding period for a choice finish than a straight corn and cob meal ration. If fed longer more feed will be sold. This could be an advantage.

Cost per pound of live weight gain is lower with calves than yearlings fed the same ration.

It will require more feed per hundredweight of gain to add an additional 200 pounds of weight, following a 200-day feeding period than starting with comparable weight cattle in ordinary feeder condition. The latter cattle will not be up to the same market grade on such a short feed.

It usually takes calves longer to regain their range weight and condition than does yearling cattle.

Meadow Crop Silage and Corn and Cob Meal

Steer calves—450 to 850 pounds or to 1050 pounds. Daily gain—1.8 to 2.2 pounds.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	100 Bu. Corn Level	
			Acres Per Cwt. of Gain	Acres 400 Lbs. on 100 Cattle
Meadow Silage	22.0	1100	.0458	18.32
Corn and Cob Meal	9.0	450	.0662	26.48
Mixed Hay	2.0	100	.0220	8.80
Sub-Totals	33.0	1650	.1340	53.60
Pounds live cattle per acre				746
TO ADD 200 POUNDS MORE PER STEER				
Meadow Silage	26.0	1300	.0542	10.84
Corn and Cob Meal	13.0	650	.0956	19.12
Mixed Hay	2.0	100	.0200	4.00
Sub-Totals	41.0	2050	.1698	33.96
Pounds live cattle per acre				589
TO ADD 600 POUNDS GAIN				
Both periods—Average . . .	35.6	1782	.1458	87.56
Both periods—Lbs. per acre				685

Feed conversion based on 400 or 600 pounds gain on each of 100 calves.

Note that no supplement is included in this ration. None should be necessary if a quality meadow silage is produced. This accounts for the relatively high number of pounds gain of live cattle per acre.

The quality of meadow silage varies greatly. These results assume a high quality product. Use a liberal grass and legume mixture. No silage preservative should be necessary.

Meadow silage is more desirable for wintering calves to be grazed in summer than in finishing rations.

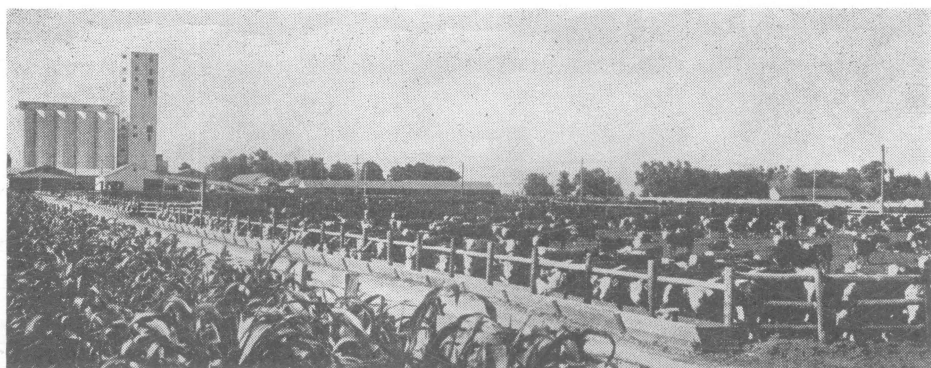
Meadow silage as a method of using the first crop of hay has advantages over conventional hay harvest.

The larger the amounts of corn added in meadow silage rations, the shorter the feeding period, the faster the daily gain, the more valuable the cattle, and higher price the resulting carcasses will bring.

Expect cattle fed meadow silage rations to sell for less than cattle fed corn silage rations or corn and cob meal. The cattle will yield less and grade lower.

Calves may respond to meadow silage about the same as yearlings. Yet they will finish less readily on similar meadow silage rations.

Note the increase in daily ration and feed per hundredweight of gain to add the additional 200 pounds of weight. Also the difference in results of adding 600 pounds of weight instead of 400 pounds of weight in the same cattle.



Large western feedlots will continue to provide stiff competition to the small Ohio operator.

Feed Conversion Summary

Relative sale value based on choice bred feeder cattle fed the same length of time or to gain approximately the same amount of weight.

Rations	100 Bu. Corn Level		Relative Sale Value
	Lbs. Gain Per Acre	Total Acres	
100 YEARLINGS—400 POUNDS EACH			
Corn and Cob Meal—Full Fed	533	75.00	Top value to \$1.50 less than top
½ Corn and Cob Meal— ½ Corn Silage	662	60.44	From 0 to \$2 less than top
Corn Silage Full Fed	750	53.36	From \$1 to \$2.50 Less than top
100 CALVES—400 POUNDS EACH			
Corn and Cob Meal—Full Fed	646	61.96	
Corn and Cob Meal—Corn Silage	730	54.76	
Corn and Cob Meal—Meadow Silage 746	53.60		
100 CALVES—600 POUNDS EACH			
Corn and Cob Meal—Full Fed	580	103.38	Top value to \$1.50 less than top
Corn and Cob Meal—Corn Silage	670	89.60	From 0 to \$2 less than top
Corn and Cob Meal—Meadow Silage 685	87.56		From \$1.50 to \$3 less than top

“Total acres” means all the acres to produce all the different feeds in the ration, not just the corn acres.

Note the difference in pounds of gain per acre by yearlings and calves. Note also, that silage shows to advantage two ways. More pounds of beef per acre and many fewer acres to produce the same total pounds of gain.

Note the effect that corn silage has on the pounds of beef per acre and how when properly combined with corn it tends to maintain high relative value.

Meadow crop silage compares favorably with corn silage only when the quality is really desirable and because of the possibility of finishing cattle without additional acres for protein being involved in the calculation. Other total farm management factors of use of labor and equipment and overhead are involved.

Meadow silage does not trail in pounds gain per care but shows to a disadvantage in relative sale value of cattle. Less meadow silage and more grain will improve the cattle value.

Volume times price minus expense gives income. Therefore consideration must be given to the value of cattle produced the same as total pounds of live weight produced.

It is not possible to state the difference in sale value of cattle fed on different rations. Sale values are sensitive to many factors, fluctuate rapidly and follow an irregular pattern because of many variables.

The value of cattle varies according to market trends, season of year, place of sale, method of selling, supply and demand factor, live weight, yield and weight of carcass, bargaining ability, etc.

