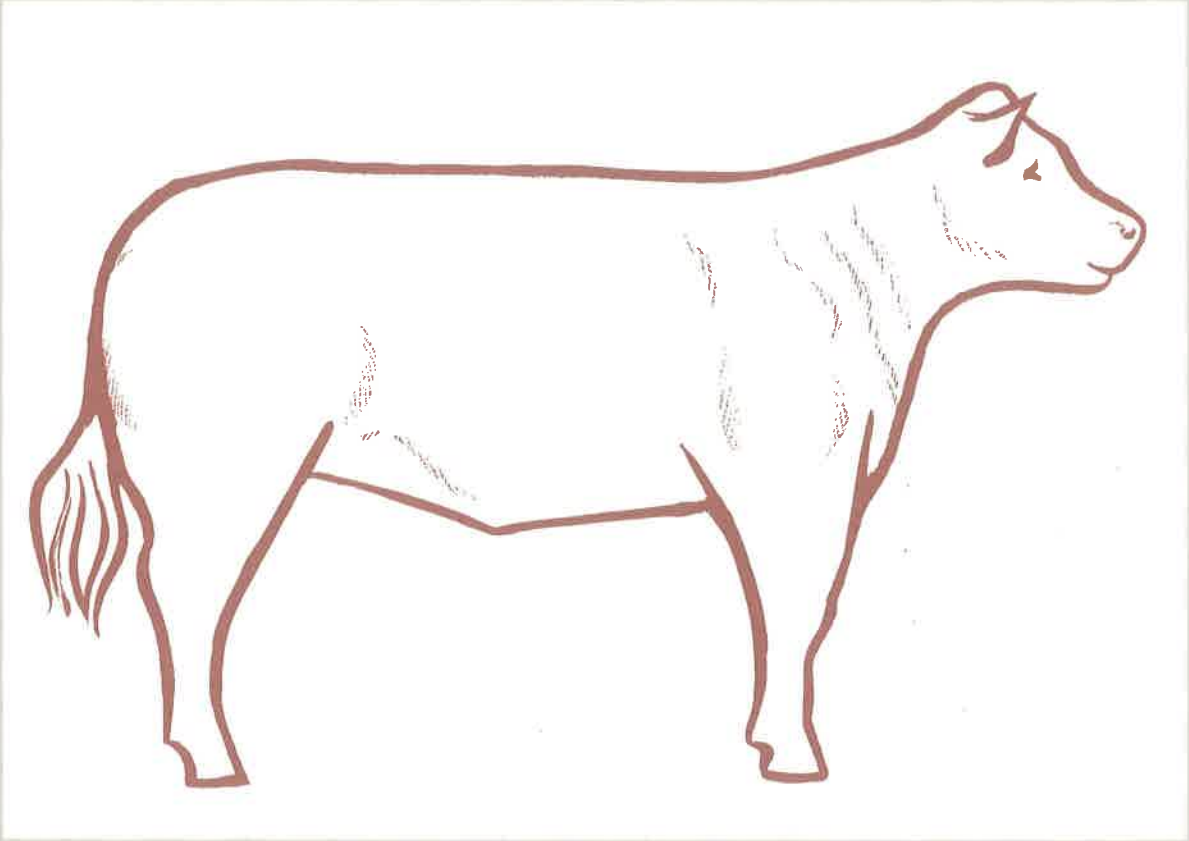
The Modern Beef Steer



Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

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The illustrations and some of the information in this pamphlet are based on publications from Purdue University and Texas A&M University.

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THE MODERN BEEF STEER

Can You Tell Muscle From Fat?

Rapid growth and muscling are the criteria for the meat-type steer. Muscling has to do with the animal's conformation or shape. Desirable conformation must increase production efficiency as well as improve cutability or meat yield. Some of the conformation points in the live animal that were considered important in the past have no relation to either cutability or production efficiency. There is no justification for a beef animal that is overfinished, excessively deep, short bodied, short legged, a slow gainer, or with a heavy brisket, deep flanks and twist.

All Fat Is Not Bad

In a beef carcass, excess fat greatly reduces the cutability or percent yield of closely trimmed retail cuts. However, under present marketing methods some fat or finish is required to minimize carcass shrinkage and maximize shelf life in the retail market display case.

A muscular, correctly finished steer can yield a carcass that is worth $50 or more than an overfinished, average muscled steer or an underfinished, poorly muscled steer.

Judging the Modern Steer

The modern steer is muscular—a meat-type steer. He is efficient from the standpoint of rate of gain, and possesses carcass excellence. He is longer, less deep-bodied, trimmer through the middle, more upstanding, and less smooth than the old-fashioned steer. The meat-type steer shows muscling when viewed from any angle, plus the necessary minimum outside finish. Muscling is indicated by bulges and creases rather than the smoothness seen in the overfinished or the angularity seen in the less muscular steer.

The illustrations that follow show that what is desired in a muscular, correctly finished steer as compared to the average muscled, overfinished or the poorly muscled, underfinished steer.

The modern well-muscled steer stands wide when viewed from the front, has a minimum of brisket, and shows superior muscling as indicated by bulges in the forearm and the shoulders.

From the side, the meaty steer will appear trim through the middle and rather upstanding and may be cut up in the rear flank. The top line will be strong and will show muscle working when he moves—a bulge over the loin and another over the rump.

Viewed from the rear, the well-muscled steer will appear rounded over the loin and rump like a quonset hut, will bulge and be widest through the middle of the round, will be somewhat cut up in the twist but will carry muscling well down on the leg. He will stand wide and have the thickness of frame to carry the muscling required in today's modern steer.

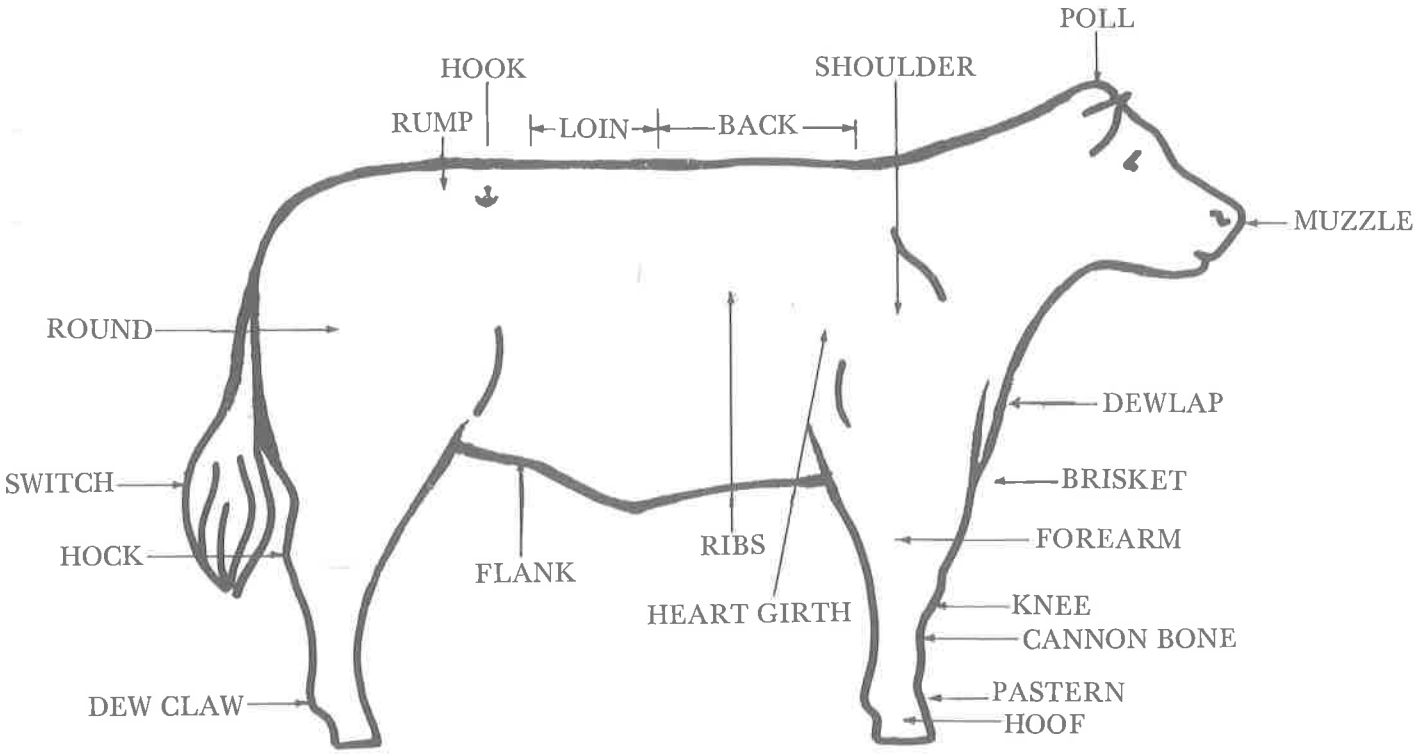
The successful judge of beef cattle, whether a 4-H member, cattleman, cattle feeder or cattle buyer, will identify and select muscular, efficient cattle that yield a high percentage of lean cuts of high-quality beef with little excess fat. Points of emphasis must be related to carcass value and production efficiency. There are some of these represented in most breeds of cattle.

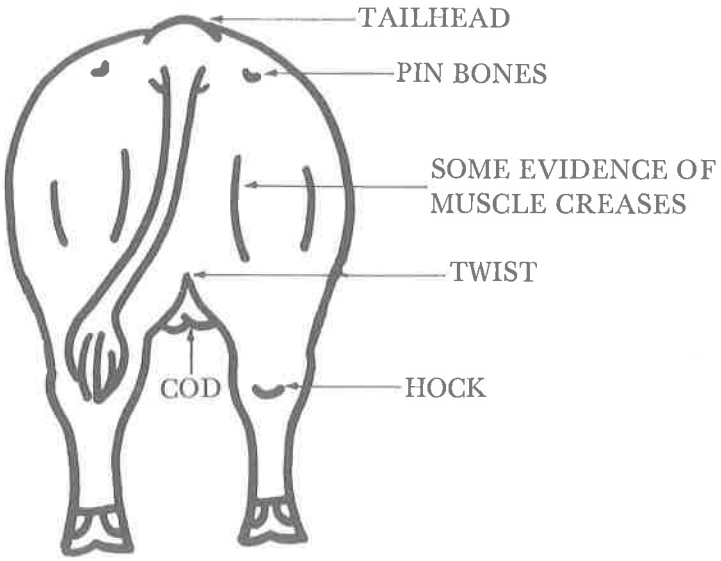
The Modern Cow—Modern Bull

The modern steer is the image of the mother cow that raised him and the bull that sired him. Performance records, keen minds, and critical visual appraisal will hasten the changeover to the modern steer.

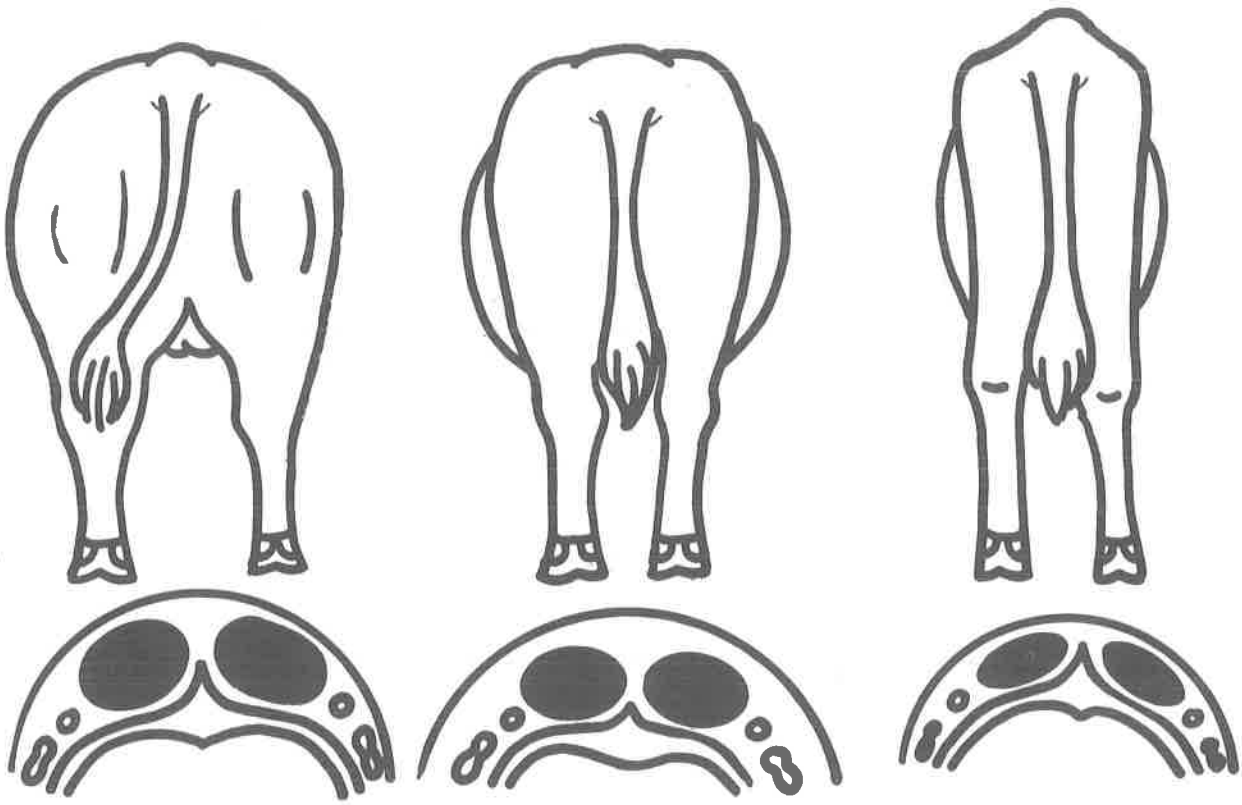
The modern cow has a feminine head and is a bit longer and leaner in the neck than the old-fashioned kind. She is longer bodied, not too deep, but stands wide front and rear on medium bone. Her udder is long from front to rear, well-attached and shows adequate capacity. She is correct on her feet and legs. She is selected on the basis of production records—her own and those of her dam.

The modern bull is massive and muscular with a strong, masculine head, prominent crest, and large testicles. He shows muscling in the forearm and shoulder, over the back and loin, the rump, and in the quarter. He is long and stands correctly with adequate width between the legs on heavy bone. He is selected on the basis of records with strong emphasis on rate of gain. Research has shown that muscling or cutability is positively correlated with rate of gain.





KNOW THE POINTS OF CONFORMATION



Muscular, correctly finished–

thick or widest through middle of the rounds. Wide at pins. Stands and walks wide on hindlegs. Wide, thick back, loin and rump with correct quonset shape (◠) or turn over top. Carries muscling well down on legs. Tailhead may be prominent–no excessive fat deposits. Muscle creases evident.

Large ribeye muscle with minimum covering of finish.

Average muscling, overfinished–

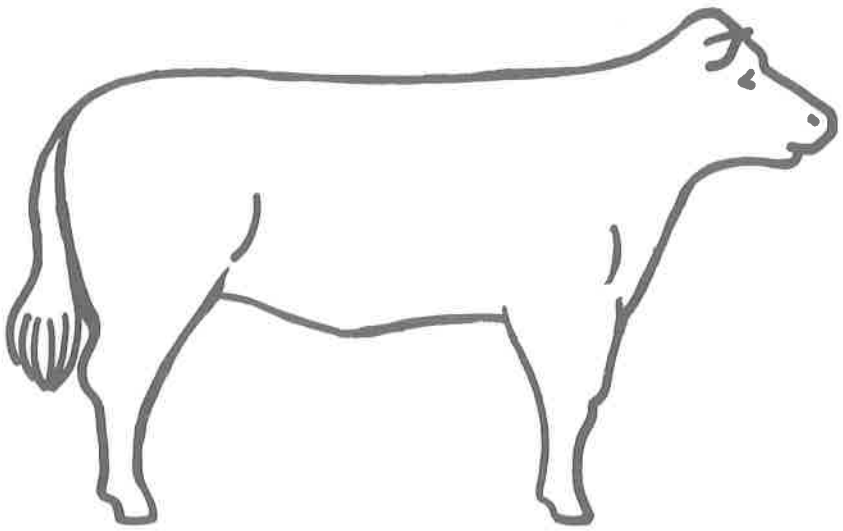
wide top but tapers in width from top to bottom of round. Lacks width between hindlegs. Full, deep twist denoting excess fat. Lacks muscle in middle round. Flatness over the rump and loin (⌐¬) indicates lack of muscle and excessive finish.

Ribeye muscle is smaller with excessive finish.

Poorly muscled, underfinished–

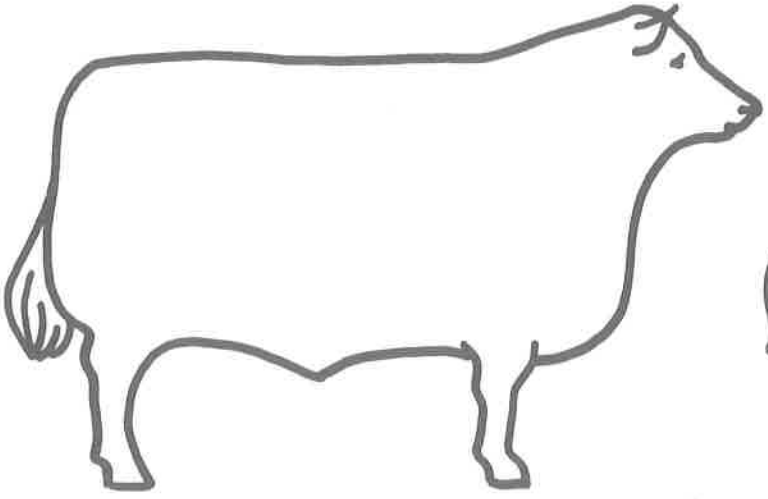
narrow, lacks thickness, flat tapering round. Narrow at pins and between hindlegs. Narrow rafter-shaped (◠) top. Prominent tailhead and hooks.

Small ribeye muscle with little or no finish.



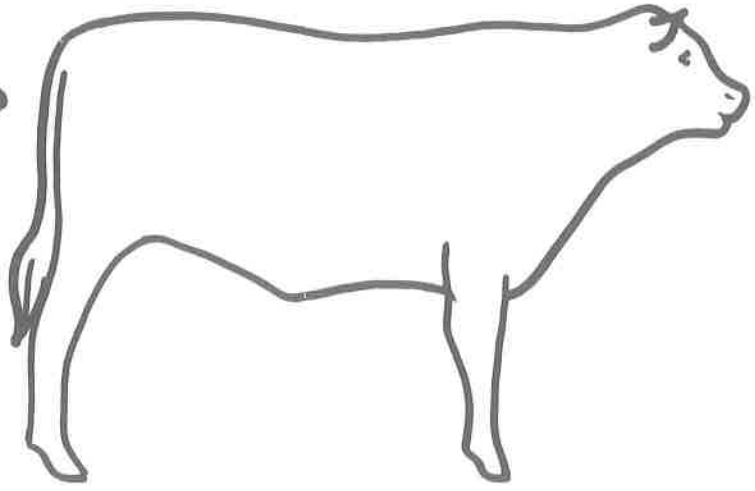
Muscular, correctly finished–

long bodied, longer legged. Clean, neat brisket and dewlap. Trim middle, moderate depth of body. Cut up in the rear flank. Long rump and round. Muscular shoulder and forearm. Round shows bulge midway down. Strong top with bulge over loin and rump.



