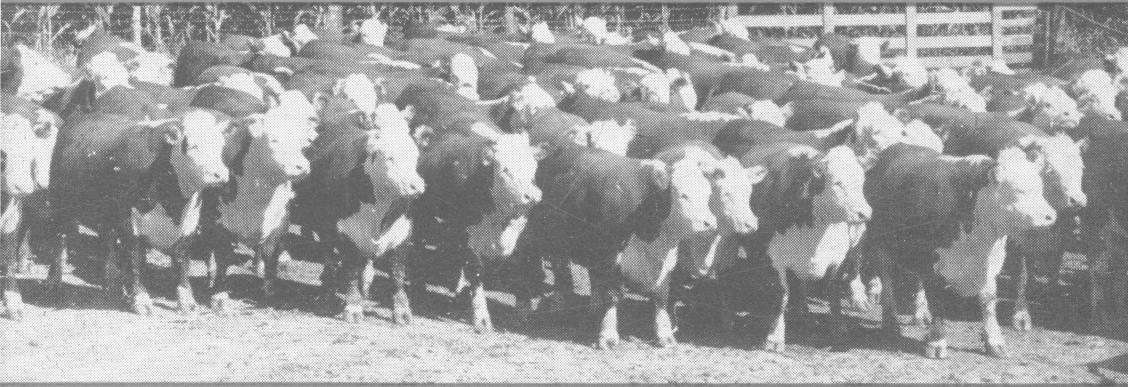


# COMMERCIAL



# CATTLE FEEDING



# IN OHIO

THE AGRICULTURAL EXTENSION SERVICE  
THE OHIO STATE UNIVERSITY



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# Commercial Cattle Feeding In Ohio

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## What Contributes Most to Successful Cattle Feeding?

1. **The human factor.** The feeder is the most variable factor of all; often the decisive factor.
2. **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 cash goes to the seller.
3. **Smart management.** Management that includes the know-how and skill of successful operators.
4. **Feed conversion.** This bulletin deals mainly with this factor. By feed conversion, we mean the gains in live weight obtained from given amounts of feed.
5. **The breeding of cattle.** Good feeds and good feeding practices will not overcome the handicap of poor breeding. There is no substitute for size, vigor, natural rapid growth, good conformation and quality.
6. **Comfortable housing.** Feeder cattle require only a minimum investment in buildings. Use an outside lot with solid footing to provide extra space. Concentrate on storing and handling feed conveniently at low cost.
7. **Wise selling of finished cattle.** Making the best sale requires sound judgment on when, where and how. Employ a maximum of "competitive selling" and "competitive buying." Usually the best time to sell is when the cattle are ready.
8. **Sufficient capital.** Have enough money or credit to operate the business on a flexible basis. Avoid being forced to sell cattle until ready to do so.
9. **Mechanical feeding equipment.** Handling roughage mechanically is a fast growing practice. The forage harvester, silo unloader, mechanized feed bunk and horizontal silo open up possibilities of new cattle feeding efficiencies. Larger numbers of cattle per feedlot handled with less labor should result from using these mechanized aids.



Open lots, with a maximum of silage and a minimum of shelter, are sound management practices.

### The Part "Feed Conversion" Plays in Cattle Feeding

1. Why feed cattle instead of selling grain and forage?
  - a. There should be dollar profit in converting forage and grain into beef.
  - b. Forage and some grain are not adaptable or desirable for human consumption as such and can be transformed into a delicious nutritious food.
  - c. There is a bond between a husbandman and his cattle that cannot be measured by economics.
2. Let's think of feed conversion two ways:
  - a. The amount of feed required to produce 100 lbs. of live weight gain on cattle.
  - b. The number of pounds of live cattle that can be produced per acre of land.
3. How much feed does it take to produce 100 lbs. of live weight gain?
  - a. Average amounts of feed based on research reports are the most accurate.
  - b. There are many variables. Study the comparative results used in this bulletin.
  - c. Feed per 100 lbs. of live weight is **one** important measure of cattle feeding efficiency.
4. How many pounds of live cattle can be produced with feed from an acre of land?
  - a. The major factors involved are the choice of crops grown, the yields per acre and how the feed is used.
  - b. The arithmetic used in this bulletin includes all these factors in measuring final results.



- c. Pounds of live cattle produced per acre of land is a major measure of feed efficiency.
5. What combination of feeds will produce the most net profit?
    - a. Corn silage leads all other feeds in producing maximum gains at low cost.
    - b. Note from the tables in this bulletin how land use and feed conversion go together.
    - c. 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.
    - d. Two cattlemen feeding similar cattle and the same ration may not finish with the same financial results.
  6. What kind of cattle will convert feed into the most money?
    - a. The difference in feed conversion between grades of cattle is important. Feed conversion may affect final profit results less than buying and selling prices of cattle. Prices and weights are the key to cattle feeding profits.
  7. How many acres of land will it take to put 400 lbs. of weight on each 100 steers?
    - a. Estimates are shown on the following pages for several rations and for two weights of cattle. The crops grown and how they are used to make a difference.
    - b. It makes no difference in feed conversion whether corn is \$1 per cwt. or \$3 per cwt. The rate of feed conversion is the same.

### There Is a Place for Arithmetic in Cattle Feeding

1. The purpose of this bulletin is to encourage "more arithmetic" and "less guess" in appraising cattle feeding operations.
2. We stress the important part that feed conversion plays in measuring the relative profitableness of different rations in the following pages. Prices and weights of cattle and their importance are included.



3. 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.
4. The method we have used in this bulletin is to determine the amount of separate feeds required in a ration to produce 100 pounds of live weight of cattle. Then by arithmetic we measure the efficiency of this ration in terms of pounds of live weight that can be produced per acre of land.
5. Several combinations of feed are compared. The arithmetic includes two levels of crop yields and two weights of cattle.
6. 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.
7. The results shown are attained and often surpassed by practical feeders. They are not the extreme, dramatic or success type story often used.
8. Some rations are efficient so far as the combination of feeds required per hundred weight of gain are concerned but are less profitable than other rations because of low acre returns. The various methods of using a crop changes its relative profitability. This is an important consideration when purchasing feed rather than raising it.
9. In order to make ration comparisons in this bulletin more meaningful, we have purposely standardized the arithmetic by using 400 pounds of live weight gain on cattle of uniform weight.
10. Dollar feed cost comparisons may be made by multiplying the average amounts of feed shown in any ration by current market value.
11. Dollar income comparisons may be made by multiplying the pounds of cattle produced per acre by the current value of any grade of cattle.

### **The "Buying Agreement" Affects "Feed Conversion"**

1. It is difficult to determine the "true weight" of a carload 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.
2. There is bargaining know-how in agreeing on how cattle are to be weighed for the "pay weight" as well as the price per hundred weight. Astuteness in bargaining over cattle weights and price not only influences the amount of profit but changes the arithmetic of feed conversion.
3. 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.
4. Example: A cattleman bought a carload 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 carload of cattle



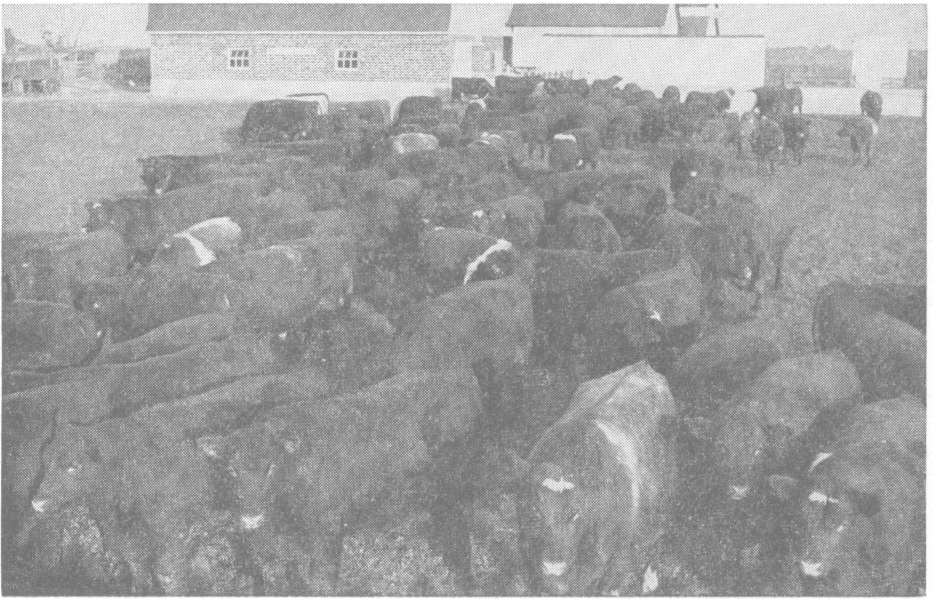
Shrinkage conditions can affect profit.

should have been 725 pounds on an average. 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.