The wise feeder will do well to observe and study comparative sales values and market trends of cattle continuously.

Larger amounts of corn than half a ration in high roughage rations, except corn silage, will increase the value of cattle sufficiently to net a higher return on the corn.

Considerations in Evaluating Feeds and Rations

YELLOW CORN

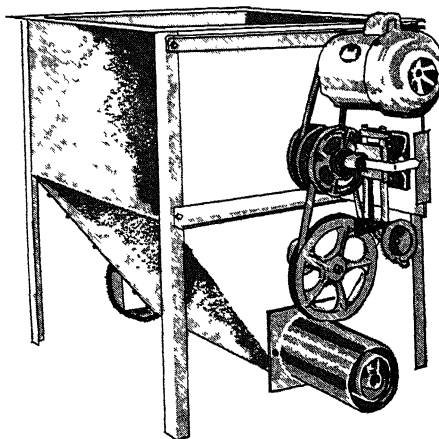
Morrison's composition tables rate No. 2 yellow corn at 85% dry matter, with 80.1% in total digestible nutrients, a protein content of 8.6 %, a digestibility rating of 6.5%, an oil or fat content of 3.9%, and 3,367 international units of vitamin A per pound. These percentages are known to vary greatly for several reasons.

Also, ground corn cobs have an analysis of 90.4% dry matter; 2.3% protein, all non-digestible; total digestible nutrients of 45.7%; fiber of 54%; and fat of 4%.

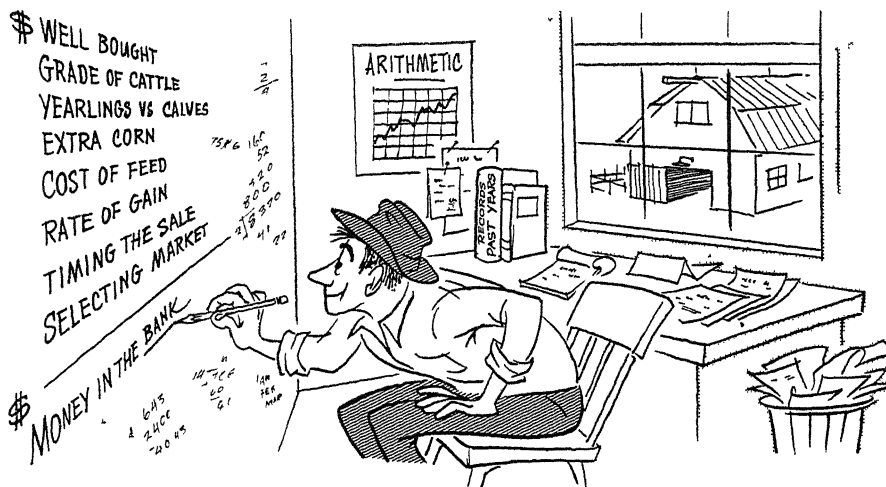
Corn is the chief fattening feed. Increasing daily consumption will speed up the fattening process. Then lengthening the feeding period will increase the total amount of finish to a very high level if desired.

For a non-silage ration, processing ear corn just fine enough to crack the corn kernels, pulverizing the cob sufficiently fine to prevent sorting and to create only a minimum of fine particles or dust provide an excellent textured feed. The

roller type mill with a cob pre-crusher should be considered for processing ear corn—also, the new type burr mill. Avoid finely ground corn and cob meal in non-silage rations.



Best management requires accurate metering of grain. Choose a type that suits your needs.



Keep accurate records for feed conversion, cost of gain and tax purposes.

The moisture content of ear corn influences the ease of processing and the quality of product obtained. Proper processing is easiest in winter and most difficult in summer.

There is less reason to be concerned with fineness of corn and cob meal or fineness of cracked shelled corn in silage rations than in non-silage rations. Ground ear corn is a better ingredient in non-silage rations than either shelled corn or ground shelled corn.

In corn silage rations, either corn and cob meal or cracked shelled corn is satisfactory. Shelled corn, processed to crack the kernels as coarse as possible so that none go through the mill whole, yet with a minimum of fineness or dust, will provide an excellent texture. Roller type mills provide an excellent texture product, as do the new type burr mills.

In corn silage rations, feeding cracked shelled corn instead of corn and cob meal is often preferred. Eliminating a pound or two of cob from the grain and permitting the cattle to consume a pound or two more silage will upgrade the ration.

The extra risk involved in storing high moisture shelled corn in conventional upright silos prompts recommending that the shelled corn be stored in some other form. It is practical to harvest so-called high-moisture ear corn with up to 32% moisture; grind either the entire ear or the shelled corn and store in a conventional upright silo. Harvesting at 21% to 23% moisture may be even more desirable according to many experienced cattlemen. To prevent spoilage the dryer corn should be ground finer than if the corn were high in moisture.

There may be a percentage advantage in feeding so-called high-moisture ground ear corn in comparison with ground dry corn in non-silage rations. This percentage advantage may disappear completely when the corn is fed in corn silage rations.

The nearly ideal way to supply corn to cattle, when volume justifies, will be to picker shell the corn, grind it at once, and store the ground shelled corn in a conventional upright silo.

The problem in providing corn for cattle is how to make it fit **total management**

which involves harvesting costs, storing costs, processing costs, available labor, time, and convenience. The answer will not be the same for all operators.

In most decision-making situations, there is apt to be more profit in minimizing costs and maximizing convenience from corn field to cattle paunch than will be gained by the superiority of one kind of corn over another, regardless of cost. This includes moisture per cent and whether ground shelled corn or ground corn and cob meal.

Each operator, before making a decision to change his corn handling methods, should carefully appraise his present facilities, equipment, and situation; then set a future goal and outline steps to achieve it without extra costs.