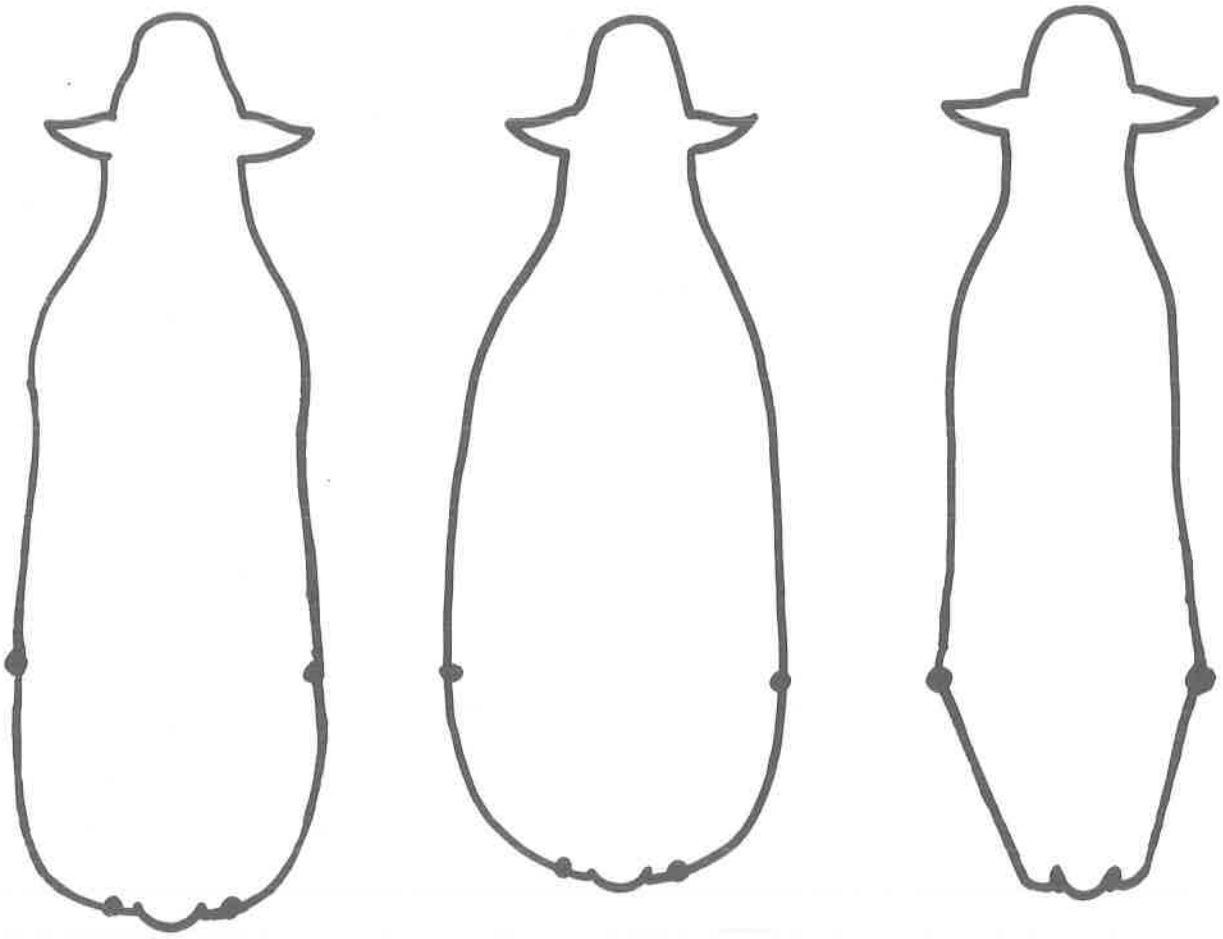
Average muscling, overfinished–

excessive depth of body, short bodied and short legged. Heavy, wastey brisket and rear flank. Average muscling in arm and forearm. Short rump and round. Bulge in lower round indicates excessive finish.



Poorly muscled, underfinished–

lacks muscling in the shoulder and forearm. Has an unbalanced, light hindquarter. Hooks, pins, and point of shoulder prominent.



Muscular, correctly finished—

indicates muscling in the shoulder and is not full and smooth back of the shoulders. Shows length through the back and from the hooks to the pins. Thickest through the rear quarters.

Average muscling, overfinished—

uniform thickness from front to rear. Does not exhibit much muscling in the shoulder area. Excessive fat over the forerib and shoulder. Close coupled, widest in the middle of the body, short rumped.

Poorly muscled, underfinished—

lacks muscling in the shoulder. Lacks thickness through the loin and rump. Short, drooping rump. Narrow at the pins.

Muscular, correctly finished–

shows muscle in shoulder and forearm by bulges. Trim brisket and dewlap. No excessive finish. Wide between the front legs.

Average muscling, overfinished–

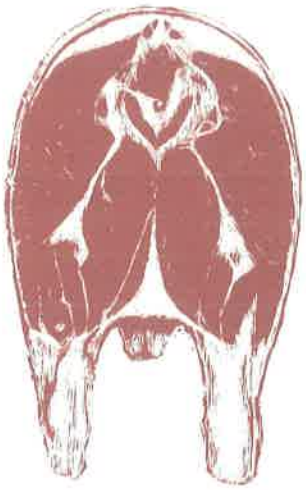
smoothness over shoulder indicates lack of muscling. Small forearm. Heavy, wastey brisket denoting excessive finish. Slightly narrow between the front legs.

Poorly muscled, underfinished–

lacks muscling in the forearm and shoulder. Narrow through the shoulders. Narrow between the front legs.

These cross sections of frozen steer carcasses illustrate the superior muscling of the modern steer (left) compared to the lack of muscling and extreme finish of the old-fashioned steer (right).

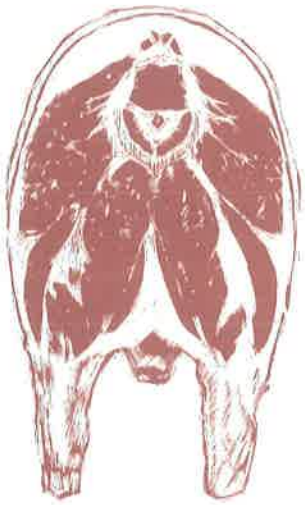
Modern Steer



The cross section of the rear quarters of the modern steer has a more rounded appearance over the top and down the side of the round. It shows less finish on the top and less intermuscular fat.

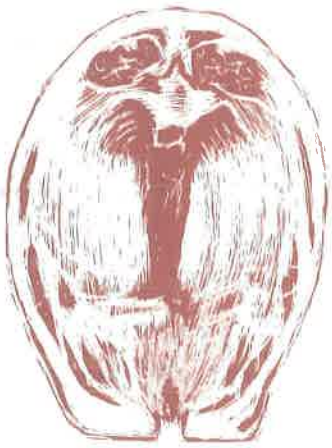
The old-fashioned steer is characterized by its extreme fat cover, large deposits of fat between muscles and in the twist, and fatness on top and down the side of the round.

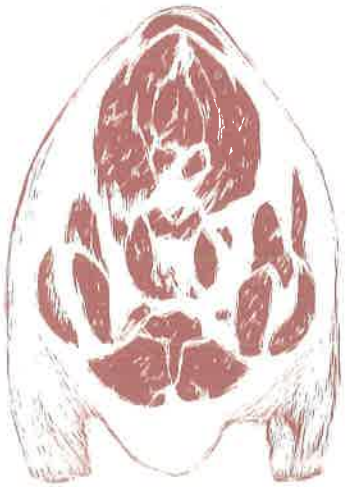
Old-Fashioned Steer



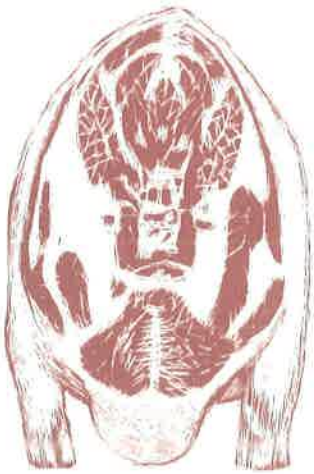
The cross section through the ribeye area shows a larger ribeye area in the modern steer as well as more muscling down the side of the body and less overall fat cover.

The old-fashioned steer has a smaller ribeye, less total muscle, and an excess of outside finish.





The cross section through the shoulder and chuck again points up the superior muscling of the modern steer as compared to the old-fashioned steer. The modern steer also has a trimmer brisket with less fat.



Facts About a Typical Beef Carcass

* A beef carcass can be physically separated into three portions: fat, muscle, and bone.

* A present-day beef carcass is about 30 percent fat, 55 percent muscle, and 15 percent bone.

* Most of the separable fat is found under the skin and the rest found around the kidneys, in the pelvic region, and between the muscles.

* Additional fat is deposited in very small particles through the muscles and cannot be separated. These flecks of fat are called marbling.

* Separable muscle contains 15 to 20 percent protein, 5 to 30 percent fat, and 50 to 75 percent water. The proportion of water decreases as an animal fattens.

* Even bone may contain 45 percent water and 10 percent fat.

* The amount and distribution of fat depends upon nutritional state, breed, and physiological age of animal.

Facts About U.S.D.A. Quality Grade

* The degree of marbling (flecks of fat) in the ribeye muscle between the 12th and 13th rib and, to a much lesser extent, the firmness of the meat in relation to maturity of a beef carcass determines the U.S.D.A. quality grade. Conformation (shape) is no longer considered in determining grade.

* The more marbling there is, the higher the U.S.D.A. quality grade.

* Carcasses from older animals (showing more maturity) require more marbling to reach the same grade compared to younger-appearing carcasses.

* A certain amount of fat around and within muscles is necessary to make the cuts of meat firm. Fat is also needed to reduce shrinkage and spoilage, and maintain shelf life except when cuts are vacuum-wrapped in plastic.

* Fat affects the palatability or eating qualities of meat. It is associated with juiciness, flavor, texture, and, to some extent, tenderness of meat.

* Tenderness is influenced most by age, with younger animals having the most tender meat. Aging the meat also increases tenderness and accentuates flavor.

Facts About Dressing Percent

* Dressing is the removing of the hide, head, tail, lower legs, blood, organs (except kidney), and the gastrointestinal tract and its contents at slaughtering time.

* Dressing percent is the percent of the live animal weight remaining in the carcass after slaughter and dressing. The formula for figuring dressing percent is—

$$\frac{\text{carcass weight}}{\text{live weight}} \times 100 \qquad \text{example:} \quad \frac{600 \text{ lbs}}{1{,}000 \text{ lbs}} = .60 \times 100 = 60\%$$

* The carcass is the part of the animal that is left after slaughter. The whole carcass or the carcass cut into primal cuts (round, loin, rib, chuck) is sold to the retail meat market.

* Dressing percent increases as an animal fattens because weight is added to the carcass without added growth of muscle, bone, and internal organs. In other words, the carcass weight increases much more than the weight of the removed parts called offal (off-all).

* The dressing percent of a Choice steer is usually 60 percent or slightly higher. It is affected by degree of finish, weighing conditions, body fill, mud, etc.

* The packer can pay a higher price per pound for a live steer with a higher dressing percent—unless the steer with the high dressing percent has so much waste fat that the carcass must be sold to the retailer for a lower price.

* If a carcass is worth 90 cents per pound, each 1 percent increase in dressing percent is worth 90 cents per cwt (hundredweight) increase in the live price.

EFFECT OF DRESSING PERCENT ON LIVE VALUE

	Steer A	Steer B
Live weight	1,000 lb	1,000 lb
Parts removed (offal)	- 400	- 380
Carcass weight	600 lb	620 lb
Dressing percent	60%	62%
Carcass value @ 90 /lb	$540.00	$558.00
Hide and offal value	50.00	50.00
Live steer value* before deducting slaughter costs and profit	$590.00 ($59.00/cwt)	608.00 ($60.80/cwt)

* Based only on dressing percent, Steer A is worth $18.00 less than Steer B.

Facts About Cutability Percent

* Cutability percent is described by both the U.S.D.A. and the meat trade by yield grades. Yield grade 1 is leanest, 5 is fattest.

* Retail cuts are those cuts of meats that the consumer buys at the meat counter.

* Cutability percent is the percent of carcass weight remaining in retail cuts after cutting and trimming the carcass.

* As an animal fattens, cutability percent decreases because excess fat is trimmed from retail cuts.

* A retailer can pay a higher price per pound for a carcass with a higher cutability percent providing the quality is the same.

* High cutability beef should yield at least 70 percent of the carcass in total trimmed, boneless retail cuts and 50 percent or more trimmed, boneless major cuts from round, loin, rib, and chuck.

* The amount of fat is the most important factor in determining cutability differences among carcasses.

EFFECT OF YIELD GRADE (CUTABILITY PERCENT) ON CARCASS AND LIVE VALUE

		Steer A		Steer B
Live weight		1,000 lb		1,000 lb
Dressing percent		60%		62%
Carcass weight		600 lb		620 lb
Yield grade		2		4
Major cuts	@ 51%	306 lb	@ 46%	285 lb
Minor cuts	@ 22	132	@ 19	118
Fat, bone, waste	@ 27	162	@ 35	217
Total	100%	600 lb	100%	620 lb
Major cuts value	@ $1.40	$428.40		$399.00
Minor cuts value	@ 1.02	134.64		120.36
Fat, bone, waste	@ .04	6.48		8.68
Carcass value before deducting cutting costs and profit		$569.52 ($94.92/cwt)		$528.04 ($85.17/cwt)
Hide and offal value		$ 50.00		$ 50.00
Live steer value* before deducting costs and profits		$619.52 ($61.95/cwt)		578.04 ($57.80/cwt)

* Based on dressing percent and cutability, Steer A is worth $41.48 more than Steer B.

Growth and Carcass Requirements of the Modern Steer

The modern steer produces consumer preferred beef and is a moneymaker for the breeder, feeder, and retailer.

Requirements of the modern steer under optimum growth conditions—

* Produced by sound, highly fertile brood stock.
* Birth weight and size to allow easy calving (5% to 7% of mature weight).
* Wean heavy enough to go directly to feedlot (600 lb or more at 7 to 8 months).
* Gain rapidly in the feedlot (3 lb/day).
* Gain efficiently in the feedlot (6 lb feed/1 lb gain).
* Have a dressing percent of at least 60 percent.
* Have ribeye area that measures 12 square inches or more on a 1,000-pound steer.
* Have a maximum of .45 inch of back fat over the ribeye on a 1,000-pound steer.
* Have no more than 2.5 percent of the carcass weight in the form of kidney knob, heart fat, and pelvic fat.
* Grade U.S.D.A. Choice, the carcass most acceptable to the California market.
* "A" maturity (young) group.
* A modest amount of marbling.

* Meat has fine texture, bright cherry-red color and is firm.

* Sixty percent or more of the carcass in boneless lean.

* Over 50 percent of carcass weight in boneless, closely trimmed retail cuts from round, loin, rib, and chuck (yield grade 2).

* Carcass weight per day of age:

	Desirable	Possible
Heifers	1.2 lb	1.4 lb
Steers	1.4 lb	1.6 lb
Bulls	1.6 lb	1.8 lb

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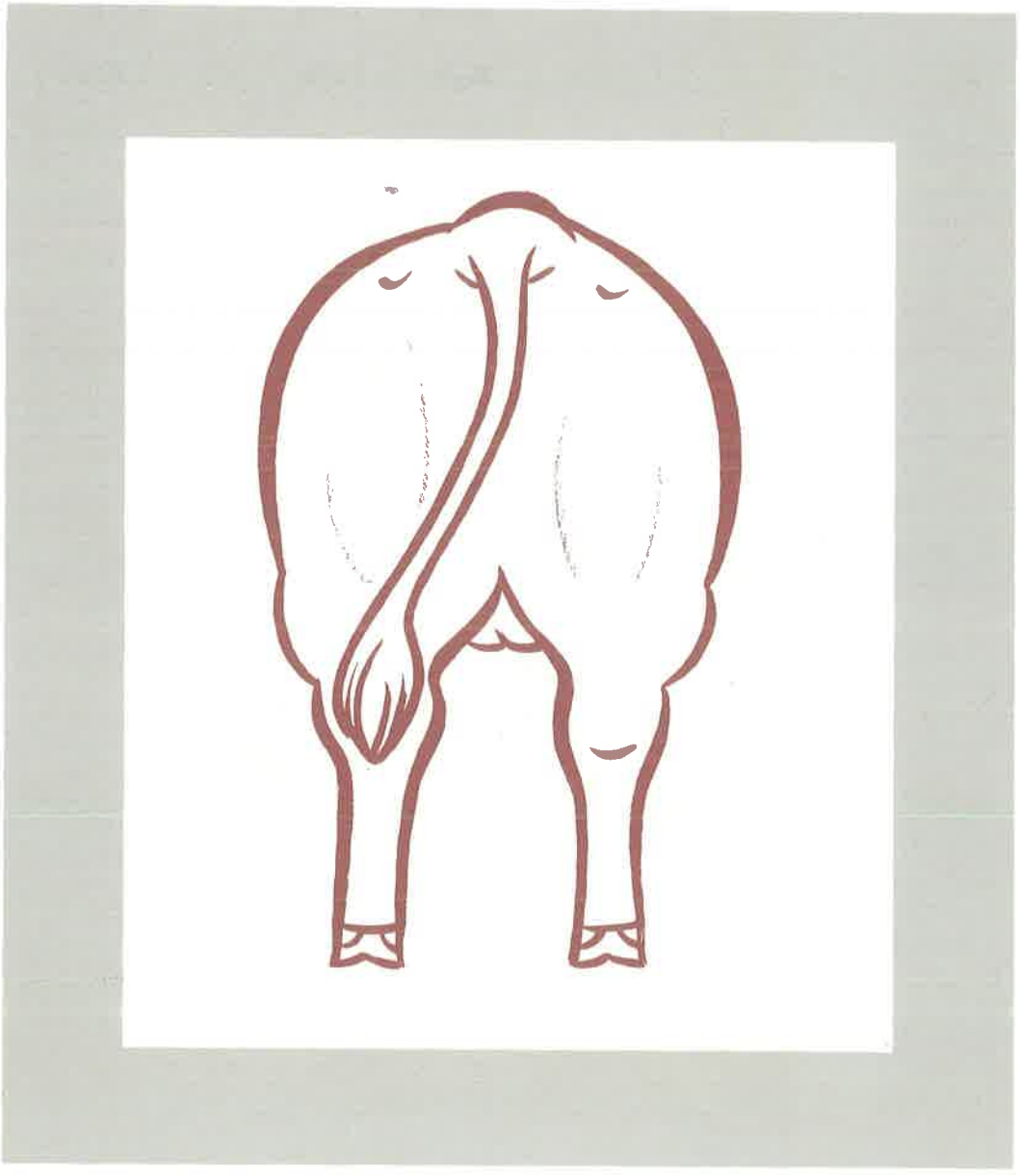

ON FEEDING CATTLE IN DRY LOT

Weigh grain as it is fed. Keep records up to date by making entries in your record book as feed is used

W. G. MARDERS[1]

H. T. STRONG[2]

SUGGESTIONS FOR 4-H CLUB MEMBERS

1. Feed cattle for a profit. Don't feed cattle if it is necessary to depend upon a premium price in order to make money.
2. Do not feed cattle beyond requirements of the market. Too much fat is wasteful. It is costly to produce. And, lastly, consumers in California object to an excessive amount of fat. Cattle ready for slaughter are most useful on the California market if they grade from good to choice. But to reach a slaughter grade of choice to prime, cattle started on feed at . . .