5. 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.
6. 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  $6\frac{1}{4}$  percent of the total gain.
7. 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.
8. Example continued: A neighbor cattleman buys a carload 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 carload of cattle should have been 675 pounds on an average. The buyer lost 25 pounds per head, because of "excessive fill" above a "correct fill." The buyer has a money disadvantage unless he protected his investment by a lower price per hundred weight.

9. These cattle when placed in the feedlot must overcome the 25 pound "excessive fill" disadvantage before showing actual gain. This could require the most or all of a 30 day feeding period and 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  $6\frac{1}{4}$  percent performance disadvantage.
10. The "buying agreement" of these two cattlemen shows that the "total weighing conditions" alone at the time of purchase influenced the "scale



Cattle fed to a choice graze are in popular demand and can be produced cheaper than when carried to a higher finish.

weights" 50 pounds per head from the "true weights." Based on 400 pounds gain per head, by the scales, this is a difference of  $12\frac{1}{2}$  percent.

11. This arithmetic shows that the daily rate of gain and the rate of feed conversion is greatly influenced by the "total weighing conditions" prior to obtaining the scale weight. Profit is likewise influenced unless a price adjustment offsets a part or all the weight adjustment.
12. A "pencil" change in weight will change results obtained in figuring feed conversion. Sometimes the "pay weight" includes a given percent "pencil add on" or a "pencil shrink" to the scale weight. It could affect profit unless a compensating price adjustment is made. This is a bargaining matter in lieu of knowing the "true weight."
13. The first and fundamental basis of evaluating the "total weighing conditions" of feeder cattle should be humane treatment of cattle. Then adjust the price accordingly rather than the weight.
14. "Buy early and cheapen the cattle on grass or stubble" is usually sound advice and smart management. But does it do that? Using non-valued feed to cheapen cattle is not selling feed or good cattle feeding arithmetic. Such feed should add weight and value to cattle. Cattle placed directly in the feedlot and the feed "not counted" for 30 days could produce the same "cheaper cattle" results.
15. Market quotations alone may not reflect the true price of cattle by \$1 or more per hundredweight.
16. It does not make any difference in feed conversion whether a steer costs 10 cents per pound or 30 cents per pound.

## The "Selling Procedure" Affects "Feed Conversion"

1. Agreements on price and the "total weighing conditions" when selling finished cattle are a matter of bargaining and are factors in feed conversion.
2. Weights vary because of many practices in manner of handling, loading, conditioning of cattle, timing feed and water, hauling distances, timing of all activities and the effect of weather.
3. Some cattlemen give away weight in various ways, knowingly or unknowingly, to try to gain a higher selling price. Other feeders "fill" or "try to fill" cattle to gain a weight advantage. Any handling practice that influences weight also influences feed conversion.
4. A "pencil shrink" in addition to all other weighing conditions in an attempt to gain a certain selling price changes feed conversion.
5. Example: The cattle started on feed at 700 pounds, weighed 1100 pounds on the average when sold by the official pay weight ticket. Their "true weight" should have been 1075 pounds on an average. By reason of favorable "total weighing conditions," including "excessive fill," this cattleman gained an average of 25 pounds per head by the scales. This represents a gain by the scales of  $6\frac{1}{4}$  percent based on a total gain of 400 pounds each. Unless the buyer protected his investment by a compensating lower price per hundredweight he is operating at a disadvantage. The "excessive fill" therefore is favorable to increasing the daily rate of gain and 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 actual.
6. Example continued: The neighbor's cattle weighed 1100 pounds on an average by the official weight ticket. The "true weight" should have been 1125 pounds on an average. This cattleman lost an average of 25 pounds per head because of "excessive shrink" over a "correct shrink," or  $6\frac{1}{4}$  percent 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.
7. 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 of selling. This is  $12\frac{1}{2}$  percent of the total gain considered.
8. 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  $12\frac{1}{2}$  percent.
9. The neighbor had a 400 pound gain between "pay weights" by the "scale weights" and yet actually had 450 pound gain by the "true weights" or an unfavorable difference of  $12\frac{1}{2}$  percent.
10. In comparing the results of feeding by these two cattlemen there is a difference of 100 pounds of weight gain

- or 25 percent of the total gain. In this example the weight differences are due to "total weighing conditions." A "pencil shrink" would change this comparison accordingly.
11. Bargaining on price and weights are equally important. Dollar profit is greatly changed in this example unless price adjustments offset poor weighing conditions. The rate of feed conversion is changed by the conditions of weighing.
  12. 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."
  13. There is a recognized lack of uniformity in reporting prices from various cattle markets which may vary \$1 or more per cwt., because of non-uniformity in weighing conditions.
  14. Many individual cattlemen should give more attention to the "total weighing conditions" than is commonly practiced.
  15. Competitive gains on slaughter cattle derived from higher carcass yields based on live cattle "pay weights" make the "total weighing conditions" a tough bargaining point.
  16. If a cattle feeder does not know how to "take care of himself" in buying and selling cattle someone will "take care of him."
  17. Weight gained from "purchase weight" to "sale weight" and the total amount of feed to produce it should provide the arithmetic in "feed conversion."
  18. It does not make any difference in feed conversion whether a steer sells for 10 cents per pound or 30 cents per pound.

### Considerations in Evaluating Feeds and Rations

1. The amounts of separate feeds used in rations presented in this bulletin are based on research work by the Ohio Agricultural Experiment Station.
2. In experimental work:
  - a. All feed is weighed daily prior to each feeding.
  - b. Corn is figured on a 15.5 percent moisture basis.
  - c. The moisture content of silage may vary as much as 10 percent.
  - d. Grain and silage is fed night and morning. Hay usually once daily at noon.
  - e. A careful routine of feed preparation and feeding is followed.
  - f. The cattle used are as relatively uniform as possible, of choice grade and usually fed to choice and low prime carcass grade.
  - g. The kind and quality of feed is similar to that commonly found on most Ohio farms.
  - h. Cattle are of necessity acclimated 3 or 4 weeks before going on test. The feed requirement and weight change for this period do not show in reported test results.
  - i. Final test weights are obtained by removing feed and water at night and weighing the next morning. The weights are actual and do not include hauling shrink or a pencil shrink. Final test weights are usually not sale weights.



3. It is recognized that lighter or heavier cattle than those considered on the following 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.
4. In appraising your feed conversion remember there is considerable shrinkage and some waste between harvest field and storage; in storage; between storage and feed bunk; and from the feed bunk.
5. Cattlemen should give attention to rations, using those that give favorable "feed conversion" and make for greater efficiency in "dollar" income.
6. The arithmetic in this bulletin is based on yields in storage, allowing for corn moisture at 15.5 percent.

### Two Levels of Acre Yields Are Used in This Bulletin

1.	Average Ohio Yield—60 bu. corn/A	High Ohio Yield—86 bu. corn/A	
	Corn	42.0cwt.	60.0 cwt.
	Corn Silage	11 ton	15 ton
	Mixed Hay	2 ton	2.75 ton
	Meadow Silage	6.5 ton	8.5 ton
	Soybean Meal	1200 lbs.	1500 lbs.

2. Check and use your own crop yield in evaluating your efficiency.
3. It is not possible to resolve all the variables in determining the yield level of a corn crop and the comparable yield level of other crops grown on the same land.
4. The yields shown above and factors shown below are compromised averages.

5. Calculate corn silage yield from corn yield as follows:

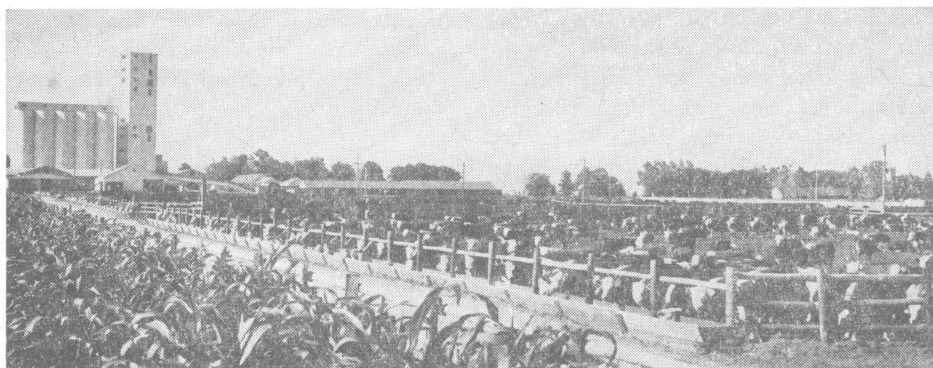
Ear corn	yield	times	1.8 = tonnage of silage from ears
Corn Stover	yield	times	3.5 = tonnage of silage from stover

For example:

Ear Corn	3 tons	X	1.8 = 5.4 tons
Corn Stover	3 tons	X	3.5 = 10.5 tons

15.9 tons of silage

6. Calculate meadow silage yields from hay yield this way:  
 3 X the hay yield + a little = Meadow silage tonnage.  
 3 X 2.75 + .25 = 8.5 tons meadow silage.  
 Plus a "little" because of less loss than in hay harvest.
7. This yield is for one cutting of a mixed meadow. Additional gleaning or seed harvest may be made as management directs from meadows. A meadow cut two or three times will yield more.
8. Calculate the yield of soybean meal by taking 82 percent of the yield of soybeans.