CORN SILAGE

The dry matter content of corn silage is 28.4%; total digestible nutrients, 20%; total protein, 2.3%; digestible protein, 1.3%; fiber, 6.3%; fat, .9% and vitamin A activity, 10,667 international units per

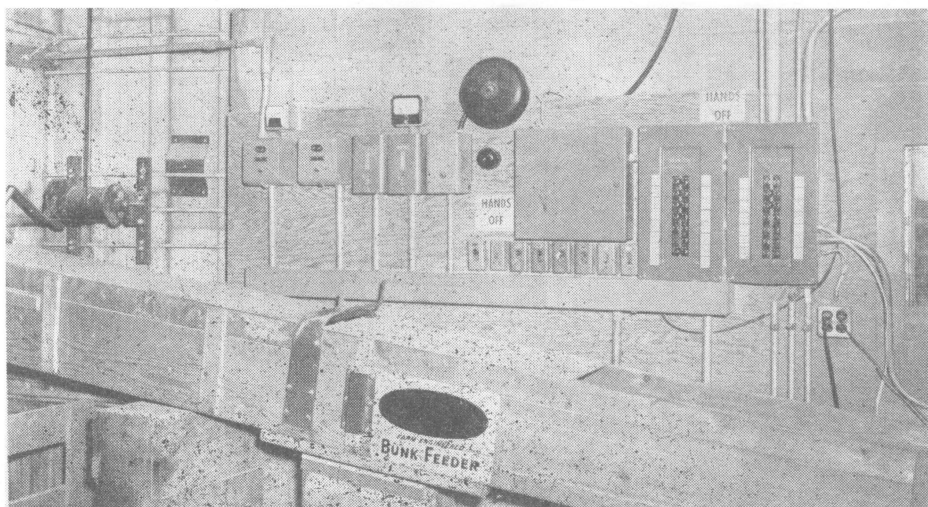
pound. These percentages are approximate.

Corn silage will contribute to the production of more pounds of beef per acre than any other crop or corn in any other form.

There is wide variation in the chemical composition of corn silage and wide variation in its physical appearance and palatability. It is far from a uniform standard product. The moisture content should average about 60% to 65%.

The best time to make corn silage is when the ear is on the ripe side of well dented. Husks on many of the ears will be dry and brown. Blades on the lower part of the stalk may be yellow or dry. Twisting the stalk just above the ear and observing the amount of juice present, is an aid in determining the moisture content of the stalk.

Corn silage should be cut in short lengths no more than 1/4 inch long. The finer the cut the better, and the more uniform it will distribute in the silo. Finely cut silage packs tighter, increases tonnage



Electric power is cheap and safe. Well planned and correctly installed wiring and controls are a must in cattle feeding operations.

that can be stored in a silo, improves fermentation, facilitates mechanical handling, increases palatability, makes mixing other ration components with the silage more accurate, and makes feed sorting by cattle more difficult.

Choose a variety of corn for silage that produces high per acre yields of corn grain as well as a large tonnage of silage.

Larger users of silage may need to plant two or three kinds of corn which mature in succession to gain the most maturity advantage at harvest time, or plant the same kind of corn at early and later dates.

The possibilities in investment and in farm management of growing continuous corn has opened the way for new and different decisions.

Corn silage offers the small farm owner who desires a greater volume of business an opportunity to expand cattle numbers, if capital is available. He can expand volume to the point that all his own corn is harvested for silage, then purchase corn as necessary.

The practice of topping corn stalks above the ear provides silage with a

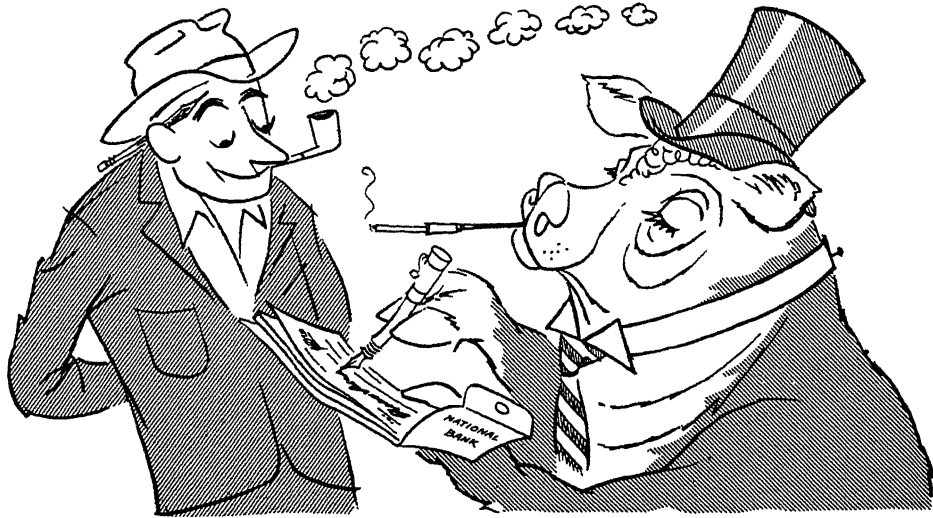
higher percentage of corn grain. It will take more acres to fill a silo. Cutting the stalk higher from the ground will accomplish the same result. Doing both at the same time will achieve still greater concentration of grain.

Either above practice may be more efficient than harvesting the entire plant under a given set of circumstances. Both practices will tend to reduce pounds of beef per acre. The answers to which method contributes to the most net dollars per acre is affected by many variable costs and factors which are not always the same. Expanding silage storage and continuing to harvest the entire plant are the most profitable alternatives..

Limit all other ration components to fit a controlled feeding program and then full feed corn silage. Maximize corn silage and minimize the balance of the ration to achieve the desired finish in the time allotted.

HAY—CLOVER AND ALFALFA

The composition of red clover hay cut before bloom is 88.1% dry matter; 60.1% total digestible nutrients; 18.3% protein



Well bred, correctly fed cattle net most profit.

with 11.3% digestible; 7.1% mineral matter; and a vitamin A content of 18,333 international units per pound.

Grass and red clover hay provide less desirable nutrients than all-clover—total digestible nutrients dropping to 52.2%; total protein to 9.6%, with 5.5% digestible; and mineral matter to 6.2%. The vitamin A content is 15,333 international units per pound for pure timothy hay.

The vitamin A content given is for No. 1 quality hay which means, among other things, that it is early cut. Vitamin A will depreciate rapidly as the quality of hay decreases. In average hay, it may be only one half the amount given.

The composition of leafy alfalfa hay is 90.5% dry matter; 52.7% total digestible nutrients; 17.2% protein with 12.6% digestible; mineral matter 8.7%; and vitamin A content of 32,333 international units per pound. No. 2 grade alfalfa has about 15,000 A units per pound.