   400 pounds require about 240 days
   500 pounds require about 210 days
   600 pounds require about 180 days

   Feeding for longer periods of time for the purpose of producing cattle in a higher condition increases the cost. More feed per pound of gain is required and the pounds of daily gain are less. For further information, study tables 1, 2, and 3.
3. Select feeder cattle that grade good, choice, or fancy if you expect to produce slaughter cattle that grade good, choice, or prime. Consult your club leader or your farm advisor before selecting feeder cattle for your project.
4. Cattle of the lower grades may be fed when it pays to do so. Such a practice may be profitable when the demand for beef is great, the supply of choice beef is small, and cheap feeds are available.
5. Do not feed cattle of the dairy breeds in dry lot. They do not make satisfactory feeders.
6. Upon delivery to your ranch, feeder cattle should be corralled, watered, and fed hay. Grain should be fed, but not more than one-half pound per head. *(Continued on page 4)*

[1] 4-H Club Specialist.
[2] Extension Animal Husbandman.

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These four pictures are different views of two slaughter steers. One graded prime and the other graded commercial. Width, depth, and thickness are terms which describe the prime steer. The commercial steer has a narrow back and a

FEEDING CHARTS FOR STEERS OR HEIFERS STARTED O

Table 1—400 Pounds in Weight

Feeding Period by Days	Pounds of Feed per Day		Expected Daily Gain in Pounds	Estimated Gain in Pounds for Period	Approximate Weight End Each Phase of Feeding Period, in Pounds
	Grain Mixture	Hay			
1st–30th	Feed ½ pound* per day for first seven days. Increase grain mixture ½ pound every three days. By the 30th day calf should be eating 4½ pounds* per day.	Feed all calf will eat, which may be as much as 11 pounds per day. Reduce as necessary to encourage calf to eat grain mixture.	1.6	48	450
31st–60th	Increase gradually the 4½ pounds* of grain mixture fed so calf will be receiving 7½ pounds* per day by 60th day.	Feed from 7 to 8 pounds per day. Reduce as necessary to encourage calf to eat grain mixture.	1.9	57	500
61st–75th	Increase gradually the 7½ pounds* of grain mixture to 9 pounds* per day.	6 to 8	1.9	29	530
76th–90th	9*	6 to 8	2.0	30	560
91st–120th	10*	6 to 8	2.3	69	630
121st–150th	11*	5 to 7	2.3	69	700
151st–180th	12*	5 to 7	2.4	72	775
181st–210th	14*	5 to 7	2.0	60	830
211th–225th	15*	5 to 7	1.9	29	865
226th–240th	16*	5 to 7	1.8	27	890

From 210 to 240 days will be required to reach a slaughter grade of choice to prime. Approximate feed required through the 240th day: (a) grain mixture, 2400 pounds, (b) hay, 1700 pounds. Expected average daily gain through 240 days, 2.0 pounds. Feed per 100 pounds of gain: (a) grain mixture, 491 pounds, (b) hay, 350 pounds. Cattle fed beyond this point may be expected to make slower and more expensive gains.

241st–255th	17*	5 to 7	1.8	27	920
256th–270th	17*	5 to 7	1.7	26	940
271st–285th	17*	5 to 7	1.7	26	970
286th–300th	17*	5 to 7	1.6	24	990

Approximate feed required from the 241st to 300th day: (a) grain mixture, 1020 pounds, (b) hay, 360 pounds. Expected average daily gain, 1.7 pounds. Feed per 100 pounds of gain: (a) grain mixture, 990 pounds, (b) hay, 349 pounds.

* This is the total amount of grain that may be eaten in two feedings each day. However, do not feed more than will be eaten in 20 to 30 minutes at the time of each feeding.

Table 2—500 P

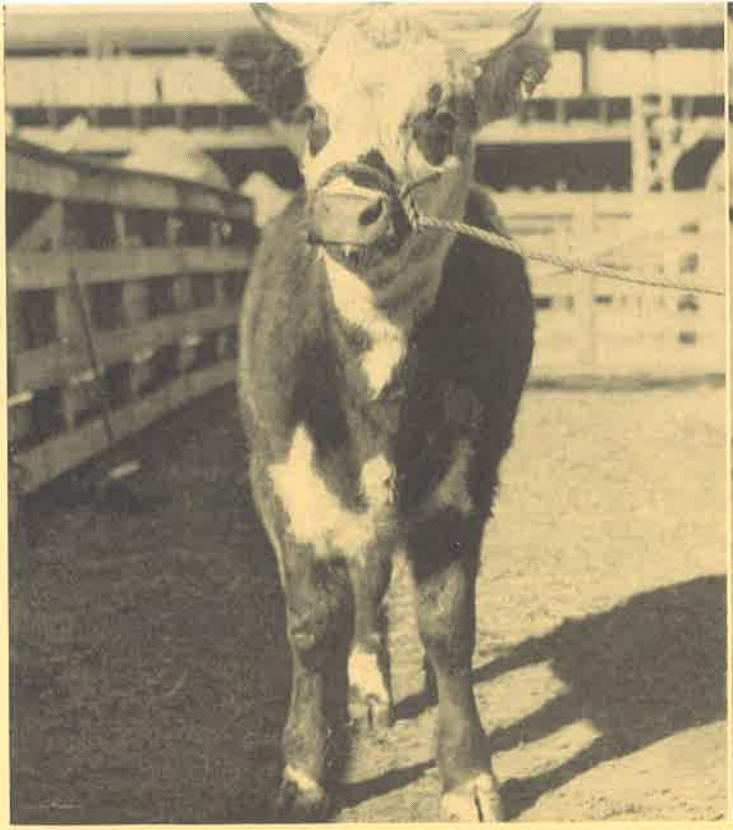
Feeding Period by Days	Pounds of Feed ay	
	Grain Mixture	
1st–30th	Feed ½ pound* per day for first five days. Increase grain mixture ½ pound every three days. Ration should total 2 pounds daily by 15th day, after which mixture should be gradually increased to 5½ pounds* by 30th day.	Feed all be as pound necess to eat
31st–60th	Increase gradually the 5½ pounds* of grain mixture fed so calf will be receiving 9 pounds* per day by 60th day.	Feed fro day. R encou mixtu
61st–75th	10*	
76th–90th	12*	
91st–120th	13*	
121st–150th	14*	
151st–180th	15*	
181st–210th	16*	

From 180 to 210 days will be required to reach feed required through the 210th day: (a) grain mix average daily gain for 210 days, 2.1 pounds. Feed pe (b) hay, 325 pounds. Cattle fed beyond this point w gains.

211th–225th	17*	
226th–240th	18*	
241st–255th	18*	
256th–270th	18*	
271st–285th	18*	

Approximate feed required from the 211th to th 390 pounds. Expected average daily gain, 1.8 pounds. pounds, (b) hay, 295 pounds.

* This is the total amount of grain that may be eaten in t eaten in 20 to 30 minutes at the time of each feeding.



shallow body. He is poorly muscled over the back and loin, and his hindquarters are shallow and thin. The commercial steer may be expected to require more feed per 100 pounds of gain in weight than the prime steer.

N FEED AT 400, 500, AND 600 POUNDS IN WEIGHT

ounds in Weight

Hay	Expected Daily Gain in Pounds	Estimated Gain in Pounds for Period	Approximate Weight End Each Phase of Feeding Period, in Pounds
alf will eat, which may much as 10 or 11 per day. Reduce as ary to encourage calf rain mixture.	1.6	48	550
m 6 to 8 pounds per educe as necessary to age calf to eat grain e.	2.0	61	610
8	2.2	33	640
5 to 7	2.3	35	680
5 to 7	2.5	75	750
5 to 7	2.4	72	825
5 to 7	2.1	63	890
5 to 7	2.0	60	950

a slaughter grade of choice to prime. Approximate ture, 2350 pounds, (b) hay, 1475 pounds. Expected r 100 pounds of gain: (a) grain mixture, 527 pounds, ill be expected to make slower and more expensive

5 to 7	1.9	29	975
5	1.8	27	1000
5	1.7	26	1030
5	1.7	26	1055
5	1.6	24	1080

e 285th day: (a) grain mixture, 1335 pounds, (b) hay, Feed per 100 pounds of gain: (a) grain mixture, 1049

wo feedings each day. However, do not feed more than will be

Table 3—600 Pounds in Weight

Feeding Period by Days	Pounds of Feed per Day: Grain Mixture	Pounds of Feed per Day: Hay	Expected Daily Gain in Pounds	Estimated Gain in Pounds for Period	Approximate Weight End Each Phase of Feeding Period, in Pounds
1st–30th	Feed ½ pound* per day for first three days. Increase grain mixture ½ pound every three days. Ration should total 2½ pounds daily by the 15th day, after which the grain mixture should be gradually increased to 6½ pounds* by 30th day.	Feed all calf will eat, which may be as much as 12 or 14 pounds per day. Reduce as necessary to encourage calf to eat grain mixture.	1.9	57	655
31st–60th	Increase gradually the 6½ pounds* of grain mixture fed so calf will be receiving 9 pounds* per day by 60th day.	Feed from 10 to 12 pounds per day. Reduce as necessary to encourage calf to eat grain mixture.	2.4	72	730
61st–75th	Increase gradually the 10 pounds* of grain mixture to 12 pounds* per day.	10	2.5	37	765
76th–90th	14*	7	2.6	39	805
91st–120th	15*	7	2.2	66	870
121st–150th	16*	7	2.0	60	930
151st–180th	17*	7	1.9	57	990

From 120 to 180 days will be required to reach a slaughter grade of choice to prime. Approximate feed required through the 180th day: (a) grain mixture, 2115 pounds, (b) hay, 1575 pounds. Expected average daily gain through 180th day, 2.2 pounds. Feed for 100 pounds gain: (a) grain mixture, 545 pounds, (b) hay, 403 pounds. Cattle fed beyond this point may be expected to make slower and more expensive gains.

181st–210th	18*	7	1.8	54	1040
211th–225th	18*	7	1.7	26	1070

Approximate feed required from 180th to 225th day: (a) grain mixture, 810 pounds, (b) hay, 315 pounds. Expected average daily gain, 1.7 pounds. Feed per 100 pounds of gain: (a) grain mixture, 1025 pounds, (b) hay, 400 pounds.

* This is the total amount of grain that may be eaten in two feedings each day. However, do not feed more than will be eaten in 20 to 30 minutes at the time of each feeding.

Co-operative Extension work in Agriculture and Home Economics, College of Agriculture, University of California, and United States Department of Agriculture co-operating.
Distributed in furtherance of the Acts of Congress of May 8, and June 30, 1914.
J. Earl Coke, Director, California Agricultural Extension Service.

7. Take plenty of time to get cattle on full feed. Usually, 20 to 30 days will be required.

8. Cattle on full feed may eat from 1½ to 2 pounds of grain mixture, and ¾ to 1 pound of hay for each 100 pounds live weight. For information regarding the amount of hay and grain to feed each day, refer to tables 1, 2, or 3. The table to use depends upon the weight of your cattle at the start of the feeding period. Weigh your feeds. Don't guess. This is important both in mixing feeds and at the time of feeding.

9. A mixture of two or more grains is desirable. Cattle fed on alfalfa hay and rolled or ground barley have a tendency to scour and may bloat. Use of cereal or grass hay with alfalfa and variety of grains in the mixture reduces this possibility and improves the ration.

10. The grain mixture you select may be fed throughout the entire feeding period. It will not be necessary to change the amounts of the various concentrates in the grain mixture as the feeding period progresses in order to provide a balanced ration. The pounds of hay fed may be gradually reduced and the pounds of the grain mixture may be gradually increased. This is illustrated in tables 1, 2, and 3.

11. Feed roughage after grain.

12. Be regular in hours of feeding and see that fresh water and salt, or a mixture of equal parts salt and bone meal, are always available.

13. Be careful not to increase feed too rapidly, and do not overfeed. If you do overfeed your cattle, either cut the amount of grain in half or eliminate it entirely for one or two feedings. As the appetite returns, gradually increase the grain again. You may recognize cattle that have been overfed by the condition of their droppings. Usually they are thin and watery. Furthermore, cattle that have been overfed usually refuse to eat their grain.

14. Feed two or three times daily and, after one hour, remove any feed that is left in the feed box. Stale feed may cause trouble. The cattle should be hungry at feeding time and should clean up the concentrates in 20 to 30 minutes even when on full feed.

15. Keep your feed boxes clean.

16. Gentle your cattle by working around them quietly. Small numbers may be halter broken and taught to lead.

17. Provide shade during the summer and shelter during the winter.

18. Be sure your cattle are vaccinated against black leg.

19. Write in your record book the following data:
    a. the date your project started
    b. the starting weight of your feeder cattle
    c. the price per pound and the total cost of your feeder cattle
    d. amount of feed used and its cost
    e. brand inspection
    f. transportation charges
    g. veterinary fees

RATIONS. Following are two tables containing suggestions for rations which you may use. Table 4 contains four rations which may be used when feeding alfalfa hay. Table 5 contains four different rations which may be used when feeding grain or meadow hay. Although there are many other combinations of feeds that may be used, the suggested rations contain feeds most common in California. Perhaps you have available on your ranch one or more of the feeds listed in tables 4 and 5. If you do, you may wish to use the feeds you have. Other feeds needed to complete the ration may be purchased. Discuss with your club leader or farm advisor other rations which may be used.

Table 4.—Grain Mixture to Be Fed with Alfalfa Hay

Ration	Pounds in Mixture
1. Barley (ground or rolled)	60
Dried molasses beet pulp	35
Cottonseed-oil meal	5
	100
2. Barley (ground or rolled)	30
Milo (ground or rolled)	30
Dried molasses beet pulp	35
Cottonseed-oil meal	5
	100
3. Barley (ground or rolled)	60
Oats	10
Dried molasses beet pulp	25
Cottonseed-oil meal	5
	100
4. Barley (ground or rolled)	50
Dried molasses beet pulp	30
Wheat bran	15
Cottonseed-oil meal	5
	100

When cottonseed-oil meal is expensive compared with other concentrates, it can be omitted from the rations listed above or fed only during the last two or three months when alfalfa hay consumption is reduced.

Table 5.—Grain Mixture to Be Fed with Grain or Non-Legume Meadow Hay

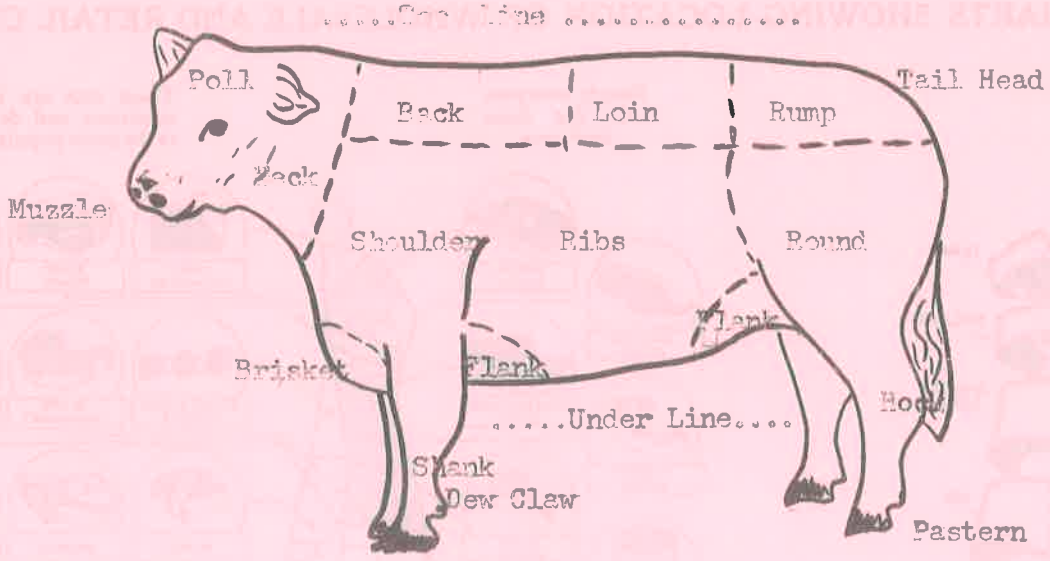
Ration	Pounds in Mixture
1. Barley (ground or rolled)	50
Dried molasses beet pulp	30
Cottonseed-oil meal	15
Alfalfa meal	5
	100
2. Barley (ground or rolled)	25
Milo (ground or rolled)	25
Dried molasses beet pulp	30
Cottonseed-oil meal	15
Alfalfa meal	5
	100
3. Barley (ground or rolled)	50
Oats	10
Dried molasses beet pulp	20
Cottonseed-oil meal	15
Alfalfa meal	5
	100
4. Barley (ground or rolled)	50
Dried molasses beet pulp	20
Wheat bran	10
Cottonseed-oil meal	15
Alfalfa meal	5
	100

Cottonseed-oil meal may be reduced to 10 per cent when cattle reach 700 pounds and are eating 12 pounds or more of concentrates daily. One pound of alfalfa hay daily fed separately may be substituted for 5 per cent alfalfa meal. If grain hay or meadow hay has good green color, alfalfa may be omitted. If alfalfa is omitted, add ½ pound of ground limestone or oyster-shell flour to each 100 pounds of mix.

5m-4,'54(4019s)

GLENN COUNTY

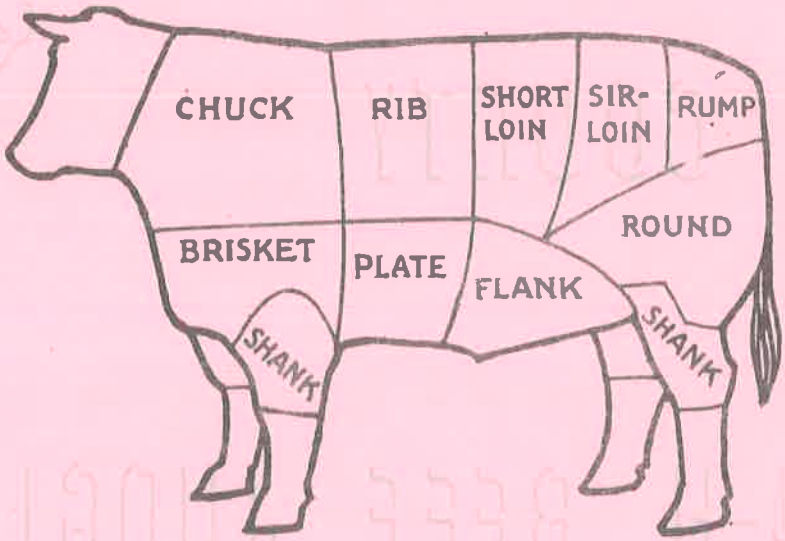
4-H BEEF JUDGING



University of California
Agricultural Extension Service
Glenn County

BEEF CATTLE INFORMATION

Fore Quarter 51%	
Chuck	26
Rib	9
Brisket	5
Plate	7
Shank	4



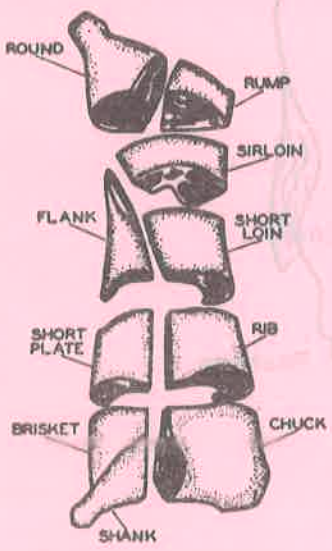
Hind Quarter 49%	
Round	16
Rump	4
Sirloin	8
Shortloin	9
Flank	4
Shank	4
Kidney Knob	4

On The Average Only 55% Of The Live Weight Is Beef, The Balance Is By-Products Or Waste.