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

9. A smart manager will check crop yields accurately to determine the efficiency of his crop production and as a first step to figure the efficiency of his livestock operations.
10. Allow for an average loss and shrinkage of 10 percent with corn silage between harvest field and feed bunk; an average loss and shrinkage of 20 percent with meadow crop silage; and smaller percentages with good management in upright silos.
11. The conversion factors and suggestions on loss were obtained from Dr. Charles F. Rogers of the Ohio Agricultural Experiment Station.

### Corn and Cob Meal—Full Fed

Yearling steers—In at 650 to 700 pounds—out at 1050 to 1150 pounds. Daily gain—1.8 to 2.25 pounds—400 to 450 pounds total gain. Feed Conversion Based on 400 pound Gain on Each of 100 Cattle at two Corn Yield Level.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	60 bu. Corn Level		86 bu. Corn Level	
			Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain	Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain
Corn and Cob Meal.....	16.0	760	.1809	72.36	.1266	50.64
Mixed Hay .....	3.7	175	.0437	17.48	.0318	12.72
Soybean Meal .....	1.5	70	.0583	23.32	.0466	18.64
Total .....			.2829	113.16	.2050	82.00
Lbs. live cattle per acre.....				353		487

1. This simple ration makes maximum use of corn as grain.
2. Corn is the most profitable crop available to Ohio cattle feeders.
3. A heavy corn ration will tend to shorten the feeding period.
4. Corn rations produce fast gains and high finish on live cattle.
5. Corn contributes more in producing high yielding cattle and more valuable carcasses than any other feed.

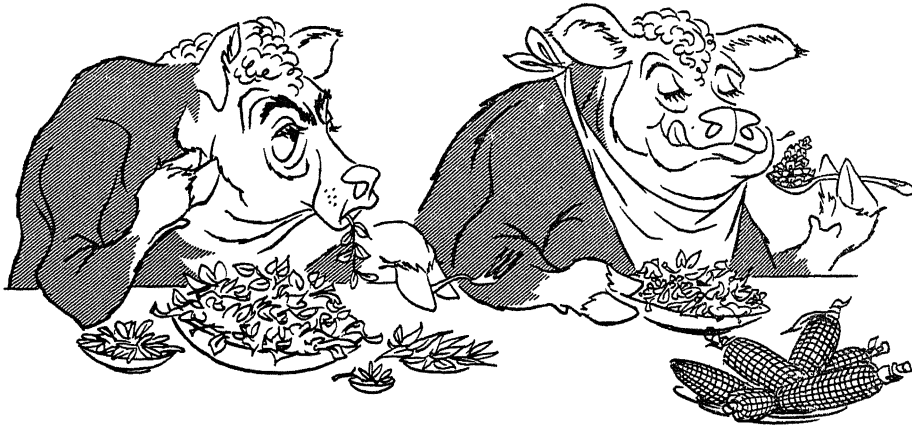
6. Corn is improved when ground relatively fine through a new type burr mill. Corn processed by a hammermill may be more desirable in silage rations than coarse ground corn.
7. The difference between good hand feeding and self-feeding is difficult to measure. Labor, other costs and other management reasons may be the deciding factor rather than maximum feed efficiency.
8. Corn fed cattle are easiest to sell—at top market price—at any price level.
9. 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 fewer heavy weight cattle to a prime grade.
10. Note in this arithmetic that pounds of live cattle per acre include all the acres in the ration and does not give corn acres all the credit.
11. A feeder on more productive land has a decided competitive advantage.
12. 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.
13. This corn and cob meal ration is used in this bulletin as a standard with which to compare all other rations.

### Corn Silage—Full Fed

Yearling steers—in at 650 to 700 pounds—out at 1050 to 1150 pounds. Daily gain 1.8 to 2.1 pounds—400 to 450 pounds total gain. Feed Conversion Based on 400 pounds Gain on Each of 100 Cattle at Two Corn Yield Levels.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	60 bu. Corn Level		86 bu. Corn Level	
			Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain	Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain
Corn Silage .....	42.0	2200	.1000	40.00	.0733	29.32
Mixed Hay .....	3.0	160	.0400	16.00	.0290	11.60
Soybean Meal .....	1.5	80	.0666	26.64	.0533	21.32
Total .....			.2066	82.64	.1556	62.24
Lbs. live cattle per acre.....				484		642

1. This ration demonstrates the value of corn silage but not necessarily its most profitable use.
2. Corn silage will seldom be practical or most profitable without added grain.
3. Corn silage captures stalk nutrients in a form to give maximum gain.
4. Corn silage will contain from 350 to 500 pounds of corn per ton of silage or an average of about 400 pounds. That is more than 8 pounds of corn daily in this ration.
5. Silage can be harvested, stored, and fed cheaply and conveniently.
6. The necessity to salvage a corn crop occasionally should not be overlooked.



Silage alone makes a sad steer.

7. 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 usually to feed some additional corn.
8. Silage is a good feed for all cattle and larger amounts of silage are especially well suited for cattle bred to yield good and less than good grade carcasses.
9. Bloat is very rare with any ration containing corn silage.
10. Nearly  $\frac{1}{3}$  of the nutrients in a corn plant is in the stalk. Let's use all the nutrients.
11. Contrary to some buyer and some seller opinion cattle full fed corn silage do not necessarily have larger wastier middles than cattle fed other rations.
12. 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.

### One-half Corn and Cob Meal and One-half Corn Silage

Yearling steers—in at 650 to 700 pounds—out at 1050 to 1150 pounds. Daily gain 1.9 to 2.33 pounds—400 to 450 pounds total gain. Feed Conversion Based on 400 pounds Gain on Each of 100 Cattle at Two Corn Yield Levels.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	60 bu. Corn Level		86 bu. Corn Level	
			Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain	Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain
Corn Silage .....	22.0	1100	.0500	20.00	.0366	14.64
Corn and Cob Meal.....	8.0	360	.0857	34.28	.0600	24.00
Mixed Hay .....	3.0	150	.0375	15.00	.0272	10.88
Soybean Meal .....	1.5	70	.0583	23.32	.0466	18.64
Totals .....			.2315	92.60	.1704	68.16
Lbs. live cattle per acre.....				431		586

1. Corn silage is the most profitable cattle feed used in Ohio.
2. This ration will produce maximum dollar income per acre.
3. Corn silage even in small amounts has a stimulating effect on the appetite of cattle and their general condition.
4. Corn silage fed cattle will show only slightly less finish than cattle fed all corn at any given time. It may 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.
5. This ration favorably combines rate of gain, cost of gain and quality of product.
- 6: Cattle fed this ration will finish to high choice and low prime according to breeding and length of feeding.
7. 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. It should not be necessary or the most profitable to feed more than  $\frac{1}{2}$  a ration of corn and cob meal with corn silage.
8. Plan to feed corn silage until cattle go to market—if only 5 pounds per head daily. The cattle will do better.
9. Some buyers try to take advantage of producers in buying corn silage fed cattle. Protect your income with the facts.
10. Cattle properly fed corn silage with some corn should sell for no more than 50 cents per cwt. less than straight corn fed cattle. They will often sell at the same price.
11. Corn silage helps to keep cattle on feed—the digestive tract in good tone.



12. Feeding heavy corn silage and only a little corn at the start of the feeding period, shifting to no silage and a full feed of corn the last 30 to 60 days, may please a buyer, but will not give best results in feed conversion or net dollars to the producer.

13. Often, cattle eating a small amount of corn silage and a full feed of corn and cob meal will take no more corn and cob meal after the silage is discontinued than formerly. Sometimes they will take less corn.