If you grow hay, make use of it. It is a good feed. You can use it to a good advantage in fattening rations. Cattle will eat 2 to 3 pounds of hay daily as commonly fed. Quality hay can greatly reduce or completely replace the need for buying protein. Just use it wisely!

Nearly all research people agree that quality hay has an extra plus value because of something not yet identified and not explained by the present understanding of minerals, proteins and vitamins.

The most desirable way to feed hay is to control the amount consumed daily by each group of cattle, similar to the way grain or supplement is controlled. This, of course, is not attained by feeding large quantities of hay in a manger free choice. There is no low cost convenient way to limit or control long hay feeding to large numbers of cattle.

Hay pellets offer a method of handling and of volume control that may eliminate

completely any long hay feeding. Hay pellets have already replaced long hay in several feedlots. Potential mechanical handling of hay pellets will encourage expansion in their production and use.

Waste and losses of hay, beginning with harvesting, transporting, storing, moving out of storage to feedbunk and out of feedbunk into cattle, are large and vary from farm to farm.

It is possible and practical to feed cattle at least a part of the feedlot time without any hay at all. It is now being done.

The over-riding consideration with hay is how the cost and convenience of producing and feeding hay compare with alternative possibilities. Proper use of land is a major factor on most Ohio farms.

It would be desirable to feed from 1½ to 2½ pounds of quality hay to each animal daily.

Grass hay of quality equal to legume hay is preferred pound for pound in free choice feeding. Grass hay falls short in yield comparison and would fall quite short under most desirable controlled conditions.

Since the total hay requirement of feedlot cattle can be relatively small or none, improved quality with less tonnage is much more important than a larger tonnage with lower quality.

SUPPLEMENTS

Most cattle growing and fattening rations fall short in providing enough protein for the most profitable growth. This can be corrected by feeding quality hay in sufficient quantity or by buying a by-product protein or commercial fabricated feed.

All vegetable and animal protein supplements are by origin by-products. Soybean meal, cotton seed meal, linseed meal, and meat scraps are the principle ones.

These are commonly referred to as straight protein carriers.

Commercially fabricated protein carriers offer a variety of protein sources, added minerals, vitamins, other numerous ingredients, and a range of products commonly called feed additives.

If you decide that a ration needs additional protein, buy that supplement which provides the protein at the cheapest cost per unit and is the most convenient. If urea provides a part of the protein, it makes comparison less significant.

If a ration falls short on any other nutrient or requirement contained in a commercial fabricated supplement, the supplement would have a corresponding added value above the protein value.

Other things being equal, expeller type protein products are preferred over solvent type products. The higher oil or fat content has added value.

Commercially fabricated protein feeds often contain a reduced guaranteed percent of protein due to the addition of other by-products of lower protein content than the straight proteins.

Ingredients of commercial protein feeds may vary in proportion to the total as the separate components vary in price from time to time. This does not necessarily reduce their value.

There is no real advantage in adding protein from several different sources rather than one good source to an otherwise desirable ration of quality feeds.

Since the protein content of all ration components other than protein carriers varies considerably, it is always a guess as to how much of any protein should be fed daily. Average composition of the component parts is a guide. An occasional analysis might be helpful. A keen observer can tell when feeds are likely to be up or down in protein content from the average.

Urea, rich in nitrogen rather than a true protein, provides a nitrogen source for rumen bacteria. It should tend to decrease the cost of any supplement. Since urea is rated 2.64 times as high as protein, it provides a rapid build up in protein analysis. Urea does not supply energy as do by-product protein supplements.

Vitamins in Cattle Rations

There is no evidence that adding vitamins to commonly used good cattle rations such as are fed in Ohio is necessary or that they improve feedlot performance. Farm grains, especially yellow corn, corn silage, and good hay, normally contain adequate vitamin A. Vitamin A is associated with carotene-rich grain or roughage. Cattle can convert the carotene in a ration to vitamin A.

Cattle store a considerable amount of vitamin A in their livers. That reserve is drawn upon when needed. An un-replenished supply lasts for months.

Vitamin A deficiency will not normally occur, if cattle are fed at least 2 pounds of good quality hay daily or as little as 10 pounds of corn silage.

A few pounds of good meadow crop silage a day can supply the vitamin A requirement for feedlot cattle.

Ample vitamin D is provided by sunshine. It is good cattle husbandry to house cattle so that they may be indoors or outdoors as they choose. This provides the vitamin D requirement.

The following sample ration would provide about 275,000 international units of vitamin A per day. This ration represents the average daily feed intake of a 700-pound calf. The vitamin A provided should be quite adequate and with a large margin of safety. The number of milligrams of carotene for a 700-pound calf is reported to be about 40 daily.

		mg.	I.U.
Corn. Sil.	25 lbs.	46.0	250,000
Sh. Corn	4 lbs.	8.8	14,000
Cl. & Tim.	2 lbs.	10.5	10,000
Soy Meal	1 lb.	?	?
Total		65.3	274,000

Note that corn silage is recognized as a potent carrier of vitamin A.

It is possible that under a given set of total ration conditions the animal may not properly assimilate vitamin A. More needs to be known on this situation.

If one uses commercial fabricated supplements, added vitamin A may as well be included. The cost is quite small. There is no known danger of over feeding vitamin A.

Some opinion and theory has been expressed that high nitrogen fertility programs in growing corn have brought about a build up of nitrates in corn silage and that a high nitrate level reduces the ability of cattle to transform the carotene present to vitamin A.

At present there is lack of proof for such opinions and some proof that the nitrate level theory is unfounded. However, further research is needed to clarify the role, if any, of the nitrates in vitamin A nutrition.

Dr. Earle Klosterman at the Ohio Experiment Station has depleted some steer calves in the fall and winter of vitamin A by feeding a ration of white corn, soybean meal, and dried beet pulp for five months. The vitamin A level returned to normal quickly after the cattle were fed corn silage—even corn silage

made from extra heavy nitrogen fertilized corn. Cattle fed extra vitamin A as a part of the research made no measurable increase in gain.

Dr. Klosterman believes that if nitrates are present in corn plants, they are likely to be destroyed by the fermentation process. This is true if the corn is well matured and is not excessively high in moisture. Wet silages contain more acid which may prevent the complete breakdown of nitrates.

This break down of nitrates does produce poisonous gases. Caution should always be used during silo filling.