U. S. D. A. GRADES — AVERAGE YIELDS

Prime 62% **Choice 59%** **Good 56%** **Commercial 53%** **Utility 47%**

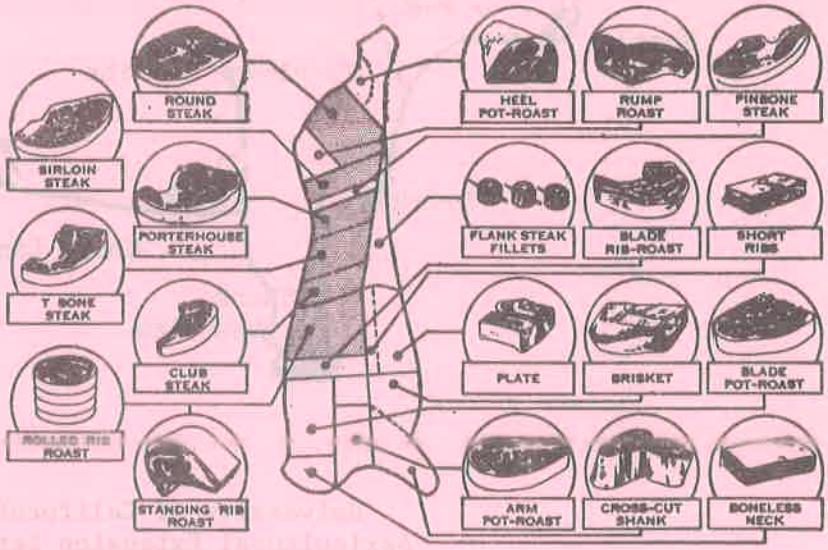
BEEF CHARTS SHOWING LOCATION OF WHOLESALE AND RETAIL CUTS



Beef Carcass Divided Into Wholesale Cuts

Nearly everyone asks for these beef cuts

These cuts are just as nutritious and delicious as the more popular ones

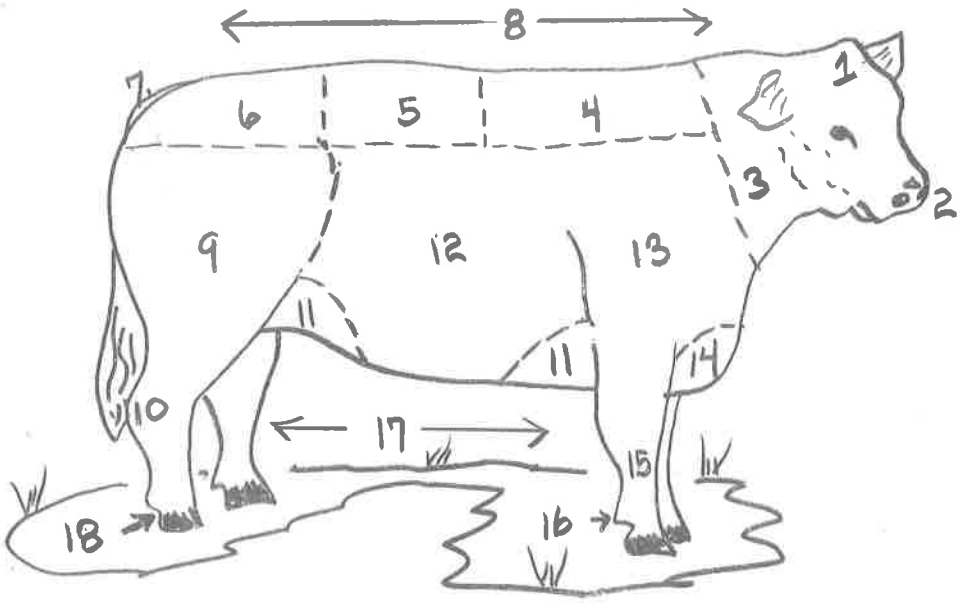


Popular Cuts 30%

Less Popular Cuts 60%

Trimmings 10%

Beef Animal Parts Quiz



1. _____
2. _____
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4. _____
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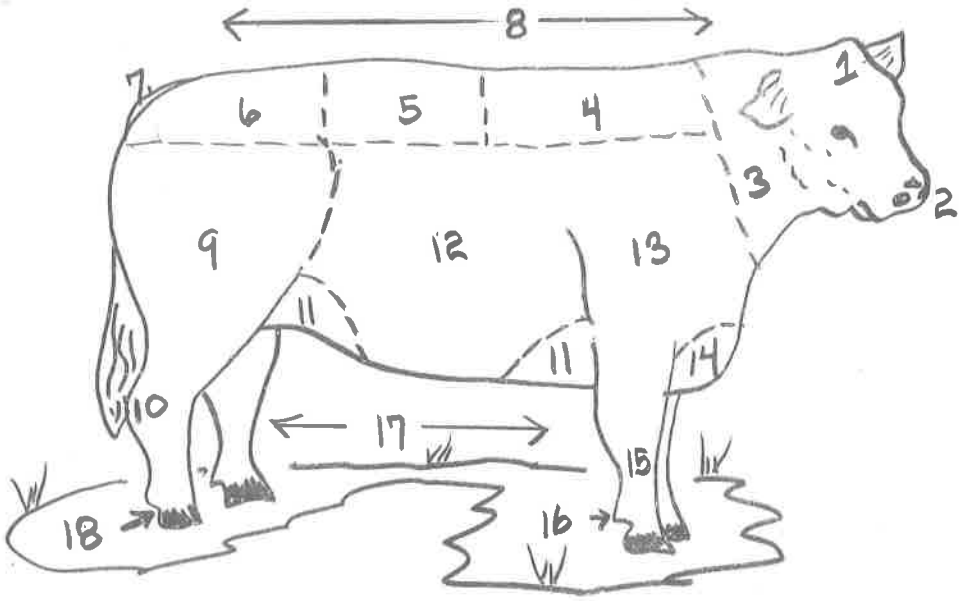
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____

Beef Animal Parts Quiz



1. _____
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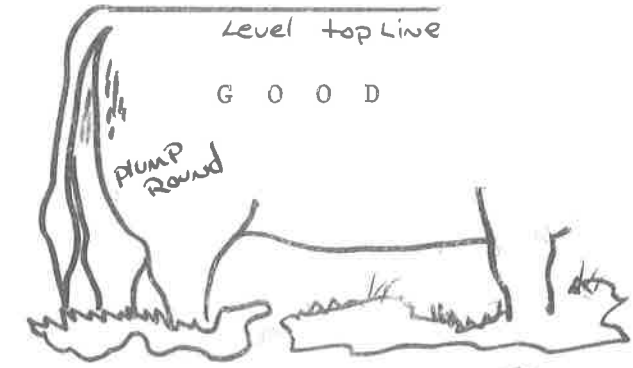
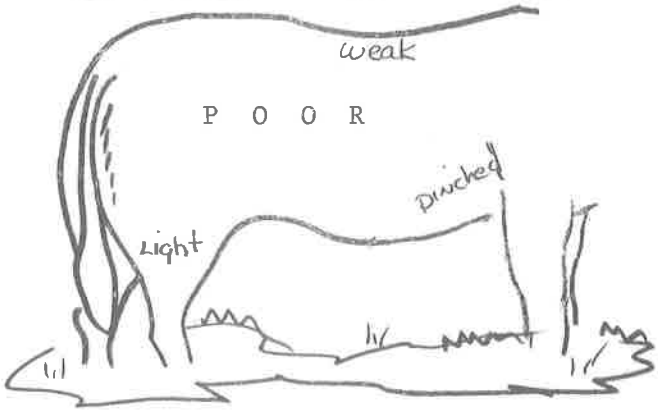
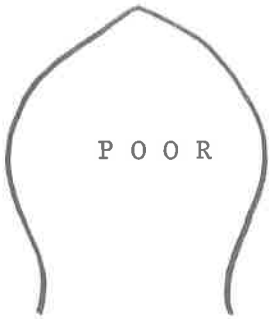
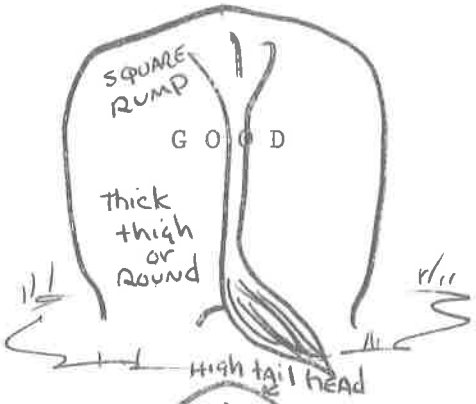
17. _____
18. _____

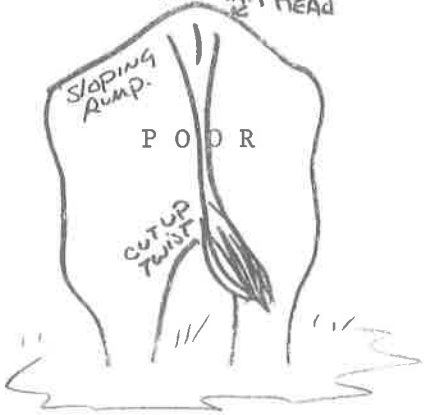
What To Look For





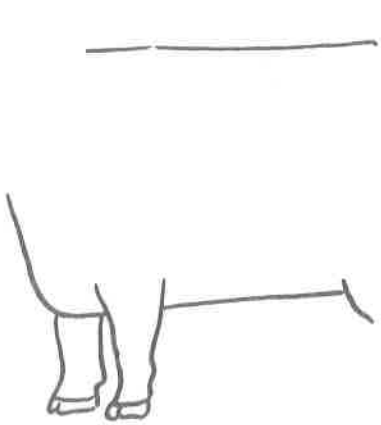




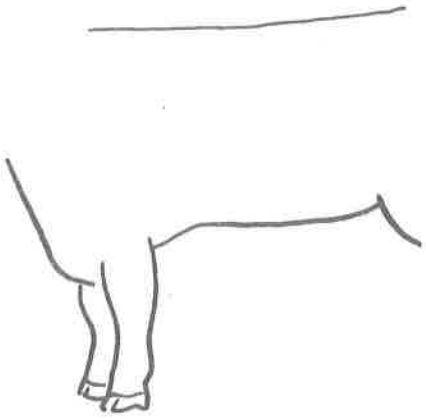


How to Compare Points

Depth of Body—The body should be deep, rectangular, and well-balanced. The fore-rib region should be deep with a good spring of rib and fullness behind the shoulder. A flat-ribbed, shallow-bodied beef animal is undesirable.



Good



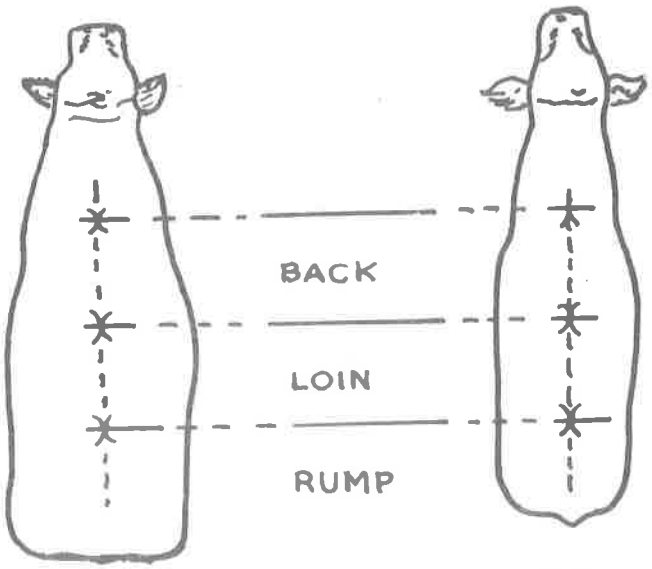
Poor

Correct

Sickle-hocked

Post-legged

Hind Legs — The legs are straight and set squarely under the corners of the body. The hind legs should have a medium set or angle at the hock as seen from the side view. Too much set (sickle-hocked) and not enough set (post-legged) are both undesirable. When viewed from the rear, the legs should be straight. Too close at the hocks (cow-hocked) and too wide at the hocks are both objectionable.

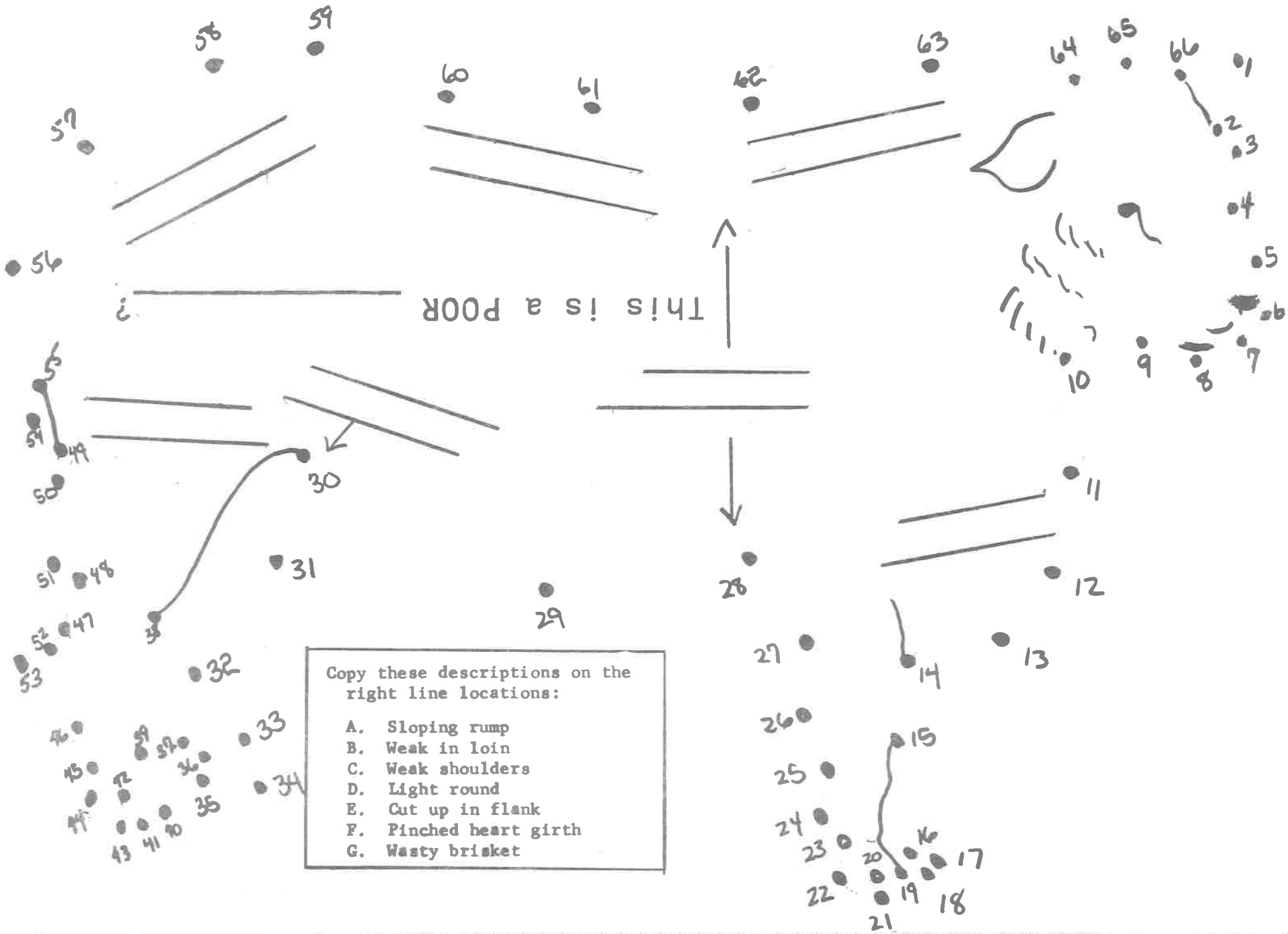


Good

Poor

Back and Loin—The back, loin, and rump should be broad, straight, and uniform in width. An animal with a narrow or weak top (swayback) is objectionable.

Close In The Dots



Copy these descriptions on the right line locations:

A. Sloping rump
B. Weak in loin
C. Weak shoulders
D. Light round
E. Cut up in flank
F. Pinched heart girth
G. Wasty brisket

JUDGING TERMS AND REASONS

BEEF CATTLE TERMS

General Appearance

- More blocky
- Blockier
- Broader
- Lower set
- Smoother individual
- More symmetry
- More symmetrical individual
- More balance
- Straighter topped
- Stronger topped
- More style
- Beefier
- More compact
- Straighter underline
- Typier
- Meatier

Head

- Sweeter head
- More breed character
- Wider head
- Shorter head
- More femininity
- More feminine head
- Plainer
- More masculine head (bulls)
- Steery
- Staggy
- Cleaner cut
- Broader muzzle
- Shorter face
- Wider forehead
- Heavier horn (bulls)

Neck

- Shorter neck
- Throaty
- Thicker neck
- Cleaner throat
- Trimmer throat
- Fuller neck
- Fuller shoulder vein
- Neck blends smoother into shoulder

Shoulders

- Out in shoulders
- Loose shoulders
- Prominent at shoulder point
- More neatly laid-in shoulders
- Open shouldered
- Coarse in shoulders
- Smoother shoulders
- Smoother blending shoulders
- More prominent shoulders
- Rougher shoulders
- Tidier shoulders

Chest

- Wider chest
- More chest width
- Deeper chest
- More chest depth
- Fuller chest
- Larger heart girth
- Stronger constitution
- Shallow in the heart
- More arch of forerib
- More spring of rib
- Fuller in heart girth

Back and Loin

- Wider
- More back width
- Stronger
- Thicker
- Bare over back or loin
- Plumper loin
- Easy in back and loin
- More mellow
- Smoother loin
- More evenly covered back or loin

Ribs and Belly

- More rib spring
- Deeper ribbed
- Closer spaced ribs
- Smoother ribbed
- Thicker, more mellow rib covering
- Narrow shoulder backs
- Poorly covered rib
- Bare over ribs
- Flat ribbed
- Straighter underline

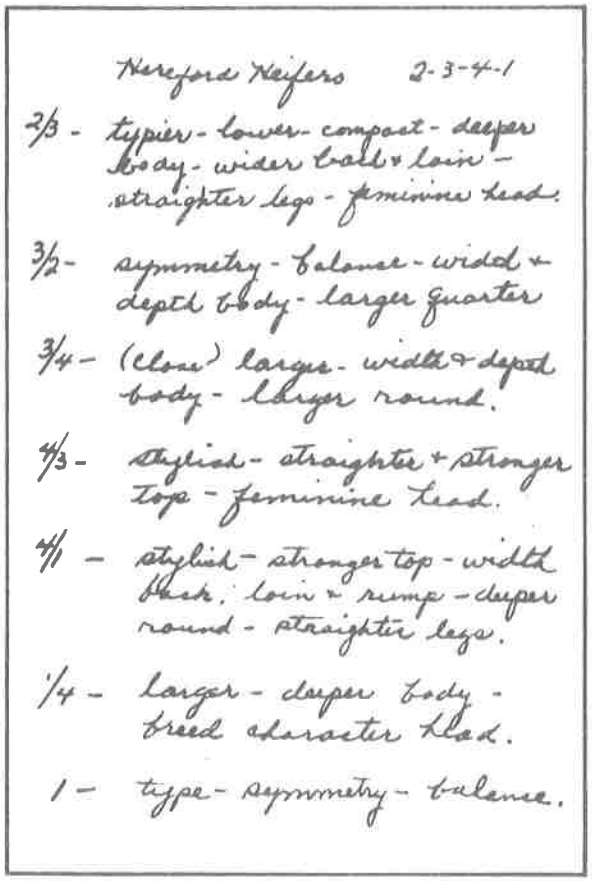
Rump

- Wider
- Squarer at rump
- Droopy rump
- Higher at tail head
- Patchy rump
- More peaked rump
- More prominent tail head
- Pinched rump
- Rough at tail
- More level rump
- Straighter rump
- Fuller rump
- Smoother rump
- Narrow at rump

Quarter or Round

- Deeper
- More bulging round
- Heavier round
- Plumper
- Longer
- Thicker
- Wider
- Larger

How To Make Notes



Organize Your Reasons

First, be sure the judge knows your number in the contest.