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

## Meadow Silage Full Fed Plus One-Half Corn and Cob Meal

Yearling steers—in at 650 to 700 pounds—out at 1050 to 1150 pounds. Daily gain—1.7 to 2.0 pounds—400 to 450 pounds total gain. Feed Conversion Based on 400 Pounds Gain on Each of 100 Cattle at Two Corn Yield Levels.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	60 bu. Corn Level		86 bu. Corn Level	
			Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain	Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain
Meadow Silage .. . . . . .	30.0	1600	.1230	49.20	.0941	37.64
Corn and Cob Meal.....	8.0	420	.1000	40.00	.0700	28.00
Mixed Hay .. . . . . .	3.4	175	.0437	17.48	.0318	12.72
Totals .. . . . . .			.2667	106.68	.1959	78.36
Lbs. live cattle per acre.....				374		510

1. This ration is a half feed of corn and cob meal with good meadow silage full fed.
2. Good meadow silage alone is not a satisfactory cattle finishing ration.
3. Good meadow silage is an excellent feed when sufficient corn or other grain is added.
4. Good meadow silage greatly reduces the amount or may eliminate buying a protein supplement.
5. Good meadow silage rations require a larger amount of corn grain than corn silage rations to give the same finish. Cattle fed this ration will sell for less per cwt. than cattle fed corn and cob meal. A larger amount of corn would tend to overcome this disadvantage.
6. The more corn added in good meadow silage rations, the faster the gain, the shorter the feeding period, the higher the value of cattle and carcass beef.
7. Four hundred pounds of corn added to 1600 pounds of good meadow silage at time of feeding will provide a ton of feed that should be comparable to 2000 pounds of corn silage.
8. Further arithmetic and comparison shows that 1600 pounds of good meadow silage replaced only 75 pounds of soybean oil meal in some cattle finishing rations.
9. At the Madison County Farm, cattle fed 10 pounds of corn daily, the last half of the feeding period with good meadow silage gained 1/10 pound more daily than other cattle fed 5 pounds of corn daily the entire feeding period. The yield and grade were higher.
10. Another lot of cattle fed a half feed of corn the entire feeding period gained faster than cattle started without corn for 2 months and then fed more corn at the end.

## Mixed Hay Full Fed—One-half Corn and Cob Meal

Yearling steers—in at 650 to 700 pounds—out at 1050 to 1150 pounds. Daily gain—1.7 to 1.9 pounds—400 to 450 pounds total gain. Feed Conversion Based on 400 Pounds Gain on Each of 100 Cattle at Two Corn Yield Levels.





Full feed of hay is too much for best results.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	60 bu. Corn Level		86 bu. Corn Level	
			Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain	Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain
Corn and Cob Meal.....	8.0	440	.1047	41.88	.0733	29.32
Mixed Hay .....	16.00	880	.2200	88.00	.1600	64.00
Totals .....			.3247	129.88	.2333	93.32
Lbs. live cattle per acre.....				307		428

1. This ration shows results that can be expected from feeding large amounts of hay. It is not recommended except in unusual situations and when silage is not available.
2. This ration provides  $\frac{1}{2}$  a feed of corn and all the hay cattle will eat. A larger amount of corn and less hay will be more profitable as a rule.
3. Good hay contains an "unknown" that has a stimulating effect on cattle. Always feed some hay.
4. No additional protein supplement should be necessary or profitable when this amount of good quality hay is fed.
5. The rate of gain is slow. The finish is not likely to be sufficient. A longer feeding period would produce higher grading cattle and carcass beef.
6. A larger amount of corn and less hay in this ration will produce cattle of higher value in relatively less time.
7. Three pounds of good legume mixed hay should provide as much or more protein than 1 pound of a 40 percent protein supplement.
8. In evaluating large feeds of good hay it should be recognized that the saving in cash by not buying protein supplement is an important profit consideration.
9. Cattle finished on this ration will sell for less than cattle full fed corn and cob meal. A longer feeding period would improve their finish and comparative price position.

10. A full feed of hay and a light feed of corn give favorable results in wintering steer calves. As a rule, it is poor management to winter yearling steers for future grazing.
11. Cattle eating 8 pounds of corn daily will eat as much as 18 pounds of hay daily at the end of a feeding period. If fed pure alfalfa hay or a nearly pure alfalfa hay, the cattle may be too loose for best results.

### Corn and Cob Meal—Full Fed

Steer calves—in at 450 to 475 pounds—out at 850 to 875 pounds. Daily gain 2.1 to 2.3 pounds—400 to 600 pounds gain. Feed Conversion Based on 400 pounds Gain on Each of 100 Calves at Two Corn Yield Levels.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	60 bu. Corn Level		86 bu. Corn Level	
			Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain	Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain
Corn and Cob Meal . . . . .	12.0	560	.1333	53.32	.0933	37.32
Mixed Hay . . . . .	3.0	160	.0400	16.00	.0290	11.60
Soybean Meal . . . . .	1.5	70	.0583	23.32	.0466	18.64
Sub-Totals . . . . .			.2316	92.64	.1689	67.56
Lbs. live cattle per acre . . . . .				431		592

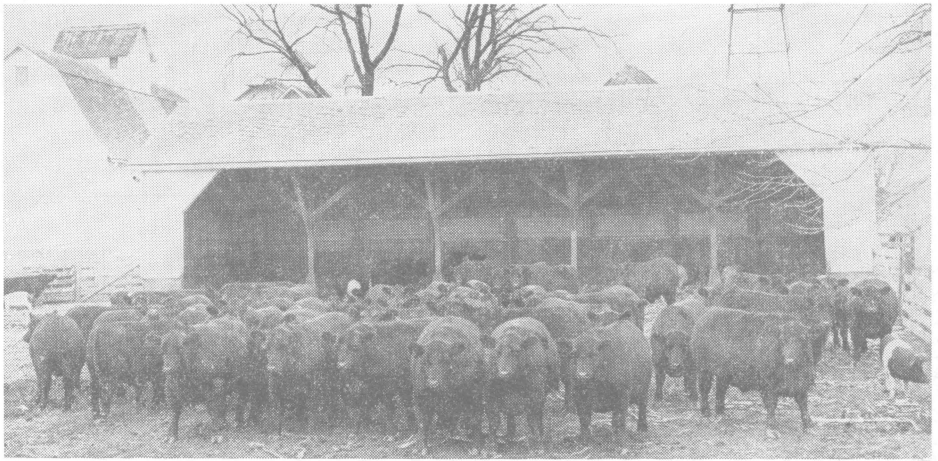
### To Add 200 Pounds More Per Steer

Corn and Cob Meal . . . . .	17.5	875	.2083	41.66	.1458	29.16
Mixed Hay . . . . .	3.5	175	.0437	8.74	.0318	6.36
Soybean Meal . . . . .	1.5	75	.0625	12.50	.0500	10.00
Sub-Totals . . . . .			.3145	62.90	.2276	45.52
Lbs. live cattle per acre . . . . .				317		439

### Based on 600 Pounds Gain on 100 Cattle

Both Periods—Acres . . . . .			.2592	155.54	.1876	113.08
Both Periods—Pounds per acre . . . . .				386		530

1. Calves are more efficient than yearlings in converting feed into live weight.
2. Calves of the weight above gain as fast daily as do yearlings.
3. Four hundred pounds increase on steer calves is too little to produce a satisfactory grade and they will not sell to advantage.
4. Steer calves require a longer feeding period than yearlings to grade as high.
5. Margin income on yearling steers is larger than on steer calves on a per head basis, but may be no larger than steer calves on a per hundredweight basis.
6. There is less income risk with calves than yearlings. There is more health risk.
7. There is greater flexibility in choosing a time to sell finished calves than yearlings.
8. Light weight finished cattle fed this ration will sell for top market prices on any Ohio market.
9. Note the increase in daily ration and feed per cwt. 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.
10. When cattle are fed to heavier weights it requires a price increase to off-set the decrease of efficiency in feed conversion.



Cattle well finished according to grade are always easiest to sell advantageously.

### Corn Silage and Corn and Cob Meal

Steer calves—in at 450 to 475 pounds—out at 850 to 875 pounds. Daily gain—1.9 to 2.4 pounds—400 to 600 pounds gain. Feed Conversion Based on 400 pounds Gain on Each of 100 Calves at Two Corn Yield Levels.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	60 bu. Corn Level		86 bu. Corn Level	
			Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain	Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain
Corn Silage .....	18.0	880	.0400	16.00	.0293	11.72
Corn and Cob Meal.....	6.0	280	.0666	26.64	.0466	18.64
Mixed Hay .....	3.0	150	.0375	15.00	.0272	10.88
Soybean Meal .....	1.5	70	.0583	23.32	.0466	18.64
Sub-Totals .....			.2024	80.96	.1497	59.88
Lbs. live cattle per acre.....				494		668

### To Add 200 Pounds More Per Steer

Corn Silage .....	24.0	1200	.0545	10.90	.0400	8.00
Corn and Cob Meal.....	10.0	500	.1190	23.80	.0833	16.66
Mixed Hay .....	3.0	150	.0375	7.50	.0272	5.44
Soybean Meal .....	1.5	70	.0583	11.66	.0466	9.32
Sub-Totals .....			.2693	53.86	.1971	39.42
Lbs. live cattle per acre.....				371		507

### Based on 600 Pounds Gain on 100 Cattle

Both Periods—Acres.....		.2247	134.82	.1655	99.30
Both Periods—Pounds per acre...			445		604

1. Choice calves will produce the most "net dollars" over a period of years.
2. 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 may be ready for market.