Special Considerations

It is recognized that lighter or heavier cattle than those considered on the previous pages, when fed the same length of time, will require different amounts of feed per each 100 pounds of gain. Also that lighter or heavier cattle fed a longer or shorter period of time will require different amounts of feed per 100 pounds of gain.

In appraising your feed conversion, remember there is considerable shrinkage and some waste between field and storage and feed bunk, and from the feed bunk.

Cattlemen should give attention to rations, using those that give favorable feed conversion and make for greater efficiency in net dollar income.

The arithmetic in this bulletin is based on yields in storage, with corn moisture at 15.5 per cent.

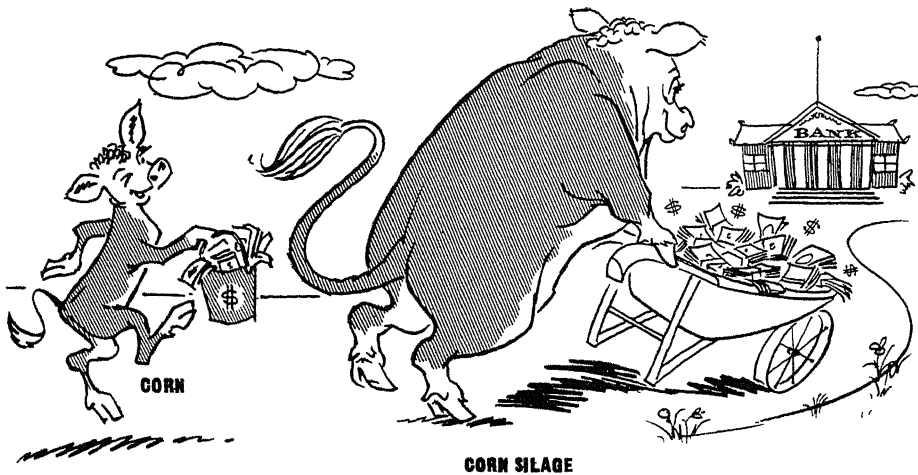
Beef Heifer Calves Offer Added Flexibility in Cattle Feeding

As a rule for comparable breeding and feeding, heifers will:

Weigh less at weaning. Average 20 pounds less than steers and may vary in weight from no difference to 40 pounds.

Cost less than steers—from \$2 to \$5 per hundredweight less.

Gain less per day. About 5 to 10 per cent less at usual weights. Nearer 5 per cent at light weights, nearer 10 per cent at heavier weights.



A maximum of corn silage and a minimum of corn make possible higher income.

Consume less feed daily. From 5 to 10 per cent less feed.

Finish in 30 to 60 days less time than steers according to weight, ration, and degree of finish.

Sell for less per pound. This is quite variable depending on many factors. Anywhere from no difference to \$3 per hundredweight. Average near \$1.50 on most Ohio markets.

Be a little less efficient in feed conversion.

Finish to a choice grade at lighter weights.

Finish with more waste fat than steers—10 to 20 pounds per head.

There is unwarranted prejudice against well bred, well fed beef heifers in both live cattle market channels and wholesale and retail beef trade. Prejudice is decreasing.

Prejudice in live cattle markets is due largely to fear of loss resulting from heifers carrying calves.

Prejudice in heifer carcass beef is due largely to dairy cattle carcass compe-

tion, extra fat waste and the lack of a continuing dependent supply.

Beef heifers are best suited to a shorter feed period and sold at lighter weights than steers—about 850 pounds is quite desirable. Markets are tending to accept weights up to 950 pounds, if the heifers are beefy, smooth, and show no over finish.

Beef heifers are much less satisfactory than steers for a program of wintering prior to a summer of grazing or a long-time feeding operation.

Well bred, well fed beef heifers of less than 950 pounds should be discounted not more than \$1 per hundredweight on an average, compared with similar steers.

A growing demand for light weight choice carcass beef has helped the value of heifer carcasses and their acceptance in trade channels.

Live cattle markets are more sensitive price-wise when heifers are offered for sale in large number than with steers. This reflects the retail trade situation.

Some retailers have a merchandising policy not to handle heifer beef at all. This is because of a lack of availability in volume for a period of time.

Feeder calf producers the country over have improved heifer values by reducing the number of beef heifers that are bred. Some producers guarantee their heifers non-bred.

Total results with spayed heifers has been such that a premium price for them as feeders is unwarranted.

Yearling heifers pose special problems in feeding and handling, and might well be left to the more experienced operators.

The practice of having a veterinarian treat all older heifers to cause abortion

is growing. This practice should be done as soon as the heifers are acclimated. There is some added risk.

Some feeders have a veterinarian pregnancy-test their heifers, then they treat only those found pregnant.

A feeder who observes that some heifers are pregnant can choose between selling them on the market at a substantial discount, selling to cow and calf operators as a breeder, or awaiting normal delivery and then selling cow and calf.

Since feedlot heifers are often bred too young, problems at calving time are great and losses severe. Buying feedlot heifers for less is a practiced safeguard.

Feed Cattle Immediately on Arrival

Unfortunately there are too many unknowns as to where cattle originate or when they start to move and how they are handled or treated. Avoid owning stale cattle with an unknown history.

There should be no mystery about how to handle calves on arrival at the farm. It should help to know exactly the time cattle leave their original home to move to your farm and to know in detail how they were handled, treated, fed, and watered.

A first requirement is to provide adequate nutrition immediately, which includes clear water. Rest is also a prime requirement.

There is no better "one feed" than quality mixed hay—50 per cent or more of which is grass. Prefer an all grass hay to an all legume hay. Prefer red clover as the legume rather than alfalfa or ladino clover. Avoid high quality alfalfa hay and any poor quality hay of any kind. Provide fresh hay at least three times daily at the start; then free choice continuously after a few days.

Whole oats, shelled or coarsely ground

corn, corn silage, and a protein feed with or without molasses can be fed from the first day. Corn might be delayed the longest.

The first feed in addition to hay might include $\frac{1}{2}$ pound whole oats, $\frac{1}{8}$ pound protein, with a little corn silage or any combination of these feeds. Increase the amounts gradually each feed until they are up to the level desired.

For that first feed, a good plan is to place a very small amount of hay in the bottom of the feed bunk; place a ribbon of corn silage on the hay, place whole oats on the silage, place protein on the oats, then another very small amount of hay on top.