You might start off by saying, "I place this class_____
(name of class)

_____."
(your placing, example 1, 2, 3, 4)

You may then introduce the class by saying, "I place No. 1 at the top of the class and over 2 because_____."

Compare the animals, giving the major points first and minor points last.

"I grant 2 over 1_____."
Say this if there is some point or points where 2 excels 1.

Compare each pair in the class in the same way (middle pair and bottom pair). "I place 4 last because_____."
Give reason, but also give credit for good points.

Close your reasons by saying, "For these reasons, I place this class_____
(name of class)

_____."
(your placing–1, 2, 3, 4)

BEEF CATTLE REASONS

I place this class of Hereford heifers 2–3–4–1.

I place 2 over 3 because she is a typier heifer that is lower set and more compact. She is deeper bodied and wider over the back and loin. She stands straighter on her legs and shows more breed character and femininity about her head.

I grant that Number 3 shows more symmetry and balance, being more uniform in her width and depth of body. She has a larger quarter.

I place 3 over 4 in a rather close placing. But I went to Number 3 because she is a larger, more growthy heifer that has more width and depth of body and has a larger, more bulging quarter.

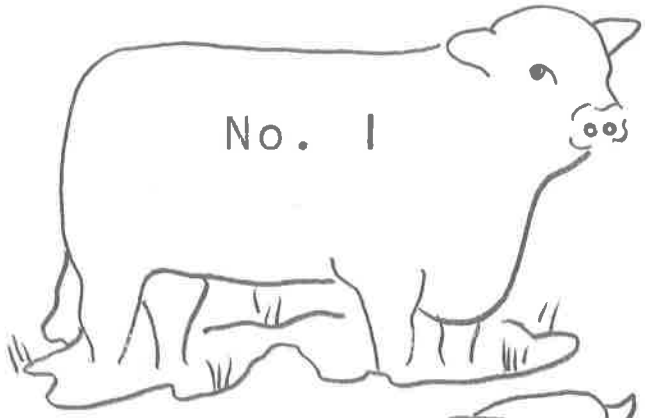
However, Number 4 is a more stylish heifer. She is straighter and stronger in her top and has a more feminine head.

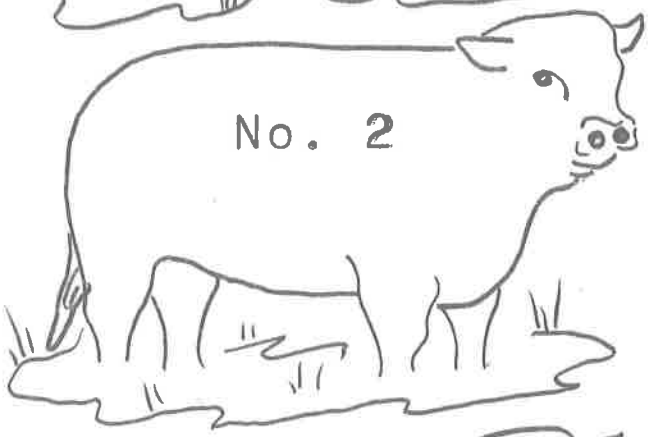
I place 4 over 1 because she is a more stylish heifer. She is stronger in her top line and carries more width over the back, loin, and rump. She has a deeper, more bulging round and stands straighter on her rear legs.

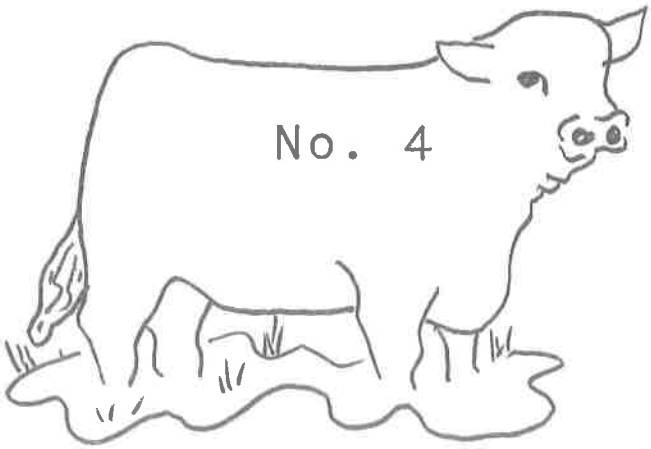
I grant that Number 1 is a larger heifer that is deeper bodied and shows more breed character about the head. I left her last in this class because she lacks the type as well as the symmetry and balance to place higher.

For these reasons I place this class of Hereford heifers 2–3–4–1.

Judge This Class - Fat Steers







Write Some Reason Notes

PLACING:

____1st, ____2nd, ____3rd, ____4th

Practice Reasons Forms

I placed this class of_________________________ ___, ___, ___, ___.

I placed No.______over No.________because. . . . . .

I placed No.______over No.________because. . . . . .

I placed No.______over No.________because. . . . . .

I placed No.______over No.________because. . . . . .

For these reasons, I placed this class of______________ ___, ___, ___, ___.

- -

I placed this class of_______________________ ___, ___, ___, ___.

I placed No.________over No.__________because. . . . .

I placed No.________over No.__________because. . . . .

I placed No.________over No.__________because. . . . .

I placed No.________over No.__________because. . . . .

For these reasons, I placed this class of______________ ___, ___, ___, ___.

ACKNOWLEDGMENTS

This manual was prepared to be used by Glenn County 4-H livestock leaders working with Beef.
1964 Leaders: Jos. L. Hull, Jon Bambauer, George Fry, Melvin Hillis, Bill Corneliussen, Eugene Massa, Neal Beckett, Roy Gollnick, Gilbert Loper, Henry Borjas, Walter Jasper, Jim Mathews, Ina Ogburn, Del Hulsey.

Material was adapted from "4-H LIVESTOCK and DAIRY JUDGING", University of California, Agricultural Extension Service manual.

Prepared by
Ray G. Lyon
Glenn Co. Farm Advisor

February, 1964
400 Copies

EXTENSION SERVICE

FARM ADVISOR WORK
AGRICULTURE CLUB WORK
HOME DEMONSTRATION WORK

U. S. DEPARTMENT OF AGRICULTURE AND UNIVERSITY OF CALIFORNIA
AGRICULTURAL EXTENSION SERVICE

OFFICE OF THE DIRECTOR
COLLEGE OF AGRICULTURE
BERKELEY, CALIFORNIA

SUGGESTIONS FOR 4-H CLUB MEMBERS

FEEDING CATTLE ON PASTURE

W. G. MARDERS[1] and H. T. STRONG[2]

These pictures show what you can expect from the use of range forage and properly fed mixtures. The steers shown above were born during October, November, and December. They were weaned at about 8 months of age (July). While grazing on the range these steers were fed a grain mixture to produce 1 to 1¼ pounds of daily gain from the time of weaning until the quality and quantity of new forage made it unnecessary to continue the feeding of these supplements (February). From this time until May 8, no supplements were fed these steers while grazing on range forage. Following May 8, they continued grazing on native pasture for 65 days, but in addition, were fed an average of 11 pounds daily of a concentrate mixture of rolled barley, ground grain sorghum, and beet pulp.

The picture on the left shows the steers at the beginning of the finishing period. They averaged 794 pounds in weight. In the picture on the right, they are shown 65 days later, just before shipment to market at a weight of 931 pounds. They graded good and dressed 59.2%. The total amount of concentrates fed as a supplement and as a finishing ration averaged between 1,500 and 1,600 pounds per steer. Less concentrates would be required on range lands supplying forage of higher quality and in greater amounts.

Your goal as a cattle feeder is profit. It will be influenced by the price of feeder cattle you buy and the price of fat cattle you send to market. Likewise, your profit will be affected by the cost of feed. Although you have little control over these costs, you can increase your profit by feeding your cattle correctly and with care. Of greatest importance, then, is the wise use of the feed you buy and grow.

Cattle that are being fattened for market resemble a factory. Both produce items that the public will buy. Both must be supplied with raw materials of the right kind and in

[1] 4-H Club Specialist. [2] Extension Animal Husbandman.

proper amounts. In the case of cattle, the raw material is feed. Its first use is to provide nourishment for the body of the animal. After this requirement is met, gains in weight may be expected, depending upon the kind and amount of feed supplied.

Costs of fattening cattle are usually less when gains in weight are made regularly and without interruption. Every pound that is lost must be regained before an additional pound can be added. Loss of weight can be avoided by feeding cattle so they will gain steadily from the time they are started on feed until slaughter condition is reached. This is the application of *the principle of continuous growth.*

Many methods are used to produce cattle. Feed, equipment, and markets determine the method of production as well as the type and grade of cattle marketed. Some go to market as feeder cattle; others are ready for slaughter. Some are fattened on the range, with or without the help of other feeds known as *supplements.* Examples are hay, barley, milo, corn, or cottonseed-oil meals or cake. Other cattle are fattened on irrigated pasture with or without the aid of supplemental feeds. Still others are fattened in dry lot where all feed is supplied by the operator and may consist of hay, grain mixtures, and ensilage. Hence to produce beef profitably, the method of feeding that you use must be suited to your ranch.

Pasture is one of our most important sources of feed for cattle. Some pastures are located in the hills, others are found in the valley areas. Thousands of acres of tillable soils are now used as pastures, on which cattle are grazed. Since pastures are harvested by livestock, the need for mechanical equipment is eliminated and feed costs are reduced.

Feeds produced by pastures vary both in quality and quantity. Fertility of the soil, along with temperature and mosture supplied by rainfall or irrigation, results in the growth of plants of different kinds and amounts. Also affecting the amount of feed produced, is the extent to which pastures are grazed by cattle.

Regardless of the kind of feed furnished by pastures, your cattle will often make better gains in weight if supplements are fed. In fact, supplemental feeds are necessary at certain times during the year if additional pounds are to be gained. At other times, pastures may produce enough forage to make supplemental feeds unnecessary.

You should make plans for the use of feed furnished by pastures well in advance of the time they are to be used. This is particularly important during the fall and winter months. At this time, the forage is less nourishing and the supply is likely to be reduced. Hence, if your cattle are to gain in weight during this time, supplemental feeds will be needed.

THE WINTER FEEDING PERIOD

Throughout a large part of California, the winter range-pasture season starts sometime in the fall, frequently in October or November. These pastures furnish both dry range forage and some green grass. This feed is often lacking in both quantity and quality, and cattle feeding on winter pasture may either lose weight or fail to gain, unless supplemental feeds are used.

When feed supplied by winter pastures is either scanty or lacking in quality, you should use enough supplemental feeds to produce a gain of 1¼ pounds per day. If continued for about 120 days, your cattle may be expected to make a total gain of 150 pounds.

For best results, winter pasture consisting of dry range grass should be supplemented with either cottonseed cake or alfalfa hay. It is usually unnecessary to feed both. The amount of supplemental feed used varies with the size and market grade of feeder cattle and the quantity and quality of the grass on the range. The following is a guide for calves and yearlings when they weigh:

400 pounds, feed 1 pound each of cottonseed cake and barley, or 3 pounds of alfalfa hay per day;

500 pounds, feed 1¼ pounds each of cottonseed cake and barley, or 4 pounds of alfalfa hay per day;

600 pounds, feed 1½ pounds each of cottonseed cake and barley, or 5 pounds of alfalfa hay per day.

Rainfall will start the growth of grass on dry range. This growth is quite high in protein but low in total feed value; hence, a change in the supplemental ration is desired. Additional grain may be necessary to maintain the rate of gain at 1¼ pounds per day. Barley, corn, or milo may be used. The following amounts are suggested rates of increase to the above rations:

1½ pounds per day for cattle weighting 400 pounds when turned onto pasture;

FEEDING CHARTS FOR CATTLE STARTED ON FEED IN D

Table 1.—Estimated Starting Weight of Steer or Heifer*—700 Pounds

Feeding Period by Days	Pounds of Feed per Day		Expected Daily Gain in Pounds	Estimated Gain in Pounds for Period	Estimated Weight End Each Phase of Feeding Period, in Pounds
	Grain Mixture	Hay			
1st–30th	Start by feeding one pound† per day. Increase gradually so the ration consists of 8 pounds† per day by the 20th day. From the 21st to the 30th day feed 9 pounds† per day	Start by feeding 15 pounds per day. Gradually reduce the amount fed to 9 pounds per day by the 20th day. From the 21st day to the 30th day 9 pounds per day probably will be enough	2.1	65	765
31st–60th	Feed 10 pounds† per day. Gradually increase to 11 pounds† per day	9	2.3	70	835
61st–75th	12†	9	2.2	35	870
76th–105th	13†	9	2.3	70	940
Cattle should be ready for market in about 100 days. By this time, cattle started as choice feeders should reach a slaughter grade of good to choice.					
106th–120th	14†	9	2.0	30	970
121st–150th	15†	9	2.0	60	1030
151st–180th	16†	9	1.8	55	1085

* Heifers fatten more quickly at lighter weights than steers. They should be ready for market at weights varying from 750 to 900 pounds.

† This is the total amount of grain that may be eaten in two feedings each day. However, do not feed more than will be eaten in 20 to 30 minutes at the time of each feeding.

Table 2.—Estimated Starting Weig

Feeding Period by Days	Pounds of Feed per Da	
	Grain Mixture	
1st–30th	Start by feeding one pound† per day. Increase gradually so the ration consists of 8 pounds† per day by the 20th day. From the 21st to the 30th day feed 9 pounds† per day.	Start be day. amou day b then 12 pou
31st–60th	Start by feeding 10 pounds† per day. Gradually increase the amount fed to 13 pounds† per day.	
Cattle should be ready for market in about 60 should reach a slaughter grade of good to choice.		
61st–75th	14†	
76th–105th	16†	
106th–150th	17†	

* Heifers just off grass and weighing from 800 to 900 pou dry lot is necessary a feeding period of 30 to 45 days probably

† This is the total amount of grain that will be eaten in t eaten in 20 to 30 minutes at the time of each feeding.

2 pounds per day for cattle weighing 500 pounds when turned onto pasture;

2½ pounds per day for cattle weighing 600 pounds when turned onto pasture.

The amount of supplemental feed fed to cattle on winter range may be reduced as the green feed becomes more mature. Often cattle refuse any feed in addition to the forage when it reaches its most nutritious stage.

In some sections of California, seeded pasture will supply green forage throughout the winter if grown on lands that can be irrigated or in areas which receive enough rainfall during the fall and winter months. During this time, fall-sown barley, oats, or wheat provide an excellent source of green forage. Sometimes alfalfa is used to supply green feed and occasionally rye grass is used. Natural meadows also supply green feed early in the fall in some sections of the state.

Growth of green feed is usually not very great during the coldest part of the winter. Gains in weight cannot be expected without the use of supplemental feeds, Therefore, they should be fed until grass is good in the spring.

THE SPRING FEEDING PERIOD

Green feed supplied by pastures is usually at its best during the spring months. Such feed is highly nutritious, and cattle using it may be expected to make rapid gains without supplemental feeds.

The spring pasture season starts with the growth of green grass. In some areas, pastures furnish plenty of feed for cattle by February. In other parts of the state, the growth of green feed may be delayed until May 1. Regardless of location, weather greatly influences the amount of green feed produced. Although pastures provide an abundant supply of feed in years of ample rainfall, they may not supply very much feed when weather conditions are unfavorable. At such times, supplemental feeds may be necessary if continuous gains are to be made.

Range pastures in California consist largely of annual forage plants that grow each year from seed and furnish a supply of green feed until dried up by warm weather. In some areas perennial grasses make up a large part of the range forage. Perennial grasses grow each year from the roots of the plant and usually stay green longer than the annuals. Therefore, the grazing season is longer for cattle on pastures of this type.

Another type of spring pasture that matures quite early is the fall-sown wheat, oats, or barley. Permanent irrigated pastures are used extensively in the valley areas for spring and summer grazing. Pastures of this type contain a mixture of grasses and legumes; for example, ladino clover, bur clover, alfalfa, rye grass, dallas grass, and orchard grass. Irrigated pastures may be expected to produce large amounts of feed from spring until fall.

Cattle on good spring pasture can gain from 1½ to 2 pounds per day and may gain as much as 180 pounds during the spring pasture season. The total gain is influenced by the number of days that forage is green. It may be expected to last for about 90 days in most areas.

Cattle pastured during the winter and spring should make a total gain of about 300 pounds. Cattle started on feed when they weigh 400, 500, or 600 pounds in the fall, should weigh about 700, 800, or 900 pounds at the end of the grass season in the spring. At this time the heavier, fatter cattle may be sold for slaughter. Others may be turned onto irrigated pasture, or may be fattened in dry lot. If the dry-lot method of feeding is used, tables 1, 2, and 3 may be helpful to you. Each contains suggestions for amounts of hay and grain to feed, along with estimated gains in weight.

Rations which you may use in finishing cattle in dry lot are found in tables 4 and 5. There are many other combinations of feeds that you may use but the suggested rations contain feeds most common in California. Perhaps you have available on your ranch feeds which you may wish to use other than those listed in tables 4 and 5. If necessary, you may purchase additional feeds needed to complete the ration. However, the ration you select should be discussed with your club leader or farm advisor.

FINISHING ON IRRIGATED PASTURES

Irrigated pastures usually furnish green feed throughout the late spring, summer, and fall. Pastures of this type supply feed that cattle like, and on which they may be expected to make rapid gains. Ordinarily, these gains are less costly than those made by cattle being fattened in dry lot because most of the feed is harvested by the cattle.