3. This 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.
4. Cost per pound of live weight gain is lower with calves than yearlings fed the same ration.
5. It will require more feed per cwt. 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.
6. It usually takes calves longer to regain their range weight and condition than it does yearling cattle.

### Meadow Silage and Corn and Cob Meal

Steer calves—in at 450 to 475 pounds—out at 850 to 875 pounds. Daily gain 1.8 to 2.2.—400 to 600 pounds gain. Feed Conversion Based on 400 Pounds Gain on Each of 100 Calves at 2 Corn Yield Levels.

	Daily Ration Lbs.	Lbs. Feed Per Cwt. of Gain	60 bu. Corn Level		86 bu. Corn Level	
			Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain	Acres Per Cwt. of Gain	Acres Per 400 Cwt. Gain
Meadow Silage .....	22.0	1200	.0923	36.92	.0705	28.20
Corn and Cob Meal.....	8.0	420	.1000	40.00	.0700	28.00
Mixed Hay .....	3.0	150	.0375	15.00	.0272	10.88
Sub-Totals .....			.2298	91.92	.1677	67.08
Lbs. live cattle per acre.....				435		596
<b>To add 200 Pounds More Per Steer</b>						
Meadow Silage .....	26.0	1500	.1153	23.06	.0882	17.64
Corn and Cob Meal.....	12.0	600	.1428	28.56	.1000	20.00
Mixed Hay .....	3.5	175	.0437	8.74	.0318	6.36
Sub-Totals .....			.3018	60.36	.2200	44.00
Lbs. live cattle per acre.....				331		454
<b>Based on 600 Pounds Gain on 100 Cattle</b>						
Both Periods—Acres .....			.2538	152.28	.1851	111.08
Both Periods—Pounds per acre...				394		540

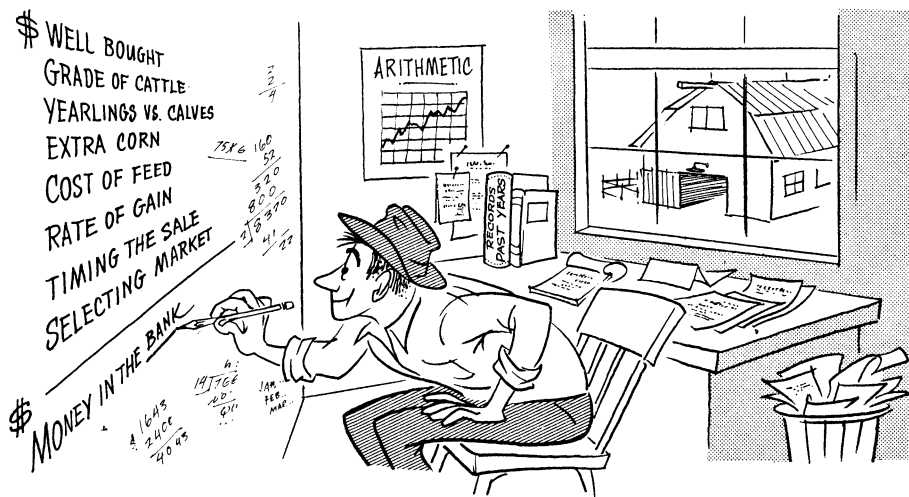
1. The quality of meadow silage varies greatly. These results assume a quality product. Use a liberal grass and legume mixture. No preservative should be necessary.
2. Meadow silage is more desirable for wintering calves to be grazed in summer than it is in finishing rations.
3. Meadow silage as a method of using the first crop of hay has advantages over making hay.
4. The larger the amounts of corn added at the time of feeding in meadow silage rations, the shorter the feeding period, the faster the daily gain, the more valuable the cattle and resulting carcasses.
5. Expect cattle fed this ration to sell for less than cattle fed corn and cob meal. The cattle will yield less and grade lower.
6. Calves may respond to meadow silage about the same as yearlings. Yet they will finish less readily on similar meadow silage rations.

## Feed Conversion Summary

1. A gain of 400 pounds on each of 100 cattle.
2. Relative sale value based on choice bred feeder cattle fed the same length of time or to gain approximately the same amount of weight.
3. Two Corn Yield Levels.

Rations	60 bu. level		86 bu. level		Relative Sale Value
	Lbs. Gain Per Acre	Total Acres	Lbs. Gain Per Acre	Total Acres	
<b>100 Yearlings—400 Pounds Each</b>					
Corn and Cob Meal—Full Fed....	353	113.16	478	82.00	Top value to 1.50 less than top
½ Corn and Cob Meal—					
½ Corn Silage .....	431	92.60	586	68.16	From 0.00 to 2.00 less than top
Corn Silage Full Fed.....	484	82.64	642	62.24	From 1.00 to 2.50 less than top
½ Corn and Cob Meal—					
Hay Full Fed .....	307	129.88	428	93.32	From 1.00 to 3.00 less than top
½ Corn and Cob Meal—					
Meadow Silage Full Fed.....	374	106.68	510	78.36	From 1.50 to 3.50 less than top
<b>100 Calves to Gain 400 Pounds Each</b>					
Corn and Cob Meal—Full Fed....	431	92.64	592	67.56	
Corn and Cob Meal—Corn Silage..	494	80.96	668	59.88	
Corn and Cob Meal—Meadow Silage	435	91.92	596	67.08	
<b>100 Calves to Gain 600 Pounds Each</b>					
Corn and Cob Meal Full Fed....	386	155.54	530	113.08	Top value to 1.50 less than top
Corn and Cob Meal—Corn Silage..	445	134.82	604	99.30	From 0.00 to 2.00 less than top
Corn and Cob Meal—Meadow Silage	394	152.28	540	111.08	From 1.50 to 3.50 less than top

4. The “total acres” means all the acres to produce all the different feeds in the ration, not just the corn acres.
5. Note the difference in “pounds of gain per acre” from yearlings and calves.
6. Note the effect that corn silage has on the pounds of beef per acre and how when properly combined with corn tends to maintain high relative value.



7. Meadow silage trails in pounds gain per acre and shows to a greater disadvantage in relative sale value. Less meadow silage and more grains will improve the value.
8. 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.
9. 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.
10. The value of cattle will vary 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.
11. The wise feeder will do well to observe and study comparative sales values and market trends of cattle continuously.
12. Larger amounts of corn than  $\frac{1}{2}$  a ration in high roughage rations, except corn silage, would increase the value of cattle sufficiently to net a higher return on the corn.

### **Beef Heifer Calves Offer Added Flexibility in Cattle Feeding**

1. As a rule, for comparable breeding and feeding, heifers will:
  - a. Weigh less at weaning. Average 20 pounds less, vary from 0 to 40 pounds.
  - b. Cost less than steers. From \$2 to \$5 per cwt. less.
  - c. Gain less per day. About 5 to 10 percent at usual weights.
  - d. Consume less feed daily. From 5 to 10 percent less.
  - e. Finish in 30 to 60 days less time than steers according to weight and ration.
  - f. Sell for less per pound. Quite variable. Anywhere from 0 to \$3 per cwt.
  - g. Be a little less efficient in feed conversion.
  - h. Finish to a choice grade at lighter weights.
  - i. Finish with more waste fat than steers, 10 to 25 pounds per head.
2. There is unwarranted prejudice against well bred, well fed beef heifers in both live cattle market channels and the wholesale and retail beef trade. Prejudice is decreasing.
3. 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 from dairy cattle carcass competition and extra trimming waste.
4. Beef heifers are best suited to a short feed and sold at lighter weights than steers.
5. Beef heifers are much less satisfactory than steers for a program of wintering prior to a summer of grazing or a longer time operation.
6. Well bred, well fed beef heifers of less than 950 pounds should be discounted not more than 75 cents per cwt. on an average compared with steers.
7. A growing demand for light weight choice carcasses of beef has helped the value of heifer carcasses and their acceptance in trade channels.
8. Live cattle markets are more "sensitive" price-wise when heifers are offered for sale in large numbers than with steers. This reflects the wholesale trade situation.
9. Some retailers have a merchandising policy not to handle heifer beef. Some