Provide less hay than the amount likely to be eaten. After an hour or two, add more hay. Repeat this at each feeding.

This way cattle become accustomed to different feeds at one time, and after a few feeds feeding will require less effort. It will pay to outwit the cattle every way possible to get them eating.

It is best to keep cattle outdoors unless the weather is severe. Permitting a choice

of being outside and inside—as they are inclined—is desirable. Cattle confined indoors should have plenty of room, top ventilation, and no drafts.

Regardless of most weather conditions, cattle confined outdoors may be better off than in many barns. Allow them plenty of sunshine and rest.

Grazing cattle when they arrive is excellent when sufficient grass is available. Too often in the fall too little grass is available, or the quality is too poor, to provide the level of nutrition desired.

In large pastures, calves weaned just before arrival may “bawl and wander” excessively at first. Confining cattle to a smaller field or lot for a few days would be more advisable.

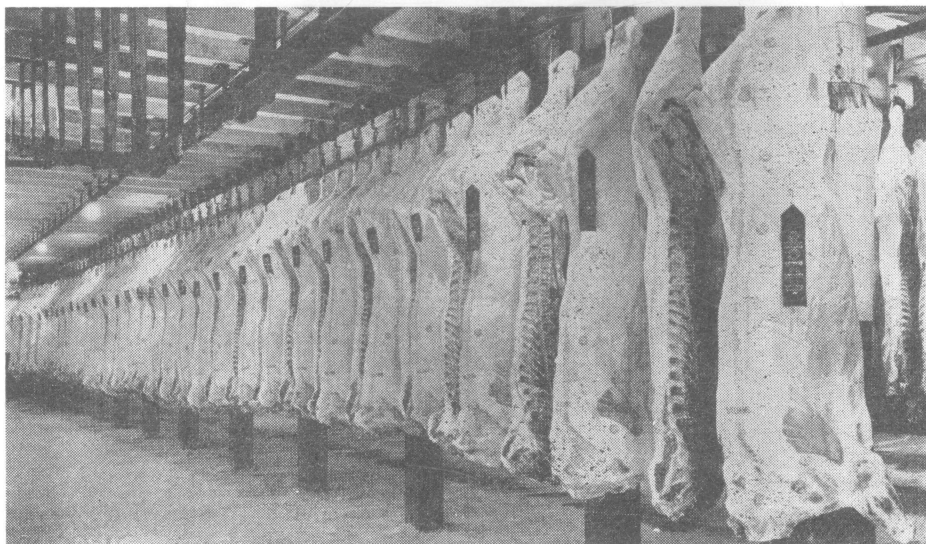
There is more chance of loss than gain in confining calves to glean in cornstalk fields. For maximum profit, this requires close observation and good judgment.

Yearling cattle will more likely return plus benefits than calves in terms of maintaining weight or gaining weight and in making profitable use of stalk fields.

Provide top management and nutrition in an attempt to reduce cattle health problems. Even so there will be health problems at times. Close observation and recognizing sub-standard cattle, with early assistance from a veterinarian, is best management.

There is no known preventative for so-called shipping fever. No treatment should be expected to substitute for nutrition and good management. There is an excellent vaccine for so-called “red nose.”

Several promoted shipping fever preventatives or tend-to-prevent type feed additives may be of value under a given set of conditions and may have no value under another set of conditions. When they will or will not work is uncertain.



There is a limited market for prime carcass beef. Such beef is more expensive to produce. A premium price on this carload made a profit for the feeder.

Small Grain and Small Grain Silage

Cattle have robust constitutions and can handle almost any kind of feed. Some feeds and certain combinations of feed pay better than others.

Oats or barley grain can be substituted for a part of the corn grain. In heavy grain non-silage rations, especially in summer, some small grain in amounts up to 20 to 25 per cent of the total could improve the ration. Other grains may be used in lesser amounts. In high roughage rations, small grains are less favorable than corn by comparison. Large amounts of finely ground barley occasionally pose a bloat problem.

Oats, barley or wheat compare favorably with corn on a per-pound or a per-hundred weight basis when substituted as a per cent of the ration. On an acre basis, they fall woefully short because of the great difference in yield. An average oat yield of 2,000 pounds per acre will not compare favorably with a corn yield of 7,000 pounds.

The small grains make excellent silage. The optimum harvest period is very short because of rapid maturity and plant moisture changes. Time the harvest so that

the straw has only a yellow sheen and the berry is in a thick milk to soft dough stage. Controlling the moisture content is very important in making a quality product. Evaluating the maturity of the stalk as well as the grain is equally important.

Small grain silage is rated about halfway between high quality meadow crop silage and corn silage in value on a tonnage basis.

Finishing rations that include small grain silage require more corn and less protein than corn silage rations.

Small grain is grown on many Ohio cattle farms to fit total farm management rather than for its superior contribution to the feed supply. A part of the management decision in cattle feeding must be to consider whether the reduced amount of feed produced by small grains is worth the cost.

If the decision is to grow small grain, then a silo will help gain maximum returns per acre by using the entire plant.

The silage route of feeding small grains will double the profit potential expected from feeding only the grain.

The Place of Pasture in Feed Conversion

There is more know-how and skill required to feed cattle successfully on pasture than is required in dry-lot feeding because of several additional factors involved. Flies of all kinds, variations in pasture feed value, and possibly additional heat are factors of concern.

Four years' research at the Ohio Agricultural Experimental Station shows by comparison the following results in pounds of live cattle produced per acre of land:

Corn silage with soybean meal—no added grain—573 pounds.

Corn silage with soybean meal—a half

feed of corn and cob meal—508 pounds.

Full feed of corn and cob meal plus soybean oil meal—438 pounds.

Meadow crop silage plus a half feed of corn and cob meal—430 pounds.

Steer calves wintered, grazed and then fed grain on pasture—368 pounds.

The difference in value of the cattle must be considered along with a difference in the number of pounds of cattle per acre.

Some skilled operators report results that are more favorable to pasture than are the above results.

Regardless of the yield per acre difference, cattlemen short on labor and long on land may fit "on pasture" feeding into their total farm management to a more profitable advantage than can cattlemen long on labor and short on land.

There are three major systems of feeding on grass with several variations in each system.