Gains in weight of cattle feeding on irrigated pasture vary. Both the quantity and quality of the forage and the market grade of feeder cattle affect the rate of gain. When supple-

)RY LOT AT 700, 800, AND 900 POUNDS IN WEIGHT

ht of Steer or Heifer*—800 Pounds

y Hay	Expected Daily Gain in Pounds	Estimated Gain in Pounds for Period	Estimated Weight End Each Phase of Feeding Period, in Pounds
feeding 19 pounds per Gradually reduce the it fed to 12 pounds per y the 16th day. From until the 30th day feed nds per day.	2.1	65	865
12	2.3	70	935

days. By this time, cattle started as choice feeders

12	2.2	35	970
12	2.3	70	1040
10	1.8	55	1095

nds may be in good slaughter condition. If additional feeding in will be long enough for finishing.
wo feedings each day. However, do not feed more than will be

Table 3.—Estimated Starting Weight of Steer*—900 Pounds

Feeding Period by Days	Pounds of Feed per Day: Grain Mixture	Pounds of Feed per Day: Hay	Expected Daily Gain in Pounds	Estimated Gain in Pounds for Period	Estimated Weight End Each Phase of Feeding Period, in Pounds
1st–30th	Start by feeding one pound† per day. Increase gradually to 10 pounds† per day. From the 21st to the 30th day feed 14 pounds† per day	Start by feeding 21 pounds per day. Gradually reduce the amount fed to 14 pounds per day	2.2	65	965

Cattle should be ready for market in about 30 to 45 days. By this time cattle started as choice feeders should reach a slaughter grade of good to choice. Often, cattle may be well enough finished to market at the end of the pasture season without dry-lot feeding.

31st–60th	Start by feeding 15 pounds† per day. Increase to 16 pounds† per day	Start by feeding 14 pounds per day. Gradually reduce to 10 pounds per day	2.3	70	1035
61st–90th	17†	Start by feeding 10 pounds per day. Gradually reduce to 7 pounds per day	1.7	50	1085

* Heifers should be fed so they are suitable for slaughter at 750 to 850 pounds and not to exceed 900 pounds if the best prices are to be obtained.

† This is the total amount of grain that may be eaten in two feedings each day. However, do not feed more than will be eaten in 20 to 30 minutes at the time of each feeding.

Table 4.—Grain Mixture to be Fed with Alfalfa Hay

Ration	Feed	Pounds in Mixture
1.	Barley (ground or rolled)	60
	Dried molasses beet pulp	35
	Cottonseed-oil meal	5
		100
2.	Barley (ground or rolled)	30
	Milo (ground or rolled)	30
	Dried molasses beet pulp	35
	Cottonseed-oil meal	5
		100
3.	Barley (ground or rolled)	60
	Oats	10
	Dried molasses beet pulp	25
	Cottonseed-oil meal	5
		100
4.	Barley (ground or rolled)	50
	Dried molasses beet pulp	30
	Wheat bran	15
	Cottonseed-oil meal	5
		100

When cottonseed-oil meal is expensive compared with other concentrates, it can be omitted from the rations listed above or fed only during the last two or three months when alfalfa hay consumption is reduced.

Table 5.—Grain Mixture to be Fed with Grain or Non-Legume Hay

Ration	Feed	Pounds in Mixture
1.	Barley (ground or rolled)	50
	Dried molasses beet pulp	30
	Cottonseed-oil meal	15
	Alfalfa meal	5
		100
2.	Barley (ground or rolled)	25
	Milo (ground or rolled)	25
	Dried molasses beet pulp	30
	Cottonseed-oil meal	15
	Alfalfa meal	5
		100
3.	Barley (ground or rolled)	50
	Oats	10
	Dried molasses beet pulp	20
	Cottonseed-oil meal	15
	Alfalfa meal	5
		100
4.	Barley (ground or rolled)	50
	Dried molasses beet pulp	20
	Wheat bran	10
	Cottonseed-oil meal	15
	Alfalfa meal	5
		100

Cottonseed-oil meal may be reduced to 10% when cattle reach 700 pounds and are eating 12 pounds or more of concentrates daily. One pound of alfalfa hay daily, fed separately, may be substituted for 5% alfalfa meal. If grain hay or meadow hay has good green color, alfalfa may be omitted. If alfalfa is omitted, add ½ pound of ground limestone or oyster-shell flour to each 100 pounds of mix or provide cattle with free access to a mixture of equal parts of salt and bone meal.

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mental feeds, such as a grain or a grain mixture, are used, the rate of gain usually increases. However, maximum gains are often made on good pasture alone.

Cattle feeding on irrigated pasture without a grain supplement, may be expected to make a gain of 1¼ to 1½ pounds per day. When a grain supplement is fed, they should gain at the rate of 1¾ to 2 pounds per day.

Grain used as a supplemental feed for cattle may be barley, milo, or corn, either fed as a single grain or as a mixture. The grain supplement should be fed at the rate of 1 pound for each 100 pounds of liveweight when cattle are grazing on irrigated pasture. For example, a 700-pound feeder steer or heifer should be fed about 7 pounds of grain per day. About half of the daily grain ration should be fed in the morning and the balance in the evening. All of the grain should be eaten in about 30 minutes after it is fed. As the weight of cattle increases, the amount of grain fed should be increased accordingly.

Cattle weighing 700 pounds or more when turned onto irrigated pasture should be ready for market sometime within 120 days. The length of time required for finishing will depend upon the size of the feeder cattle. Likewise, the slaughter grade that cattle finally reach depends upon the condition and quality of cattle at the start of the feeding period.

For best results, cattle feeding on an irrigated pasture should have dry hay or straw before them. The amount eaten likely will be small, but will provide some variety in the ration and may stimulate the appetite. Furthermore, cattle grazing on green pasture will be less likely to bloat if they have access to some dry feed.

To use irrigated pastures successfully, cattle should have a regular supply of fresh feed. It may be provided by dividing the pasture into small fields, using first one and then the other. This method of handling irrigated pastures may help in reducing the variation in quantity and quality of the forage. Thus, continuous growth is not interrupted and gains in weight may continue at a uniform rate.

RECOMMENDATIONS

1. Use pasture and supplemental feeds to secure low-cost gains in weight.
2. Feed cattle for continuous gains in weight.
3. Use supplemental feeds during periods when pastures fail to supply forage that is lasting in quality and quantity.
4. When cattle are grazing on good pastures and rapid gains are desired, use supplemental feeds.
5. Provide cattle grazing on lush green pastures with some dry feed, either hay or straw.
6. Cattle on pasture should be provided with salt. Block salt placed where cattle can reach it will be simplest for you to use.

These are fancy feeder calves. Best results are secured when they are fed for continuous growth.

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FEED GUIDE FOR GROWING AND FINISHING CATTLE

The authors are Farm Advisors Ervin L. Bramhall and Robert A. Brendler, Ventura County and W. James Clawson, Extension Animal Scientist, Davis.

Efficient use of hay or grain grown on a ranch to grow or fatten cattle depends on balanced rations. A balanced ration is a mixture of feed that supplies each nutrient in the proper proportion. Nutrients include proteins, carbohydrates, fats, minerals, vitamins, and water. Furthermore, for an animal to grow normally or to gain weight efficiently, the amount of feed it can eat in one day must contain enough energy for body maintenance, growth, and weight gain.

For practical purposes, published tables[1/] state daily feed requirements of an animal if we know its weight and age and the amount of gain expected per day. For each weight and class of animal and for the expected gain per day, these tables show 1) how much feed the animal can eat; 2) how much digestible protein is required; and 3) how much total digestible nutrients are needed. Another set of tables states how much feed of each kind will meet these requirements.

The tables in this publication give examples of feed requirements, nutrient contents of feed, and rations formulated from this limited information. With these typical rations, trace mineralized salt blocks should be used to be sure the animals receive their mineral requirements. Clean water should be available at all times and old feed cleaned out periodically.

TABLE 1. Basic Nutrient Requirements per Head per Day.

Weight	Feed Consumed	Growing ($1\frac{1}{2}$ pounds per day gain)		Finishing ($2\frac{1}{2}$ pounds per day gain)	
lb	lb	TDN lb	Digestible Protein lb	TDN lb	Digestible Protein lb
300	9	4.6	0.84	----	----
400	12	5.6	0.90	----	----
500	15	6.6	0.96	----	----
600	16	7.6	1.01	10.6	1.41
700	17	8.5	1.06	11.9	1.46
800	22	---	----	13.1	1.51
900	24	---	----	14.3	1.56
1000	26	---	----	15.5	1.60
1100	28	---	----	16.7	1.65

[1/] Morrison, S. R. et al., Feeds and Feeding, 22nd Edition 1958, Morrison Publishing Co., Ithaca, N.Y. "Nutrient Requirements of Beef Cattle," National Research Council, 4th Edition, 1970.

ONE-SHEET ANSWERS
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TABLE 2. Common Feed Composition.

Feed	TDN (lb/cwt or %)	Digestible Protein (lb/cwt or %)
Alfalfa hay	52	10.8
Almond hulls	66	0.4
Alfalfa silage	20	1.1
Barley, rolled or ground	74	9.2
Barley straw	36	0.5
Beet pulp	68	6.0
Corn, No. 2 dent, ground	81	6.7
Cottonseed meal, 41% protein	68	33.2
Molasses	62	----
Oats, rolled or ground	72	7.0
Oat hay	54	3.9
Sudan hay	50	4.3
Urea	--	210.9
Wheat, rolled or ground	78	7.7

TABLE 3. Typical Rations Meeting Requirements.

Growing 300-400 lb	8 lb Alfalfa hay 2 lb Barley 10 lb	3 lb Alfalfa hay 6 lb Sudan hay 1 lb Corn 10 lb	4 lb Oat hay 2 lb Cottonseed meal 3 lb Almond hulls 9 lb*
Growing 500-600 lb	10 lb Alfalfa hay 2 lb Wheat 4 lb Barley straw 16 lb	8 lb Alfalfa hay 20 lb Corn silage (7 lb Dry matter) 28 lb (15 lb D.M.)	7 lb Sudan hay 4 lb Almond hulls 2 lb Cottonseed meal 2 lb Molasses 15 lb*
Finishing 700-800 lb	8 lb Alfalfa hay 12 lb Barley 20 lb	6 lb Oat hay 10 lb Corn 2 lb Cottonseed meal 2 lb Beet pulp 20 lb*	3 lb Alfalfa hay 3 lb Barley straw 7 lb Wheat 5 lb Barley 1 lb Molasses-urea mix 19 lb*
Finishing 900-1000 lb	6 lb Alfalfa hay 6 lb Oats 8 lb Corn 2 lb Beet pulp 22 lb	7 lb Alfalfa hay 2 lb Oat hay 7 lb Barley 8 lb Corn 1 lb Molasses 25 lb	2 lb Alfalfa hay 2 lb Sudan hay 2 lb Beet pulp 16 lb Barley 22 lb*

*Use trace mineralized salt, free choice.

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BEEF CATTLE TERMS

Finish terms - Positive comparative

1. Correctly-finished steer
2. Neater, trimmer-middled steer
3. A higher-dressing steer
4. Cleaner and neater in the brisket
5. Cleaner over the loin edge
6. Firmer, harder-finished calf
7. More uniformily and correctly finished
8. Neater in the flank

Finish terms - Negative descriptive

1. Wasty, overfinished steer
2. Rough over the edge of the loin
3. Soft in his finish
4. Underfinished
5. A lightly-finished steer that wouldn't grade
6. Heavy-middled
7. Wasty in the brisket, heavy-fronted
8. Patchy at the tailhead

Muscling terms - Positive comparative

1. Heavier-muscled
2. Meatier hindquarter
3. Greater natural thickness over the top
4. Thicker, neater loin
5. Greater total dimension of round
6. Thicker, meatier-rumped steer
7. More muscular over the crops and loin
8. Longer-hipped, longer-rumped, longer from hooks to pins
9. Wider at the stifle
10. Longer through the stifle region
11. More bulging in the round
12. More bulging hindquarter
13. Fuller in the forearm
14. Stronger-topped
15. Deeper-quartered

Muscling terms - Negative descriptive

1. Lighter-quartered
2. Flat round
3. Light Muscled
4. Short rumped
5. Narrow over the top; narrow loin
6. Narrow at the stifle
7. Flat ribbed
8. Shallow twist
9. Narrow at the pins

BEEF CATTLE TERMS, cont.

Type and structure terms - Positive comparative

1. Straighter-lined, straighter-topped
2. Nicer-balanced
3. Tighter-framed
4. Taller, growthier
5. More upstanding
6. Longer-bodied
7. Longer in the hindquarter
8. More spring of rib
9. Stands more correctly on feet and legs
10. More correct in his leg placement
11. Greater proportion of his weight in the hindquarter
12. Leveler rump
13. Straighter from hooks to pins
14. More uniform in thickness from end to end
15. Stands wider front and rear
16. Greater width at the chest floor

Type and structure terms - Negative descriptive

1. Slack-framed, loosely-made
2. Uneven over the top; rough-topped
3. Short-legged, dumpy kind
4. Short-hipped
5. Short-bodied
6. Tight-wound
7. Flat-ribbed
8. Coarse-shouldered
9. Coarse-fronted
10. Stands: cow-hocked, sickled-hocked, close in front, narrow
11. Toes in or toes out
12. Lacks balance and is heavy in the forequarter

BREEDING CATTLE TERMS

Positive - Comparative

1. More rugged
2. Heavier-boned
3. Breedier-headed
4. More feminine head
5. Broodier
6. Burlier, more masculine
7. Stronger-headed
8. More (breed name) character
9. More attractive head (must then state why)

BREEDING CATTLE TERMS, cont.

Negative - Descriptive terms

1. Plainer-headed; weak-headed
2. Coarse-headed
3. Lacks breed character about the head
4. Light-boned
5. Lacks ruggedness; too refined
6. Lacks constitution
7. Walks narrow

CARCASS TERMS

Positive comparative

1. More shapely carcass
2. Meatier carcass
3. Higher yield of retail cuts
4. Would require less trim
5. Higher percent round and loin
6. A thicker, meatier carcass

Negative descriptive

1. A narrow carcass
2. Low-cutting carcass
3. Would require excessive trim
4. A wasty carcass
5. Heavy chuck
6. A long, tapered round

GENERAL TERMS FOR BREEDING AND SLAUGHTER CATTLE

Comparative Terms	Criticisms
Typier	Off type
Heavier muscled (meatier)	Light muscled
Thicker (beefier)	Narrow
Higher quality	Coarse; Low quality
More nicely balanced	Poorly balanced
More stylish	Plain
Smoother	Rough
Deeper body	Shallow body
Deeper rib	Shallow rib
Deeper flank	Shallow flank; Cut up in the flank
Shorter neck	Long neck
Wider (thicker) top	Narrow top
Greater spring of rib	Narrow forerib
Fuller behind the shoulders	Narrow behind the shoulders
Wider (thicker) back	Narrow back
Thicker (wider) loin	Narrow Loin
Thicker (wider, fuller) rump	Narrow rump
Longer rump	Short rump
More level rump--Drooping rump	Sloping rump
Deeper quarter	Shallow quarter; Light muscled quarter
Thicker quarter	Narrow quarter
More bulging quarter	Flat quarter
Smoother handling	Rough handling
Thinner hide	Thick hide; Heavy hide
Smooth shoulders	Rough (coarse) shoulders
Smoother top	Rough top
Smoother hooks	Hooky; Rough hooks; Out at the hooks
Smoother tail head	Rough tail head

STEER TERMS

Comparative Terms	Criticisms
Trimmer finished	Over-done, excessively finished, too fat
Fatter (higher finished)	Thin; Under-finished
More uniformly covered (finished)	Patchy; Rough handling
Firmer finished	Soft finish
More finished over the loin (rump, back, ribs)	Bare over the loin (rump, back, ribs)
Would yield (dress) high	Wasty; Would yield low
Trimmer middled	Wasty middle, heavy middle
Trimmer (neater) fronted	Wasty fronted
Trimmer (neater) brisket	Wasty brisket
More quality (refinement) of:	
Head	Coarse head
Hide	Heavy hide; Thick hide
Would hang up a:	
Thicker carcass	Narrow carcass
Meatier carcass	Thin, light muscled carcass
More shapely carcass	Long, narrow carcass
Neater carcass	Wasty carcass

BREEDING CATTLE TERMS

More (Angus, Hereford, Shorthorn) breed character about the head	Lacks breed character about the head
Breedier head	Plain head
Shorter head	Long head
Wider muzzle; Wider head	Narrow muzzle; Narrow head
More feminine head	Coarse head
Strong head (especially bulls)	Weak head

over

PHRASES USED IN LIVESTOCK JUDGING

Beef

1. Breedier-headed bull wider at the muzzle with a greater distance between the eyes.
2. A stronger, more masculine-headed bull.
3. A larger-framed, growthier, more-rugged...
4. Stronger in his constitution wider in his chest floor, larger in the heart girth with a greater spring of forerib.
5. An easier, free-walking bull.
6. A more structurally-correct bull, not sickle-hocked at 2.
7. A more stylish, higher-quality, breedier-headed bull.
8. A weak, plain-headed...
9. Off-type, slack-framed, poorly-balanced bull.
10. Has more breed character and femininity about her head.
11. Has a deeper, more-bulging round and stands straighter on her rear legs.
12. Stronger in her top line and carries more natural muscling over the back, loin, and rump.
13. A growthy heifer that has more natural thickness, length of body, and has a larger, more-bulging round.
14. A heavier-muscled, more shapely, meatier steer.
15. ...that should hang up a meatier, more-shapely, heavier-muscled carcass with more natural thickness through the rump and loin, and a deeper, thicker, more-bulging quarter with especially more thickness through the stifle.
16. A more modern, upstanding, longer-bodied, trimmer-middled steer that should hang up a trimmer, more-shapely carcass.
17. A more symmetrical, nicer-balanced, tighter-framed, stronger-topped, and leveler-rumped steer.
18. ...carrying through more evenly from front to rear.
19. Strong and masculine about the head and neck denoting breed character.
20. An upstanding, thick, rugged bull with an excellent spring of ribs.
21. An attractive-headed, short-necked bull with good width.
22. A narrow-faced bull.
23. A wide chest with plenty of depth in the foreribs and hearthgirth.

STEER TERMS

1. A low-set, short-bodied, tight-wound steer, old fashion in his kind, that has too much bark over the rib, back and loin.

2. A cleaner-fronted steer that was harder, firmer and more correct in his finish over the rib, back and loin, and should hang a trimmer carcass that would yield a higher percentage of high-quality retail product than any other steer in the class.

3. A cleaner-made, tighter and trimmer-middled, cleaner-fronted steer, that should hang a carcass yielding a lesser percent waste and a larger percent red meat and muscle and still kill in the Choice grade.

4. He should hang a meatier, trimmer, more shapely carcass that will yield a higher percent of high-quality retail product than any other steer in the class.