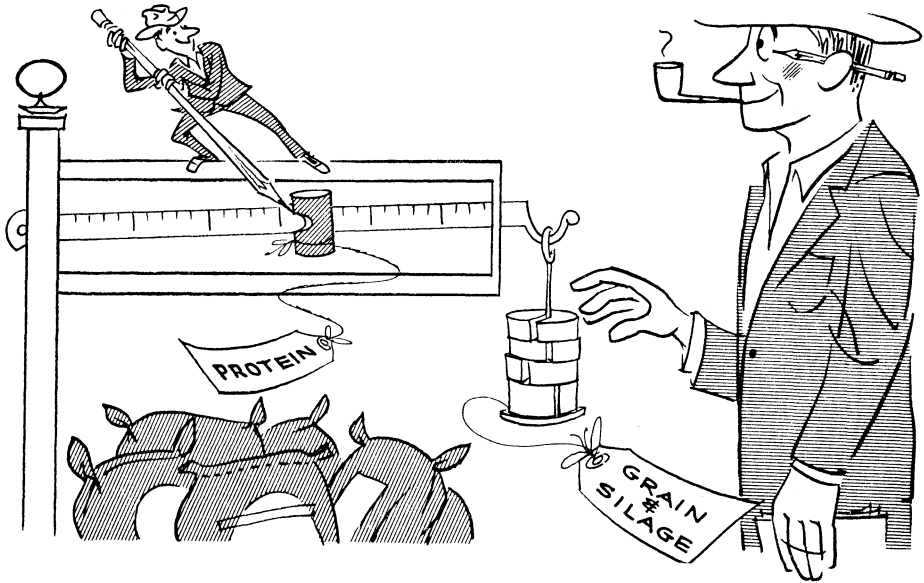
Heifers are winning a place in the beef market.

retailers have changed from this policy.

10. Feeder calf producers the country over have improved heifer values by reducing the number of heifers that are bred. Some producers guarantee their heifers non-bred.
11. Total results with spayed heifers is such that a premium price for them as feeders is unwarranted.
12. Yearling heifers pose special problems in feeding and handling and might well be left to the more experienced operators.

### The Part Protein Plays in Feed Conversion

1. Good arithmetic to use in buying 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.
2. Soybean meal is a standard source of protein, good in any ration and usually the cheapest in "per unit cost of protein." Cottonseed meal is a favorite source in corn silage rations. Linseed meal is a favorite source the last few weeks of a finishing period especially in non-silage rations in summer.
3. Evaluate commercially mixed protein feeds on a "per unit cost of protein" basis the same as straight protein feeds. As a rule, the lower the protein content of a feed, the more expensive is the "unit cost of protein."
4. Since the protein content of grains 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 profitable.
5. Rations using large amounts of corn silage will usually require the largest amounts of a protein supplement daily. The maximum amount of a 40 percent or more supplement is about 1½ pounds per head daily, 1 pound daily is a reasonable average.
6. Rations containing large amounts of good hay should not require additional protein. The quality and quantity of hay fed daily is an excellent guide to



the amount of protein supplement that should be required.

7. Three pounds of average good hay will provide as much protein as 1 pound of a 40 percent protein supplement.
8. 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.

9. 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.

10. 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 a protein feed that does not contain urea.

### The Place of Pasture in Feed Conversion

1. 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.
2. 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:

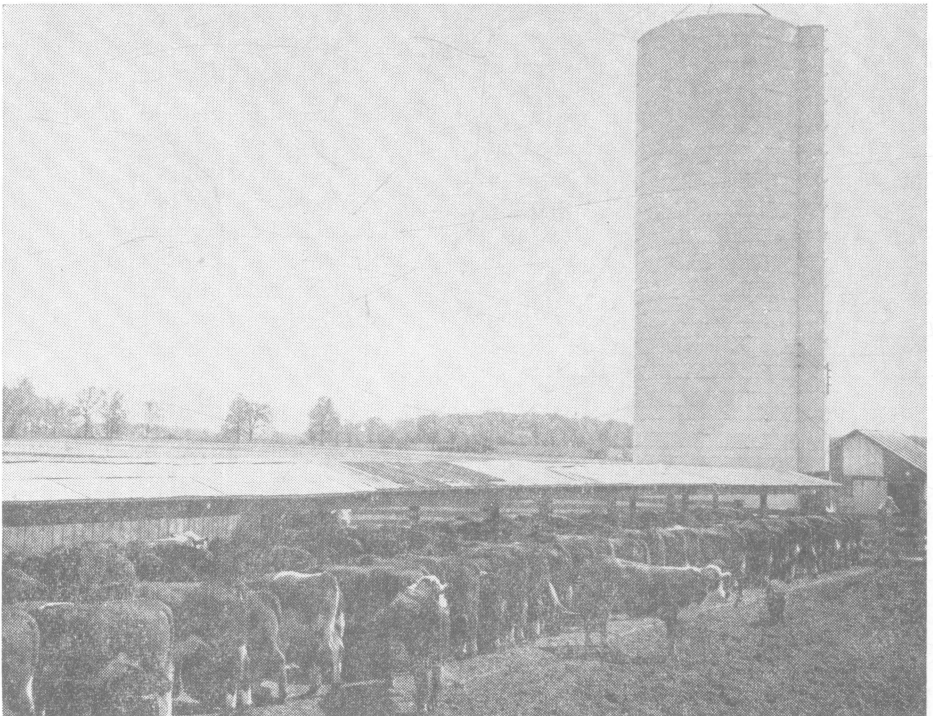
a. Corn silage with soybean meal—no added grain—573 pounds.

b. Corn silage with soybean meal— $\frac{1}{2}$  feed of corn and cob meal—508 pounds.

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

d. Meadow crop silage plus  $\frac{1}{2}$  feed of corn and cob meal—430 pounds.

- e. Steer calves wintered, grazed and fed grain on pasture—368 pounds.
3. The difference in value of the cattle must be considered along with the number of pounds per acre.
  4. Some skilled operators report results that are more favorable to pasture than the above results.
  5. 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 a cattleman long on labor and short on land.
  6. There are three major systems of feeding on grass with several variations in each system.
    - a. Winter cattle to gain about  $1\frac{1}{4}$  pounds 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.
    - b. Winter cattle to gain about  $1\frac{1}{4}$  pounds daily and have the cattle eating  $\frac{1}{2}$  feed of grain when placed on pasture; then continue the grain at this level until the pasture supply fails increasing the amount of grain as desired.
    - c. 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.
  7. 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.



The automatic feed bunk and silo unloader make possible the use of larger amounts of silage with less labor.



The auger offers a method of mixing grains, supplement and silage while being transported in the feed bunk with less hard labor.

8. Another variation is to pasture all summer with limited grain feeding or none at all until the new crop is available; then full feed new crop as chopped corn. Weight and finish of cattle along with the market situation are guiding factors in making a decision.
9. Experiences indicate that no one of these plans is superior to others in all cases and that management know-how 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.
10. 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. Know-how in management detail pays off in making this change. Some cattlemen report little or no difficulty.
11. As a rule, by comparison, the faster cattle gain daily 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.
12. 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 loss on bluegrass pastures which usually produce less gain.

13. 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.
14. 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 desirable as any if sufficient grain is fed along with pasture to provide desirable slaughter cattle by late fall or early winter.

### Comparative Rate of Gain and Feed Cost

1. 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.
2. 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.
3. 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.
4. The original producer of choice grade feeder cattle enjoys a much greater return from his cattle than does a producer of lower grades.
5. Many Ohio feeders are over-sold on plainer grades of cattle, being influenced more by the first cost, and not giving enough consideration to the final sale value which is equally important.
6. Some feeders might well shift to a choice grade of cattle, to a season of marketing when such cattle sell to advantage and secure an increased dollar return for their feeds.



Well bred, correctly fed cattle net most profit.