Winter cattle to gain about 1 pound daily; pasture heavy without additional feeding until the pasture is short or dries up, then begin to feed grain and increase the amount of grain as desired.

Winter cattle to gain about 1 pound daily, and have the cattle eating a half feed of grain when placed on pasture, then continue the grain at this level until the pasture supply fails. Increase the amount of grain as desired.

Winter cattle to gain at any desired rate, usually about $1\frac{1}{4}$ pounds daily, then full feed grain on pasture from the beginning.

One variation in each of these plans is to place the cattle in dry lot for finishing whenever the pasture supply is short or as the condition of the cattle or market situation warrants.

Another variation is to pasture all summer with limited grain feeding or none at all until the new corn crop is available; then full feed new crop corn as chopped corn. Weight and finish of cattle along with the market situation are guiding factors in making a decision. Another variation is to pasture cattle full time or at night only and feed in shelter rather than to use the field.

Hand feeding once a day for a time then shifting to a self feeder is good management. This practice requires more equipment.

Experiences indicate that no one of these plans is superior to others in all cases and that management knowhow is

a major factor in obtaining best results. A part of the problem is that of fitting a pasture plan to the balance of the farm management plan.

Usually it will take from 1 to 3 weeks and the loss of some weight to change cattle from winter feed and management to pasture. Knowhow in management detail pays off in making this change. Some cattlemen report little or no difficulty.

As a rule by comparison, the faster cattle gain and the more finish cattle have at the close of the wintering period, the slower will be the summer response. The reverse is true when winter gain is small, and the cattle are thinner in spring. Wise management would be to follow a plan that capitalizes best on the kind and amount of feed to be sold.

Bloat is a serious problem in grazing beef cattle on legume pasture. Avoid using ladino clover. Ladino is the worst offender of all legumes in Ohio. Provide a liberal amount of timothy or brome in seeding mixtures to be used for beef cattle pasture. Regardless of precaution taken in grazing rotation-type pastures high in alfalfa or clover, some inconvenience or loss of cattle will occur over a period of years. There will be less bloat loss on bluegrass pasture which usually produces less gain.

Cattlemen planning to sell pasture should consider the advisability of a commercial breeding herd. Utilizing the pasture area and other low-value farm forage in producing a part of their feedlot cattle. This type of operation will prove desirable for some operators and will provide a profitable use of pasture.

The system of buying young cattle in the spring and selling them in the fall off grass without additional feeding offers the least possibility of profit, as a rule, of any system of handling cattle. This system may be as desirable as any, if sufficient

grain is fed along with pasture to provide desirable slaughter cattle by late fall or early winter.

Harrassment by flies poses a problem and reduces cattle gains on pasture. Oilers

with fly control compounds are helpful. Spraying regularly offers considerable control. Time and expense are involved. The fly loss justifies doing something for at least partial control.

Comparative Rate of Gain and Grades of Cattle

There is no great variation in the ability of any one grade of cattle to make more rapid or more efficient gains than another grade.

The variation in rate of gain of kinds of cattle within a given grade can be as great or greater than is the average variation between grades.

Generally the plainer grades of finished cattle sell high in comparison to better grades during the spring months. Choice cattle sell higher in comparison during the summer and fall months. The extent or lack of competition from grass cattle is a major factor.

It is misleading when comparisons on the relative profitableness of grades of cattle are based on price spreads at the season of the year when the spread is

narrowest.

The original producer of choice grade feeder cattle enjoys a much greater return from his cattle than does a producer of lower grade cattle.

Many Ohio feeders are over-sold on plainer grades of cattle. They are influenced more by the first cost and do not give enough consideration to the final sale value which is equally important.

Some feeders might well shift to a choice grade of cattle and to a season of marketing when such cattle sell to advantage and secure an increase net dollar return for their feeds.

It usually requires a larger margin on plainer cattle than choice cattle to provide the same income potential because the value of the increase in weight is less.

There Is Arithmetic Know-how in Grade Differences

There is too much inclination among feeders to buy cattle on a price basis rather than a price and grade basis, and there is a tendency to pay too much for the plainer grades of cattle.

Too many feeders buy good grade feeders at choice grade prices and medium grade feeders at good grade prices. The "good to choice grade" phrase is quite a good bargaining phrase for cattle dealers.

A larger margin is usually necessary on plainer cattle than choice cattle because the added weight sells for less money.

Note this comparison:

A 500 lb. choice feeder steer fed to a 1,000 lb. choice fat steer sells for \$240.

A 500 lb. plain feeder steer fed to a 1,000 lb. fat steer sells for \$200.

A difference in income or value of \$40.

This \$4-per-hundredweight spread in sale price is a fair average. The feed efficiency is about equal in adding 500 pounds weight, unless the plain steer is too plain.

The plain steer must be bought for \$40, or 8 cents per pound, less than the choice steer to give the same dollar income return.

If feeder cattle are lighter in weight than that used in the illustration above, then the buying margin per pound between grades must be larger to give equal returns.

If feeder cattle are heavier in weight than used in the illustration, then the buying margin can be less and give equal returns.

This arithmetic will hold at any selling price spread between any grades of finished cattle or cattle of the same grade, if the selling weights are equal.

Feeder cattle grading as done at many sales tends to place too much emphasis on the amount of fleshing, or condition of the cattle, and too little on desirable breeding. Such grading places a premium on creep feeding feeder calves and extra milk, both more advantageous to the seller than the buyer.

Understanding and application of grade differences in feeder cattle and bargaining on feeder cattle are very much on a trading basis rather than a standardized basis.

There is a tendency and perhaps a need to upgrade cattle by feeding a richer ration, or to feed longer in order to over-

come what could have been done cheaper by improved breeding.

The spread in price between plain, medium, and choice fat cattle is usually more narrow during the spring months than the fall months. Individual killers and markets appraise the various grades of beef quite differently and in terms of what their particular trade will accept.

The season of year when fat cattle are to be marketed and the place of marketing are important factors in determining the preferable grades of cattle to feed.

Steers showing characteristics of dairy breeds may make satisfactory gains. They sell for less when finished.

Steers with characteristics indicative of poor breeding, regardless of the breed, make less satisfactory gains and sell for less money.