5. Should hang up a more desirable carcass, yielding a minimum waste and a maximum of red meat and muscle.

6. An over-finished steer that was wasty about the forerib, brisket and tail head.

7. A higher-yielding, high grading steer that should yield the most desirable carcass.

8. Will yield an over-finished, wasty carcass with an excess amount of back and internal fat.

9. A firmer handling, smoother-covered steer that was cleaner in the forerib and loin edge.

10. A deep-bodied, over-finished, soft-handling steer.

BALANCING BEEF CATTLE RATIONS WORKSHEET

Animal_____ Weight _____ Daily Gain _____

Section 1 — Composition of Home-Grown Feeds

FEED	Dry matter	Total protein %	T. D. N. %	Calcium %	Phosphorus %	Vit. A equivalent IU

Section 2 — Quantity of Nutrients in the Feeds

FEED	Lbs. fed (air-dry basis)	Protein (total) lbs.	T. D. N. lbs.	Calcium gm.	Phosphorus gm.	Vitamin A I. U.
TOTAL						

Section 3 — Daily Nutrient Requirements

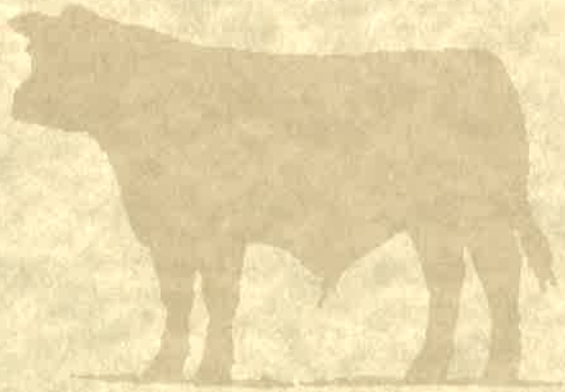
(Based on air-dry feed containing 90 percent dry matter)

Daily feed	Lbs. fed	Protein (total) lbs.	T. D. N. lbs.	Calcium gm.	Phosphorus gm.	Vitamin A I. U.

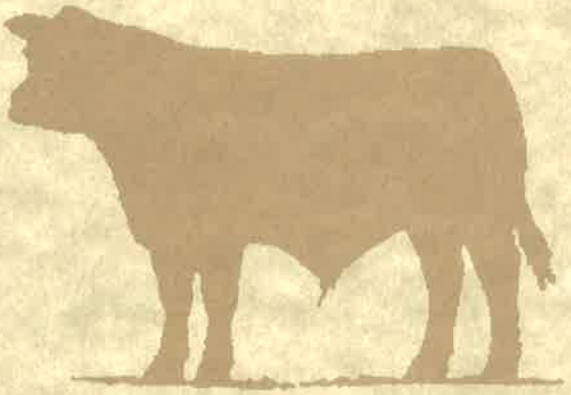
Section 4 — Balancing the Ration and Meeting the Requirements

Total from Section 2						
Ration deficiency						
Supplement						
Balanced ration						

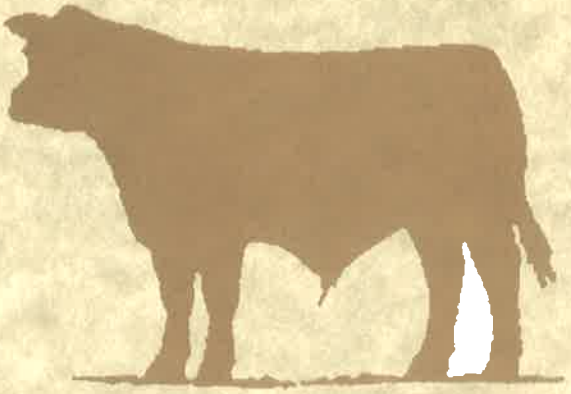
Animal Care Series:



BEEF



CARE PRACTICES



Beef and Range Workgroup
University of California ♦ Cooperative Extension

FOREWORD

Beef Care Practices is one of a series of publications addressing the issue of animal care relating to food animal production in California. This publication is the result of a joint effort between the University of California Cooperative Extension, beef industry representatives, and members of the Beef and Range Workgroup.

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The information in this publication is valid as reference material until June 30, 1996, unless revisions are necessary at an earlier date.

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INTRODUCTION

An ethically acceptable level of cattle well-being is not limited to one set of husbandry practices. Rather, it may exist over a wide range of conditions provided in a variety of beef production systems.

Science has not produced the answers required to understand all the basic needs of cattle. Continued research is needed to provide additional information. Currently, we must base animal care on past research and decades of practical experience.

This publication was written to assist and foster the understanding of factors affecting the well-being of cattle. Information presented is based on published data, scientific principles, expert opinion and experience with the methods and practices for the safe, humane, and efficient production of beef in California.

The goal of this publication is not to set forth or suggest specific guidelines for production practices but rather explain why, when and how these practices are used in the complex beef production systems found in California. To best describe management practices it is also necessary to describe factors which influence their use. These include an understanding of the regions in the state where cattle are produced, the types of beef production systems, and a basic knowledge of animal science as it relates to beef cattle.

THE BEEF CATTLE INDUSTRY IN CALIFORNIA

Beef production practices in California are influenced by the region where the production occurs and the type of operation involved. Production practices also are influenced by the breed, nutritional requirements, reproductive status, and behavioral characteristics of cattle.

California is the second largest state in the contiguous United States and probably the most geographically diverse. It also contains both the highest and lowest elevations of the contiguous United States. California's climate varies from Del Norte County's cool temperatures and 80 to 100-inch annual precipitation, to Imperial County's 2 to 4-inch rainfall and hot 114°F summer days. This geographic diversity, along with its climatic and environmental conditions, has resulted in the development of a complex livestock production industry.

California has more than 100 million acres of land. Approximately 40 million acres are range and pasture lands. The rangelands of California are classified as Mediterranean, desert, and intermountain. They are among the most productive in the West. The predominant range type is Mediterranean annual rangelands.

They encompass all the Central Valley and the coastal and foothill ranges. Annual range production in these regions is seasonal, but grazing of green or dry forage occurs throughout the year. In comparison, the Mediterranean grasslands of the North Coast are unique because forage production spans a longer growing season because of increased rainfall and moderate climate.

The desert rangelands are located mainly in the southern region of the state. A mixture of annual vegetation, perennial grasses and shrubs is the primary forage supply on the desert range. Winter and spring rains support annual plants and grasses; however, rainfall can be erratic and shrubs supply feed for livestock during dryer periods.

The intermountain ranges are located in the northern and eastern portions of the state. Winter dormancy and spring-summer growth dictate a different livestock management scenario for forage utilization on these rangelands. Cattle may graze the lower elevation forage in the spring and then be moved to higher elevation pasture during the summer. Generally, forage needs to be harvested and stored during the summer for winter feeding. In the fall, cattle may graze crop residue, residual rangeland or pasture forage. Cattle may be fed hay or transported out of the region during the winter.

TYPES OF CATTLE OPERATIONS

An important commodity in California, beef cattle are produced in all but one county. Nationally, the 1991 inventory of cattle and calves in the state ranked fifth among all states. There are four types of beef cattle operations throughout California: cow-calf, seedstock, stocker, and feedlot.

A ***cow-calf*** operation maintains a breeding herd of cows, replacement heifers and bulls. Steer calves and most heifer calves are sold, but some heifers are selected to enter the breeding herd. Calves are sold at weaning or are retained as stockers. Climatic and management conditions dictate different calving seasons in different regions.

Seedstock production is a specialized cow-calf operation sometimes referred to as producing purebred or registered cattle. The goal of seedstock production is to make genetic improvements in cattle that benefit the entire beef industry. Improvements in purebred cattle are documented through the extensive recording systems maintained by both the producer and breed organizations. Seedstock are marketed as herd sires and replacement females to other seedstock producers or to cow-calf producers.

Stocker operations grow steer and/or heifer calves or yearlings on rangeland or other roughages. Generally, the cattle are purchased following weaning in the fall and are wintered on low quality feed until new grass can nutritionally support the animals. The beginning of the grazing season varies with location, rainfall and temperature. Stocker cattle are normally marketed or transported to feedlots at the end of the grazing season when the nutritional quality of the forage starts to decline.

Feedlots use facilities designed to confine large numbers cattle. The feedlots are designed to meet the feed, water and care required of cattle held in confinement.

Beef fed solely roughage feeds could take years to reach market weight. Land resources in the United States are insufficient for a forage-based beef supply at the present level of consumer demand. With the vast amount of feed grains and by-products available in this country, feedlots efficiently feed large numbers of cattle. Higher energy rations greatly reduce the time required to reach market weights. By feeding cattle in feedlots, finished cattle weighing 1,050 to 1,150 pounds can be marketed at 18 to 24 months of age.

BREEDS OF CATTLE

There are 275 recognized cattle breeds in the world. There are more than 40 breeds in California, including the major dairy cattle breeds. Five to 10 breeds dominate beef production. In the case of seedstock and cow-calf producers, breeds may be introduced into herds by artificial insemination.

Breeds differ in many characteristics. Simple observable traits may include hair and skin color or the presence or absence of horns (polled). Differences in production traits such as reproductive performance, growth rate, milk production, disease resistance and carcass merit also occur within breeds as well as between breeds.

Most cattle produced in California are crossbred to combine or match desirable characteristics from two or more breeds. Crossbreeding may be used to develop animals with characteristics for optimum production in a particular region.

Selection of a breed or breeds is based on many factors, including the environment where the production occurs, breed characteristics, labor resources, market demand and personal preference.

NUTRITION

Because of physiological processes unique to ruminants, cattle readily consume and receive adequate nutrition from feedstuffs unsuitable for many other types of animals. The Food and Agricultural Organization of the United Nations estimates that more than 65 percent of the world's land mass cannot be farmed and can only be harvested by ruminant animals. Beef cattle are capable of utilizing numerous by-products produced in the processing of agricultural products for human consumption. Examples include beet pulp from sugar production, citrus pulp after juice extraction, and milling commodities from the production of flour.

Adequate feed quantity and quality are required for body maintenance and growth. However, cattle adapt to periodic over or under availability of feedstuffs. During periods of inadequate nutrition, some body functions may be adversely affected, but with the resumption of an adequate feed intake, normal conditions can be restored.

Required nutrients

Numerous dietary components or elements are essential in the diet of beef cattle. These components include water, energy, nitrogen, minerals and fiber. Bulletins produced by the National Research Council are generally accepted as nutritional guidelines. These are periodically updated and are reliable references.

Minerals required in cattle rations include calcium, phosphorus, cobalt, copper, iodine, iron, magnesium, manganese, molybdenum, potassium, selenium, sodium and chlorine. Other elements have been suggested as essential but little scientific data is currently available for cattle.

Interactions between minerals further complicate requirement levels in cattle diets. Additionally, some minerals should not be fed above certain levels. Federal and state regulations apply to some of these minerals.

Vitamins required by cattle may be supplied in feedstuffs, or may be synthesized in tissues and by microorganisms in the rumen. Vitamins B and K are produced in the rumen soon after solid feed is introduced in the diet. Vitamin D is synthesized when the animals are exposed to sunlight and is also found in sun-cured forages. High quality forages also contain large amounts of vitamin A precursors and vitamin E. Vitamin A is the only vitamin likely to be of practical importance in the diets of cattle.

There have been numerous attempts to establish objective, numerical standards for normal compounds or chemicals in the body (metabolic profiles) that could be used to evaluate an animal's nutritional status. Many constituents found in the circulatory system have been measured and data published indicating averages and ranges. There is little evidence, however relating this data to an animal's performance or nutritional well-being. For example, different feeding regimes influence protein levels in blood (serum), but changes are subtle and difficult to detect and interpret.

BEHAVIOR

The observation and assessment of behavior patterns in cattle is important in determining health, minimizing stressful or painful situations, assisting in the improvement of production practices, and providing for the well-being of individual animals. Understanding and recognizing cattle behavior is critical in the proper design of livestock facilities, during transportation, and during procedures involving the interaction of handlers and animals.

Senses

The basic senses help cattle perceive their environment or situation and provide information that governs their subsequent reaction. Cattle have nearly a 360° field of vision. This is an important consideration when approaching cattle. Cattle possess relatively poor depth perception; however, they can distinguish between most colors. They easily detect motion and rely on their vision for identifying herd mates or receiving signals provided by different body postures. In cattle, positions and motions of the head and body can indicate alarm, threat or submission.

Cattle can move their ears to improve the acuity of hearing. An unexpected or sudden loud noise may startle animals and this is an important consideration when handling or confining cattle. Information on possible threats or identification of an approaching animal can be communicated between animals by vocalizations and hearing. Smell and taste are significant in determining feed preferences, indicating the reproductive status of females, identifying territory, and bonding between a cow and her calf. Tactile or touching stimulation may convey signals of heat, cold, pressure, or pain that will signal the central nervous system to evoke appropriate physiological and behavior changes. Cattle may change or alter their posture to conserve or avoid heat, while pain can result in the animal fleeing its immediate environment.

Types of behavior

Instinct or innate behaviors have evolved so animals can survive and reproduce given an appropriate environment. Examples of innate behavior include the receptive stance of a female at mating or the initial nursing behavior of a newborn calf.

Behaviors resulting from previous experience are learned behaviors. Learned behavior requires the animal to use its memory and store information over time. Cattle walking to the feed bunk at the sound of a tractor is a learned behavior. A behavior also can be altered as an animal becomes

accustomed to a harmless stimulus, such as a calf showing little or no behavioral response to a noisy tractor. Some behaviors can be changed; others, such as sexual behaviors, are more difficult to alter.

Daily behavior types

Cattle exhibit daily behavior cycles, especially for resting, grazing and ruminating. These daily patterns may be dependent on the light-dark cycle, dietary components, age of animal, temperature and other stimuli. Cattle spend a variable amount of time eating, depending on their diet and its availability. Cattle grazing on pasture spend a large portion of time eating, whereas cattle fed a concentrated diet spend relatively less time eating. Most eating occurs during two periods of the day, just after dawn and before dusk. Cattle spend about 20 episodes each day in a drowsy or sleep state that may total 7 to 8 hours of rest.

There may be an internal motivation for exploration that depends on the animal's age, weight and sex. This involves using their senses along with locomotion skills. Cattle seek to explore changes in the immediate environment and will also closely investigate novel objects.

Grooming is performed by individuals and within groups. Often two animals will engage in mutual grooming. Cattle stand in proximity to each other and switch their tails to counter fly disturbance. They will also alter their lying position to protect sensitive skin areas from flies.

Social grouping and spatial relationships are important management considerations especially in confinement systems. Cattle are social animals. Dominance or the "pecking order" determines the hierarchy within animal herds. Dominance is a learned and predictable relationship between a pair of animals, where one is consistently submissive to the other. In cattle, dominance is probably determined within 24 hours of grouping and may be related to age, sex, weight and breed of the individual animals. Aggressive behaviors are often exhibited following regrouping or the introduction of additional herd members. Regrouping younger animals produces less aggression and fighting than does regrouping older animals. This is particularly true with bulls. Dominance displays become more pronounced when there is limited access to resting areas, feed and water. Dominance order is not permanent and may change depending on the age, health or production status of the herd members.

Production losses can occur if space is not adequate for proper social spacing of each animal. Many variables influence social space. Included are floor type, water availability, feeder space, pen mates, sickness, pen shape, kinship among pen mates and environmental factors such as fly prevalence, shade availability and temperature.

Cattle possess a natural following tendency. This is especially evident when a herd is threatened or aroused. Following behavior may be dependent on the animal's ability to maintain visual contact with other animals. The flight zone of an animal may determine how close a handler can approach an animal. The flight zone is an area surrounding an individual and moves with the animal. Both following behavior and flight zone are important considerations to minimize stress while handling and moving animals or designing facilities. It is usually less stressful to move cattle in small groups than individually.

STRESS AND PAIN

A major concern to everyone involved in animal production relates to practices or conditions that may result in stress and/or pain to the animal. An animal is stressed if it is required to make abnormal or extreme adjustments in its physiology or behavior to cope with adverse effects of its environment or management. Identifying and minimizing stressful situations in livestock production allows for greater reproductive efficiency, growth, and well-being of the animal as well as economic benefits for the producer and consumer.

Stress from the environmental and management aspects of beef cattle production can be classified into four broad categories: thermal, physical, disease, behavioral. The stress described in one category may also manifest itself by creating additional stress in another form.

Thermal Stress

Factors include temperature (heat or cold), humidity, wind, and solar radiation. Cold stress can affect younger or sick animals more severely than mature, healthy cattle. Heat stress can affect lactating and heavier feedlot cattle more than lighter, younger cattle. Certain breeds of cattle are more capable than others of acclimating to cold or hot climates.

Physical Stress

The physical component of an animal's environment includes the space available and the surfaces with which the animal comes into contact.

Disease Stress

This stress is that which results from the onset and spread of disease.

Behavioral Stress

This stress includes those factors which affect normal behavior of the animal. Adequate areas should be provided for activities such as feeding, sleeping or lying, and grooming.

There is no practical, reliable method other than observation to evaluate stress. Short-term stress can increase heart rate, respiration and blood pressure. Long-term stress may induce changes in immunological response and/or hormonal secretions. Stress may also be quantified by studying behavioral adaptations to a specific stressor. Research suggests some methods may be developed to measure stress, but to date these remain to be verified in field conditions.

While difficult to quantify, there are observable indicators of stress. Cattle can be considered undergoing stress when they show one or more of the following signs:

- Lack of appetite
- Abnormal posture
- Restlessness
- Elevated respiration rate
- Lameness or alteration of gait
- Dull or depressed attitude
- Grunting or other unusual vocalizations
- Lack of grooming
- Self isolation from the herd or pen mates.

Pain and stress are different. Perceived pain by an animal is initiated by stimuli transmitting information to the central nervous system via receptors located in the skin, muscles, viscera, or joints. The animal then responds by physiological and behavioral changes similar to those exhibited during stressful situations. However, pain symptoms are often more acute or have a sudden onset.

There are practices used in beef production (e.g., vaccination, branding, dehorning, castration) which can be short term stressors and may also be painful. Other management practices such as gathering cattle to move to new pastures, separating calves from their dams during processing or weaning, and the sorting by age and or sex may also cause short-term stress. Some tools, such as restraints used to perform production practices, create short-term stress but provide a safer environment for both the cattle and livestock personnel.

Although they cause stress over a short period, these practices are beneficial stressors. They provide long-term health and management benefits to individual animals and their herd or pen mates by alleviating long-term stress from injury, disease or nutritional factors. In their management plan, beef producers must consider how to manage stress using practices that may be short-term stressors to improve the long-term well-being of their animals.

CARE AND MANAGEMENT PRACTICES

Feeding Practices

On rangeland, cattle consume a varied diet that may include grasses, legumes, forbs, and brush (browse). Often range situations appear to provide insufficient feed or variable feed quality for cattle. Height of forage alone is not a good indicator of forage quality and the nutritional status of grazing cattle. As plants mature, their nutritional quality for the grazing animal decreases. However, as forage quantity increases the total nutrients available to the animal may increase. Recognition of the possible varied diet of the grazing animal and consideration of the evaluation methods previously discussed will guide the trained observer in assessing nutritional adequacy of beef cattle on range.

Producers should strive to reduce periods of inadequate nutrition through either supplementation or moving the cattle to another location where feed is available. However, cattle can cope with temporary periods of undernutrition. Without intervention by man, beef cattle and wild ruminant animals undergo periods of poor nutrition and body condition. Younger cattle are more susceptible than older cattle to inadequate feed. During periods when feed may be inadequate, efforts to provide adequate nutrition should focus on the needs of younger cattle. Such periods can occur during drought, extreme snowfall, flooding or in other situations beyond human control.