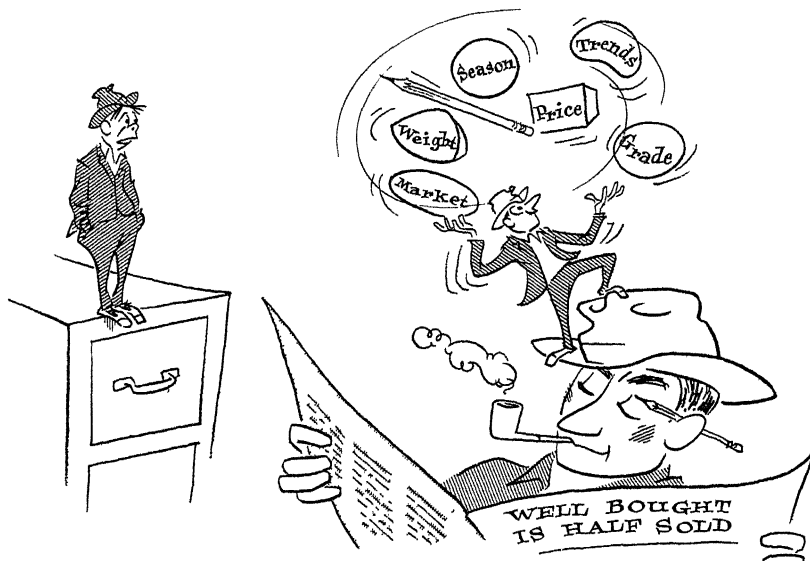
## 7. Average Daily Grain and Feed Cost for Each Grade.

Grade	Avg. daily gain lbs.	Feed cost per 100 lbs. gain	Avg. daily gain lbs.	Feed cost per 100 lbs. gain	Avg. daily gain lbs.	Feed cost per 100 lbs. gain	Avg. daily gain lbs.	Feed cost per 100 lbs. gain
Choice	2.15	\$10.89	2.35	\$5.35	2.02	\$4.60	1.97	\$8.47
Medium	2.40	10.24	2.43	5.35	1.86	4.96	2.02	8.29
Common	2.33	10.59	2.30	5.40	2.06	4.73	2.08	7.96

- Results in the table above were taken from a summary of 4 years' work at the Ohio State University in the early thirties. Note the rates of gain reported by grades.
- The above feed costs are low and meaningless because of the low price of feed of that period.

## There Is Arithmetic Know-How in Grade Differences

- There is an inclination among some feeders to buy cattle on a price basis, rather than a price and grade basis; and a tendency to pay too much for the plainer grades of cattle.
- Too many feeders buy "good grade" feeders at "choice grade" prices. The "good to choice grade" phrase is quite a good bargaining phrase.
- A larger margin is usually necessary on plainer cattle than choice cattle.
- Note this comparison:  
A 500-lb. choice feeder steer fed to a 1000-lb. choice fat steer sells for \$215.  
A 500-lb. plain feeder steer fed to a 1000-lb. fat steer sells for \$175.  
A difference in income or value of \$40.
- Let's assume this \$4 per cwt. spread in sale price is a fair average currently. 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.

6. If feeder cattle are lighter in weight than that used in the illustration above the buying margin per pound between grades must be larger to give equal returns. If feeder cattle are heavier in weight 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.
7. These conclusions are based on work done by the Ohio Agricultural Experiment Station at O. S. U. by Dr. C. W. Gay and Paul Gerlaugh, formerly of the Ohio Station.
  - a. There was little to choose between the three grades in the ability to make efficient gains. It should be remembered that the common steers in this study were good dairy-bred steers rather than poor individuals of the beef breeds. This point is of importance because, surely, many of the common feeder steers seen in the stockyard alleys or feedlots would not gain as well as those of this group.
  - b. The spread in price between plain, medium and choice fat cattle is narrow during the spring months.
  - c. The common grade of steers received the "breaks" in this test.
  - d. The local killers and the small markets appraised the various grades quite differently from the terminal markets.
  - e. 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.
  - f. Steers showing characteristics of dairy breeds made satisfactory gains.
  - g. Steers with characteristics indicative of poor breeding regardless of the breed made less satisfactory gains.

### Small Grain and Small Grain Silage

1. Cattle have robust constitutions and can handle almost any kind of feed. Some feeds, and certain combinations of feed, pay better than others.
2. Oat or barley grain can be substituted for a part of the corn grain in most cattle rations. In heavy grain, non-silage rations, especially in summer, some small grain in amounts up to 20 to 25 percent might improve the ration. Other grains can be used in lesser amounts. In high roughage rations, small grains are less favorable than corn by comparison. Large amounts of ground barley pose a bloat problem occasionally.
3. Oats or barley compare favorably with corn on a per pound or a per hundred weight basis when used judiciously. On an acre basis, they fall woefully short because of the great difference in yield. An average 1600 pound per acre oat yield will not compare favorably with a 5000 pound corn yield.
4. 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 in a thick milk to soft dough stage. Controlling the moisture content is very impor-

tant in making a quality product. Controlling the maturity of the stalk is equally important.

5. Small grain silage is rated about half-way between meadow silage and corn silage in value on a tonnage basis. Finishing rations that include small grain silage will, therefore, require more corn and less protein than corn silage rations.
6. Small grain is grown on many Ohio

cattle farms to fit the total farm management rather than for its superior contribution to the feed supply. A part of the management decision in cattle feeding arises from the reduced amounts of feed produced by small grains.

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

### Test Results Reported by the Ohio Agricultural Experiment Station

1. Carefully conducted experiments in cattle feeding show a variation in results although as many factors as practical are kept under control.
2. Note below 6 comparable test results:
  - a. The same man did the work.
  - b. The rations are the same each year.
  - c. The cattle are as similar as can be secured from year to year.
  - d. The season and length of feeding is similar.
  - e. Prices of feed and prices of cattle change.
3. Variations in results with the same ration.

	1951	1951	1951	1952	1953	1954	Percent Variation
Finish weight .....	1154	1132	1071	1058	1140	1096	
Starting weight .....	637	630	663	606	667	686	
Daily gain .....	2.0	1.94	2.08	2.05	2.25	2.12	16.0
Corn daily .....	16	15.0	15.9	15.6	16.4	15.5	9.0
Supplement daily .....	1.5	1.5	1.5	1.5	1.5	1.5	
Hay daily .....	3.0	3.3	4.1	3.8	3.7	3.5	36.6
Corn per cwt. gain.....	801	774	763	761	731	730	9.7
Sup. per cwt. gain.....	75	77	72	72	65	70	18.5
Hay per cwt. gain.....	145	169	197	184	165	166	35.8
Cost of gain.....	23.27	21.99	21.87	24.88	23.43	20.52	
Dressing percent .....	61.99	63.4	62.0	60.8	63.3	61.13	2.6 (Dif.)
U. S. Carcass Grade.....	1 pr+	6 p	9 ch	4 p	6 p	5 ch+	
(The value of the end product is not the same.)	5 pr	3 ch+	4 ch	1 g	6 ch	4 ch—	
4. Pounds Live Cattle Per Acre			511	398	435	408	28.3

5. It takes several years' testing to provide dependable results. One year's results can be misleading. Interpreting results requires judgment.
6. Cattle are large animals that mature slowly over a long period of time. The daily maintenance requirement is high and the unit of measurement is small. Many factors may change perform-



These choice calves are the kind Dr. Earle Klosterman of the Ohio Agricultural Experiment Station is using in research work.

ance. It is difficult to measure the effect of any one factor.

7. In addition to differences in cattle there is variation in the quality of hay,

corn, silages and supplements from year to year.

8. This table illustrates a problem in calculating feed conversion.

### Variation in Results of a Simple Ration Used 8 Years

1. The results below are taken from reports published by the Ohio Agricultural Experiment Station.

2. Performance of cattle fed the same ration under well conducted research is quite variable.

3. It is not possible to control all the

5. Variations in the test results below are at a practical minimum.

many variable factors that influence final results of a series of cattle feeding tests.

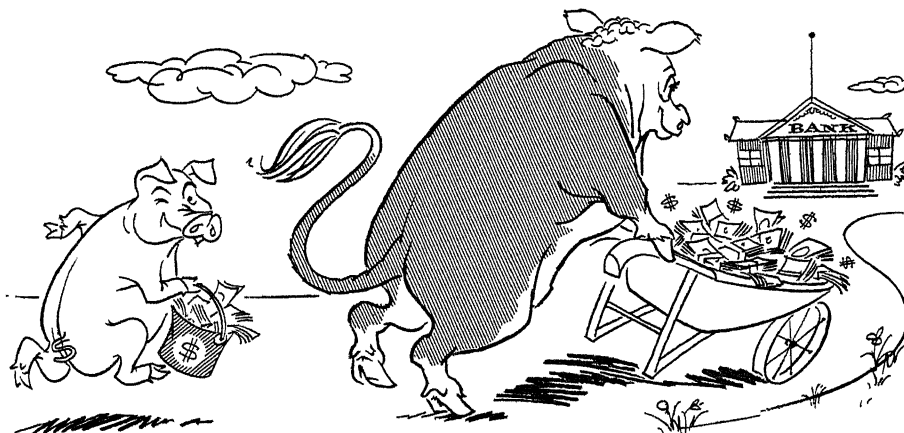
4. Complexity of cattle feeding makes it difficult to conduct research, interpret results and adopt changes that assure a more profitable farm practice.