The Part Protein Plays in Feed Conversion and Profit

Good arithmetic to use in purchasing a protein supplement is to buy on a unit-cost-of-protein basis. Other factors, as a rule, are reasonably equal and of less importance.

Soybean meal is a standard source of protein, good in any cattle ration and usually the cheapest in per-unit cost of protein. Cottonseed meal is a favorite source in corn silage rations when the price is competitive. Linseed meal is a favorite source the last few weeks of a finishing period, especially in non-silage rations or in summer.

Evaluate commercially fabricated protein feeds on a per-unit cost of protein basis.

Since the protein content of grain and roughage varies, and cattlemen proportion the combination of feeds in their rations differently, especially hay, it is only a guess as to how much protein supplement is actually required or is most profitable.

Rations using large amounts of corn silage usually require the largest amounts of a protein supplement daily. The maximum amount of a 40 per cent or more supplement is about 1½ pounds per head daily; 1 pound daily is a reasonable average if quality hay is fed free choice.

The quality and quantity of hay fed daily is an excellent guide to the amount of protein supplement that should be required. Rations containing large amounts of good hay should not require additional protein.

Three pounds of average good hay will provide as much protein as 1 pound of a 40 per cent protein supplement.

In pasture feeding operations, protein supplement should not be necessary at the start of a spring grazing period or when the pasture is green and growing. Provide protein as in dry-lot feeding to cattle on brown, dried-up pastures or as judgment dictates, depending upon condition of cattle and pasture.

Urea, a synthetic substitute nitrogen

compound, is used in many feeds to build up the protein percentage. Urea should tend to cheapen the unit cost of protein and should be evaluated accordingly.

Small amounts of urea are reported to

be safe, to aid rumen activity, and to improve performance, especially in rations short in organic source of protein. Some experienced cattlemen prefer protein feed supplements that do not contain urea.

Molasses in Cattle Feeding Rations

There is nothing magic about molasses. Nothing magic when added to quality feeds and desirable rations.

Liquid molasses is worth about 85% as much as corn in cattle fattening rations. Compare the cost.

Molasses will increase total feed consumption when low quality feeds are fed and may give a small plus per cent in rations short on a variety of feeds especially in hot weather.

Commercial feed fabricators find that molasses aids materially in controlling dust in their plants—a plus value in addition to the nutrient value.

Evaluate molasses and molasses feeds in terms of cost compared to other ration ingredients. In most rations, they are not worth a premium.

Molasses will not stimulate water consumption unless it stimulates total feed consumption. The Ohio Experiment Station found out, over a period of years, that water consumption increases or decreases in proportion to total feed intake.

There is no difference of consequence in cattle performance between sugar beet molasses and cane molasses.

Research workers are agreed that molasses contains an unidentified something

that under certain circumstances produce favorable results in cattle feeding. It is something beyond the usual mineral, vitamin, or protein content of a good ration.

Here is a quotation from Morrison's *Feeds and Feeding* on the value of molasses. "Many experiments have been conducted to determine the effect of adding cane molasses to well-balanced rations made up of palatable feeds. In 29 trials, the addition of an average of 2.2 pounds cane molasses per head daily to an excellent ration has made only a trifling increase in the rate of gain (an increase of only 0.04 pound per head daily). The molasses-fed cattle sold for slightly lower average price than the others, and they required more concentrates for 100 pounds gain. Considering all factors, cane molasses was actually worth only 54 per cent as much per ton as grain in these many experiments."

Unless used wisely, molasses feeds may cost rather than pay. They should be evaluated as any other feed or ration ingredient. Use them plentifully when the cost or balance of the ration justifies and use sparingly or not at all when it does not justify.

Ground Limestone in Corn Silage at Harvest

A good quality corn silage can be made even better by adding high calcium limestone. This was shown by some pioneer work done by Dr. Earle Klosterman at the Ohio Experiment Station. The recommendation is to add up to 20 pounds of

limestone per ton of chopped corn at the time of blowing into the silo. No special kind of lime is necessary other than that it should be of feeding grade and relatively high in calcium.

Spread the required amount of lime on

top of the chopped corn in the wagon just before unloading. Or engineer a metering device at the blower to get better distribution and perhaps a more thorough mixture.

Research at the Ohio Experiment Station has shown that organic acids, especially lactic acid, in corn silage have a high feeding value and that increasing the amount of such acids increases the feeding value. Cattle fed the treated silage sometimes gained at a little faster rate and always required a little less feed per hundredweight of gain.

The purpose of the added limestone is to neutralize the acids, raising the pH level which permits the fermentation process to continue over a longer period. The increased amount of desirable acids gives the silage more potent feeding value.

The added limestone also corrects the normal calcium deficiency of corn silage, and treated silage tends to keep better when removed from the silo.

The same quantity of urea as limestone, when used alone, was not as satisfactory. However, half the amount of urea added to half the amount of limestone was satisfactory. The cost of the urea will be higher and the convenience less.

Many Ohio cattle feeders have adopted adding limestone as a regular practice. It is worth a try.

Minerals in Cattle Rations

There is no point in force feeding minerals to beef cattle. All cattle do not require the same amount of minerals. It is as reasonable to assume that a little "trace something" may be as harmful to cattle as it is to assume that a little

trace something will do them good. It is recommended that trace minerals be provided at all times free choice and especially when poor hay is a part of the ration.

Calcium and phosphorus are the two minerals most likely to be lacking. Legume hays and some protein supplements are excellent carriers of these two elements.

An approved Ohio mineral mixture, consisting of 2 parts bone meal, 2 parts limestone, and 1 part salt, gives excellent results. Use a source of ingredients prepared for livestock feeding. Provide it free choice.

If a commercial mineral is preferred, feed it free choice. There are several good ones on the market.

Salt in Cattle Rations

Salt should be available free choice at all times. Loose salt is greatly preferred. Salt should be fed separate from minerals and other feed. Force feeding salt is not a recommended practice. Feedlot cattle will eat about 1 pound of loose salt per month.

Salt blocks are a poor substitute for loose salt. Providing salt once or twice a week is not considered the best method.

Cattle will eat more salt when on pasture than in dry lot. Protect salt fed on pasture with a suitable box.

Provide Clean Clay Soil

Feedlot cattle will consume much clay soil regardless of the ration or the addition of minerals and additives. In fact, cattle crave clay soil. Make some clay available.

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