									Percent Variation
Final weight	880	851	894	906	859	881	880	889	
Starting weight	459	463	465	466	454	461	459	472	
Gain per day	2.15	1.98	2.19	2.25	2.06	2.14	2.15	1.86	20.9
<b>Daily Ration</b>									
Corn and cob meal	11.9	12.2	11.8	12.6	11.8	11.7	11.9	11.1	13.5
Soybean Meal	1.5	.75	1.5	.75	1.5	1.5	1.5	1.5	100.0
Hay	2.6	2.6	2.6	2.6	2.1	2.1	2.6	2.1	23.8
<b>Feed per cwt. gain</b>									
Corn and cob meal	552	613	539	560	574	547	552	598	13.7
Soybean Meal	70	38	68	33	73	70	70	80	242.0
Hay	119	129	117	114	102	98	119	112	31.6

6. These results are typical of normal variation with steer calves.
7. The starting weights and daily rations are quite similar.
8. Note that "percent variation" seems to dramatize the range of differences.
9. The most successful operators exploit every variable factor to the maximum.
10. Iowa reports a variation of 10 percent in response when six lots of 14 cattle each were fed identical rations under identical conditions the same year.
11. Variation in results make interpretation and use difficult to apply in feedlot practice.

### Hogs in Cattle Feedlots

1. Hogs and cattle feeding make an excellent combination on corn farms.
2. Many cattle feeders overlook the efficiency and profit derived from hogs gleaned in the cattle feedlot.
3. Some folks dislike hogs getting in feed bunks, the water supply, crowding, rooting up the bedding and sleeping under feed bunks, etc.
4. Other feeders develop skill and know-how in arranging hog and cattle facilities so that these disadvantages are minimized.
5. The following conclusions can be made from reports published by the Ohio Agricultural Experiment Station several years ago.
  - a. It pays to have hogs follow cattle. Even when ground ear corn is fed.
  - b. More pounds of pork will be produced per 100 bushels of corn fed to yearling cattle than to steer calves.
  - c. One bushel of shelled corn fed to cattle will produce 1 pound of pork. One bushel of ground ear corn fed to cattle will produce ½ pound of pork.
  - d. About twice as much gain was made by pigs following cattle from a bushel of shelled corn fed the cattle than when fed as corn and cob meal.
  - e. One hundred bushels of corn fed as shelled corn to calves gave 100 pounds of gain on the pigs and saved 100 pounds of supplement, .24 of corn silage and .1 ton of hay.



Hogs in cattle feedlots increase income.

## Molasses in Cattle Feeding Rations

When low quality feeds are fed, molasses will increase both palatability and quantity of feed consumed. If the quality of the feeds are good, molasses will likely stimulate appetite rather than increase palatability.

In Ohio tests, 2 pounds of molasses daily apparently increased water consumption in proportion to total feed consumption. More than 2 pounds of molasses daily did not further increase water consumption.

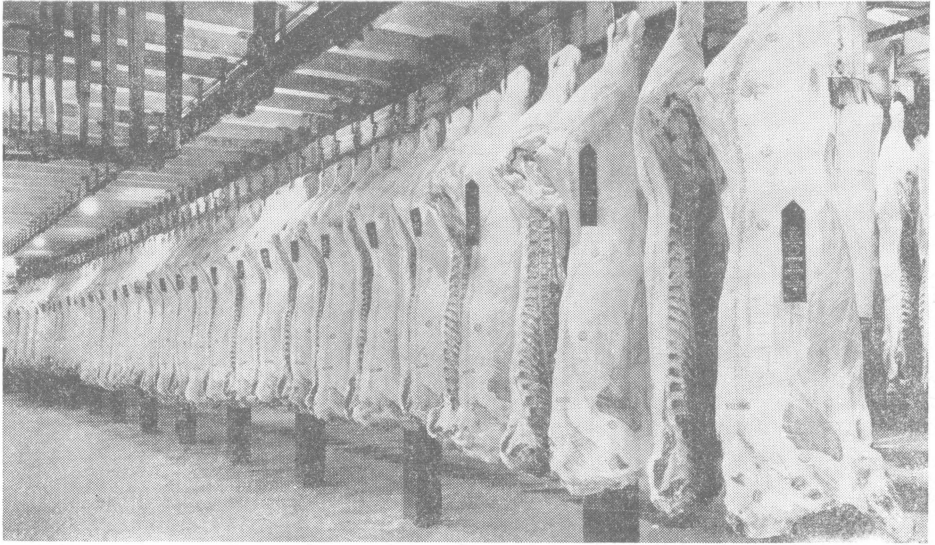
## Conclusions on Molasses Tests at the Ohio Agricultural Experiment Station

1. Two pounds of cane feeding molasses did not replace 2 pounds of shelled corn in a 252 day fattening test with calves.
2. Two pounds of either cane or beet feeding molasses noticeably increased feed consumption.
3. Self-feeding cane molasses produced rapid gains and a high selling value, but was uneconomical because of too costly gains.
4. Beet molasses, when fed at the rate of 2 pounds daily per calf, was fully the equal of cane molasses when fed at the same rate.
5. Both cane and beet molasses contain a growth factor. This growth factor probably has an important place in calf fattening rations when a long feeding period is followed; otherwise, it is probably a handicap.
6. Calves fed beet molasses as a part of their ration made more efficient gains during the early part of a 9-month feeding period and less efficient gains during the latter part of the test than did calves fed cane molasses.
7. Molasses did not appreciably increase water consumption when used as a substitute for shelled corn in a limited ration. When molasses was used in a ration where corn was full-fed, molasses increased feed consumption which, in turn, increased water consumption.
8. Self-feeding molasses did not cause the cattle to scour.
9. Cost of producing gains is a more important factor in profitable cattle feeding than either rapidity of gains or market topping ability.

## 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 percent as much per ton as grain in these many experiments."



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

### Some Conclusions of Dr. Earle Klosterman on Molasses

In "poor quality hay" rations tested at the Ohio Agriculture Experiment Station, 1 pound of molasses increased the rate of gain and produced cattle with higher finish. The cattle ate from 1.3 pounds to 1.8 pounds more corn and cob meal per head daily. In the same "poor hay" rations, the ash from 1 pound of molasses produced results nearly comparable to molasses, indicating that minerals of some kind in

cane molasses were the major factors in improving the poor quality hay ration.

In rations containing 1 pound of molasses daily with good hay and corn and cob meal fed to yearling steers, 1 pound of molasses and .75 pounds of soybean oil meal gave results equal to 1.5 pound of soybean oil meal. One pound of molasses added to a similar rations with 1.5 pound of soybean meal gave no more favorable results.

### Know When and How to Feed Molasses Profitably

It will pay to study the analysis of molasses feeds before buying. Most authorities agree that the feeding value of molasses is about 85 percent that of corn on an average. Therefore, the price as compared to corn should be a major factor.

Unless used judiciously, molasses or molasses feeds may cost instead of pay. They should be evaluated as any other feed or feed ingredient. Use plentifully as the cost justifies and sparingly or not at all when it does not.

There is nothing magic about molasses. Dr. Orville Bentley of the Ohio Agricultural Experiment Station and other research workers are agreed that molasses contains an unidentified something that, under certain circumstances, produced favorable results in cattle feeding. It is

something beyond the mineral, vitamin or protein content of good rations.

It is a mystery why molasses, when added to poor hay rations or rations known to be a little low in protein, actually give as good response as when more protein is added.

### **Vitamins in Cattle Rations**

There is no evidence that adding vitamins to commonly accepted good cattle rations in Ohio is necessary or that they improve feedlot performance. Farm grains, especially yellow corn, and good hay normally contain adequate Vitamin A. Vitamin A is associated with carotene-rich grain or roughage.

Cattle store considerable Vitamin A in their livers. That reserve is drawn upon when needed.

Vitamin A deficiency will not occur if cattle are fed at least 2 pounds of good legume hay daily or as little as 6 pounds of corn silage.

A few pounds of good meadow crop silage a day can supply the Vitamin A requirements for beef 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 solves the Vitamin D problem.

### **Minerals in Cattle Rations**

There is no point in force feeding mineral 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 mineralized salt be provided when poor hay is a part of the rations.

Calcium and phosphorus are the two

minerals most likely to be lacking. Legume hays and 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.

### **Salt in Cattle Rations**

Salt should be available free choice at all times. Loose salt is preferred. Salt should be fed separate from minerals and other feed. Force feeding salt is not a recommended practice. 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.

### ***For Your Information . . .***

Your county agricultural extension office has several other bulletins and leaflets to help you with your livestock feeding and management. For a complete list of available information, contact your local extension agent.