Body condition and the ability to mobilize reserves for periods of inadequate nutrition should be assessed. Body condition affects certain body functions. The ability to sustain such functions as growth and reproduction can be related to the animal's well-being. Attainment of specific body reserves or condition could be used as a guideline to animal nutritional well-being and potential for life cycle activities. Scoring systems have been developed to estimate body condition.

Regular feed intake enhances body functions such as lactation, but cattle can withstand some irregularity in feeding frequency without long-term harm. Water of suitable quantity and quality should always be available to cattle. During hot or extremely cold weather when the possibility of water shortage exits, the water supply should be checked and be available at least once and preferably twice daily. Time necessary for drinking will vary with the number of animals and the accessibility of water. Water

requirements depend on type of feed consumed, temperature, humidity and stage and type of production. Guidelines are available but should be used with considerable judgment since water requirements may range from 4 to 45 gallons per day per animal.

Supplemental feeds can increase nutrition when nutrient deficiencies exist in range forage. Numerous supplemental feeding methods use various products and management strategies. At times, feeding a minimal amount of concentrated protein, energy, and/or mineral supplements may correct nutrient deficiencies in the forage. In other situations, hay may be fed to meet the animal's needs.

Feed and water should be provided in a manner that promotes cleanliness and minimizes health problems. Anticipation and the prevention of adverse feeding conditions from manure contamination, spoiled feed, mud or dust that could compromise the health of the animal is needed when providing supplemental feed.

Occasionally a calf may need supplementation because it is orphaned or is not receiving enough milk from its dam. This supplementation will differ from that of an adult animal because the calf's rumen is much less developed. A young calf cannot utilize roughages or other dry feeds fed to more mature cattle. Liquid milk replacers can be fed to meet the nutrient requirements of a calf. If the calf is a newborn, care should be given to assure it has received colostrum during the first hours after birth.

In California, calves or stocker cattle typically remain on rangelands or pastures until they weigh 600 to 700 pounds. As feeders they enter feedlots for 120 to 150 days to reach a market weight of 1,150 to 1,250 pounds. Feedlots in the desert regions of the state can receive cattle weighing 300 to 450 pounds. These animals which are fed for 240 to 270 days to reach a market weight of 1,050 pounds.

In California feedlots, cattle are fed high energy diets of feed grains and by-products. High energy feeds increase daily weight gains and feed efficiency, reducing the number of days cattle require to reach market weight.

Unlike the range or pasture situation where forage changes in quality and quantity over time, the nutrient intake of animals in feedlots is controlled and nutritional stress is minimized. Feedlot managers should have a quality assurance program to ensure that feeds used in their rations are of adequate feeding quality. The supplier of these feeds should also have a quality assurance program to satisfy the needs of the feedlot for residue-free feedstuffs which meet the Food and Drug Administration (FDA), Environmental Protection Agency (EPA), and state regulations regarding pesticide tolerance in animal feeds. The program should also include a method that records

feed quality being used by the feedlot. It should also maintain records of all feed additives used by the feedlot. These records should be kept for at least three months after the cattle are sent to slaughter.

By-product feeds

California's vast and varied agricultural production system produces large quantities of agricultural by-products. These by-products, often from the processing of human foodstuffs, pose problems in disposal, may contribute to higher prices for the primary product and are often unwanted. However, many of these by-products can provide nutrients needed by beef cattle. Numerous regulations ensure the safe use of agricultural by-products as feed for cattle.

Feed additives

Feed additives for the livestock feeding industry have been used in the United States for more than 30 years. Antibiotics may be fed to provide therapeutic and subtherapeutic protection from disease. These feed additives aid in reducing digestive disturbances that may result from feeding high energy feeds to cattle. The subtherapeutic levels of antibiotics used in cattle feed can increase weight gain and biological efficiency of the animal. The FDA regulates both the type and amount of antibiotics fed to cattle. Research indicates that when antibiotics are used in concurrence with FDA standards, they are not found in beef products.

Ionophores are another class of feed additives used primarily in feedlots. Since ionophores are not absorbed by the animal but act within the rumen to enhance digestion, residues from these products are not found in the carcass. When fed, ionophores are used in very minute amounts, only grams per ton of feed. As with all feed additives, the use of ionophores in cattle feed is regulated by the FDA.

Animal Health Practices

As with other living organisms, morbidity and mortality also occurs in cattle. During the production year in California, the mortality for cattle operations ranges from 1-3%.

A combination of factors involving cattle susceptibility, the environment and the presence of a disease agent is necessary for disease to occur. Producers need to manage their animals to reduce or prevent the incidence of disease. If disease should occur, they must consider how to treat the animal.

A herd health program that addresses the prevention and treatment of disease depends on the type of beef cattle operation it is designed to serve. There will be differences between range and confinement programs, cow-calf and stocker operations and possibly regional differences caused by environmental factors.

While there can be differences between types of operations, the health program should be part of the total cattle management program, incorporating facility design and all feeding, reproduction, handling, and transportation practices. Experienced or trained personnel also are important for a successful health program.

Every producer should have a licensed veterinarian help design and implement a herd health program. The veterinarian can also provide product and management options.

Many practices used in beef production require experienced or trained personnel. Some procedures require a veterinarian. When processing cattle, only qualified personnel, with knowledge of the procedure to be performed, should be used.

Procedures such as vaccination, castration, dehorning, pregnancy diagnosis, and artificial insemination are normally performed by producers. However, only licensed veterinarians should perform invasive surgery or administer restricted vaccines.

To be effective, pharmaceutical and parasite control products used to prevent or treat disease must be administered according to the label directions. This includes directions for storage of the product, sanitation practices required in its use, and dosage and method of administration. Only personnel experienced or trained in the use of these types of products should administer them to cattle.

To reduce stress from disease, cattle should be checked by experienced personnel for the presence of sick animals. Cattle in confinement should be checked at least daily and cattle in pastures or

on rangeland should be observed as often as feasible.

In confinement operations, and when feasible in range operations, sick or injured cattle should be held in separate "sick" or "hospital" pens while receiving treatment. This isolates them from healthy animals and reduces the transmission of disease. It can also reduce stress. When animals are treated, they should be individually identified. If antibiotics are used in the treatment, the type and amount used should be noted for each animal. These records and those described below are integral parts of a quality assurance program to ensure the wholesomeness of beef products.

Only FDA approved drugs at approved dosages can be administered to sick animals. If sick animals do not respond to label usage, any extra-label drug usage must be under the direction of a licensed veterinarian.

Herd health records of vaccination and parasite treatments should be kept on all animals to monitor disease prevention. A record of all antibiotics used should be kept to avoid excessive medication and stress in sick animals.

When an animal is injured or suffering from a degenerative disease or advanced age and is declining in condition or mobility, additional care should be provided. This may include veterinary care, supplemental feed and water, and protection from other cattle and adverse environmental conditions.

When an animal responds to treatment and recovers but cannot return to the breeding herd or the feedlot, it should be culled and sold for slaughter. Slaughter can occur only after the withdrawal time for any medication has been followed.

If the animal does not recover and becomes permanently physically impaired or non-ambulatory, it should be humanely euthanized. There should be no attempt to transport and sell animals in this condition.

Despite all efforts to provide health care to cattle, a small percentage of the herd will die at birth or later from disease, injury, or other causes. When an animal dies from unknown causes, the decision whether to perform a necropsy should be made with advice of a veterinarian. A necropsy may provide information for adjusting the herd health program.

The carcass of a dead animal may present a health risk to other cattle in the herd or pen. It should be disposed of promptly to reduce the spread of disease and odor. The method of disposal may depend on the cause of death - whether the carcass should be buried, burned, or if feasible, be rendered at a licensed rendering facility. State law and local ordinances may define the manner in which dead animals must be disposed.

Reproduction Management Practices

A number of management practices are used to enhance the reproductive success of the cow herd. Proper decisions made before breeding can prevent reproductive failures. Consideration should be given to implementing a preventive health program and supplementing nutrients, if required. Selecting bulls with records of calving ease can reduce calving difficulties.

Managing young replacement animals to ensure adequate growth before and after the first breeding season and pregnancy is also important. They need adequate nutrition to meet the demands of reproduction and lactation while they continue to grow to maturity.

After weaning, calves are usually grouped by age and gender. Young bulls are separated from non-pregnant heifers. This protects the heifers from potential injury from breeding activity and untimely pregnancies. Young bulls are managed separately from older breeding-age bulls to prevent injury to the young bulls. Care also must be taken when introducing new bulls, regardless of age, into holding pens or fields with other bulls. This can disrupt the social order of the bulls, and injuries from fighting or sexual activity may occur.

Knowledge of the process involved in calving is helpful in deciding whether or when assistance should be provided. Clean calving areas that can be observed easily should be available. Depending on the time of year and the region of the state, shelter may be necessary to protect the cow and calf. Under most California conditions, calving can occur in pastures, with the cows seeking their own location to calve.

At calving time, first calf heifers may be managed in groups separate from the main cow herd. This allows for frequent and easier observation in case assistance is needed.

Artificial insemination allows a large number of cows to be bred using the semen from a bull with greater genetic merit than may be available from bulls available for natural breeding. This can improve the genetic quality or diversity of the herd without having to care for a large number of bulls on the ranch.

Embryo transfer is used primarily by seedstock producers. Fertilized ova are non-surgically collected from genetically superior cows and transferred to recipient cows which carry the transferred embryos to term. With either artificial insemination or embryo transfer, herd conception rates are fairly consistent with those observed in unsynchronized, or natural reproductive cycles.

Rectal palpation is used to determine pregnancy in cows. It is a

useful method for evaluating the reproductive efficiency of the herd and possible health problems affecting the reproductive tract.

The reproductive organs of bulls are palpated and semen is collected to evaluate their breeding soundness and fertility.

When the above practices are used, it is important to have appropriate facilities. It also is important that the animals are handled quietly and easily to minimize stress. Only skilled technicians should perform these procedures.

While there is a need to manage for the reproductive success of the breeding animal, there is also a need to inhibit the reproductive process in animals not selected for breeding proposes. Sexually mature stocker and feeder cattle can create stressful situations for themselves and their herdmates in both range and feedlot situations. Depending on the sex of the animal, the following management practices are used to alter reproductive function and prevent stress which could otherwise occur later in the production cycle.

Castration

Sexually mature males are more aggressive than castrated males and are more likely to injure themselves, other cattle or cattle handling personnel. In range operations, intact males present managerial problems that may include homosexual behavior, incest and unwanted pregnancies within the herd.

The standard for beef quality is also an important consideration. Carcasses from intact males, 9 to 30 months of age, are graded as bullocks. Bullock carcasses may be USDA quality graded but are discounted relative to steer and heifer beef.

There are several methods used to castrate bull calves. One of the nonsurgical procedures uses an instrument called a burdizzo. This procedure requires the male calf to be restrained as the specially designed tool is placed on the scrotum above the testicles and is closed, crushing the spermatic cord. This action severs the blood supply to the testicles causing them to degenerate. The burdizzo requires skill to use properly, the procedure is slow and may result in only partial castration. Post-castration discomfort or pain from the use of the burdizzo is comparable to other castration methods.

One other nonsurgical castration procedure uses a tool known as an elastrator. Large, strong rubber bands are slipped over the testicles and released on the scrotum above the testicles, stopping the blood supply to the testicles. After several weeks, the testicles and scrotum degenerate and separate from the body. Like the other nonsurgical procedure, failures can occur if the rubber band breaks or is not applied properly. Post-castration

discomfort is prolonged by this method.

Surgical removal of the testicles using sharp cutting instruments and emasculators involves opening the scrotum and removing the testicles by severing them from the spermatic cords. Aseptic techniques and trained personnel should be used to reduce the possibility of post-castration bleeding or infection. Clean and well maintained cutting instruments and emasculators should be used. The wound should be treated with an antiseptic solution. Castration failure is less likely to occur from this procedure than the nonsurgical procedures because the testicles are removed at the time of surgery. Post-castration discomfort is normally not as long as it is when elastrators are used.

Chemical castration has been used in the past but currently there are no products available. The procedures are bloodless but require extreme skill because chemical substances must be injected directly into the testicles. These procedures are slow and errors are easily made.

Regardless of the procedure used, only experienced and trained personnel should be allowed to castrate cattle. Castration of bull calves should be accomplished before they reach puberty, preferably as a young nursing calf. If bull calves are not castrated before entering the feedlot, castration should occur soon after arrival.

Post-castration care of calves should include special attention and management during the week after the procedure. Nursing calves should be returned to their dams in clean areas. Calves should be checked to ensure that they are nursing or eating, that bleeding has stopped, and that the wound is healing normally.

When sexually mature heifers are not selected to enter breeding herds, they are normally managed to eventually enter a feedlot. Before entering the feedlot, they may become pregnant.

Pregnant heifers may calve in the feedlot, depending on the stage of fetal development when they are received by the feedlot and the length of time they remain in the feedlot. This creates a stressful situation for the heifer and a high probability of mortality for the calf. To prevent this situation, producers can castrate (spay) heifers not selected for breeding or induce pregnant heifers to abort soon after entering the feedlot.

Spaying surgically removes the ovaries from the heifer to prevent pregnancy. Performed by a trained veterinarian, it requires abdominal surgery. It is not frequently used in California. To gain access to the reproductive tract of the heifer, one procedure requires an external incision under local anesthesia in the flank region of the animal. Another is a vaginal procedure using a special surgical instrument to gain access to the reproductive tract and

surgically remove the ovaries. Both procedures can be accomplished quickly but require the heifer to be restrained during the surgery. Unlike the recommendation of early castration of bull calves, spaying should be done when the heifer is physically more mature in order for the procedure to be quickly and easily accomplished.

Inducing abortion involves the single injection of an FDA approved drug which affects the physiological function of the ovary during pregnancy. When the drug is administered early to midterm, the pregnancy can be terminated with little observable stress or discomfort.

Implanting

The steroid hormones normally produced by the testes or ovaries are not present at the same level in castrated animals as in intact animals. Because of this, castrated animals can have a slower growth rate than intact animals.

Several hormonal and hormonal acting ear implants are available for beef cattle. They are regulated by the FDA. These implants increase weight gain and efficiency when cattle are receiving adequate nutrition. Also, implants tend to increase lean and decrease fat content of beef. Implants come in the form of small pellets or a single insert. These are implanted in the backside of the ear between the skin and cartilage. Implants should be placed in the ear according to label instructions.

Identification

The positive identification of beef animals is necessary for several reasons. As proof of ownership, most beef producers brand their cattle with a hot iron. The California Bureau of Livestock Identification regulates the use of brands and provides inspectors who monitor the sale of cattle to verify proper ownership.

Identification also is required for many management reasons. Genetic improvement and selection require the identification of sires and dams and their sons and daughters. Diseased animals need to be identified and removed from the herd and properly treated. Feedlot cattle are identified to provide management with health and feeding information.

Cattle rustling is a concern to animal producers. Stolen animals may suffer mistreatment while being transported and hidden. Unidentified animals are at a much greater risk of theft.

Methods used to identify cattle include hot iron branding, ear marking, tattooing, ear tags, wattles and freeze branding.

Hot iron branding is the only legal method for proof of ownership. All brands must be registered with the California Bureau of Livestock Identification. To produce a legible brand, a heated branding iron is applied to the skin for several seconds when the animal is restrained. The length of time the branding iron is in contact with the skin depends on the time of year, the breed of cattle, and the length of the hair on the animal. Only experienced or trained personnel should brand cattle.

Earmarks augment hot iron brands and may be registered with the brand. Earmarks are made by marking the ear with a specific notch, slit, or other surgically produced mark. This may be done at branding time. It may produce short-term stress, but may decrease the stress of excessive handling required for positive identification when other forms used for identification are not legible.

Tattooing the inside of the ear is a permanent form of identification used in the Brucellosis vaccination program in California and is also commonly used to identify individual animals in purebred herds. It requires specialized equipment and restraint of the animal.

Ear tags of many different styles and types are commonly used for identification. Ear tags are not considered to be permanent identification because they can be removed or lost, but they are useful for management purposes. Tags are commonly supported by a plastic or metal shaft which pierces the ear

and is held in place by a fastener on the back of the ear. The tags are relatively easy and quick to apply and require less restraint of the animal than other forms of identification. The tags should be applied in a area of the ear that is free of blood vessels to reduce bleeding.

Wattles are used as an alternative ownership identification tool in colder climates where longer winter hair growth makes brand recognition difficult. This form of identification is made by surgically separating both layers of skin from the connective tissue a distance of 2 to 4 inches. Wattles are commonly placed on the dewlap, neck or shoulder. This practice creates a short-term stress when the procedure is performed, but may prevent repeated handling of the animal to identify the owner. It is used mainly in the cold intermountain region of California and is not a necessary or generally utilized form of cattle identification in other regions.

Freeze branding is a method requiring more expertise and more restraint of the animal than hot iron branding. This practice is not used as often as other methods to identify cattle. The hair must be clipped and a liquid, cold-transfer agent must be used on the site to be branded. Branding irons are chilled in a dry ice and alcohol solution and then are applied to the skin of the animal to produce the brand. This method of identification requires a longer period of branding iron contact with the skin than the hot iron method. Because this method changes pigmentation of the hair, resulting in the hair turning white, animals with light colored hair do not show freeze brands well. Adequate brands on cattle with dark hair are readily visible from some distance.

Hot iron face branding may be required by the USDA to identify animals for specific purposes. These include identifying animals with certain contagious diseases, for herd reduction programs or for feeder cattle imported from Mexico. This method is not suitable for ownership or individual identification purposes and is not used by producers.

Dehorning

Calves of either sex can be born with or without horns, depending on their genetic makeup. If horns are not removed they may be used to determine social dominance and severely bruise or injure other animals. In confinement, cattle with long horns can be injured by getting their horns caught in fences, gates, and chutes. Cattle with horns may also cause severe injuries to penmates and personnel. If horns are not removed from purebred cattle, they can be trained to an acceptable shape using weights at the appropriate stage of their development.

Dehorning can be accomplished using several methods or their combination, depending on the age of the animal and the size of its horns.

Caustic dehorning liquid or paste can be applied to the horn "button" of calves during the first few weeks of life to stop horn growth. This method is used primarily on intensive ranches where calves can easily be handled.

Hot iron or electric dehorners can be used on young calves to destroy new horn tissue, preventing further growth of the horn.

Procedures used on older calves with developing horns involve tools of various sizes that scoop or remove the horn from below its base and assist in sealing the adjoining blood vessels to reduce bleeding. A cautery tool may also be used at this time as an aid to stop bleeding from the wound.

Larger, well-developed horns of older animals that do not require total removal can be tipped using a tool to remove the end of the horn to the desired length.

Regardless of when dehorning takes place, only experienced or trained personnel should perform this procedure. When a surgical procedure is required for the removal of horns, aseptic methods using well-maintained tools or instruments are necessary. Following removal of the horn, the wound should be treated to prevent excessive bleeding or infection.

Cattle in feedlots should be dehorned soon after arrival to avoid prolonged stress on the animals. If feasible, dehorned cattle should be checked daily the first week to assure that wounds are healing properly.

Weaning

As nursing calves grow older, the cow's milk production decreases. Calf removal or weaning allows the cow to build up her body reserves before the birth of her next calf. Weaning is accomplished by permanently separating the calf from the cow. This can be a stressful time for both the cow and the calf, since the bonding which existed from birth is interrupted and removed.

Weaning does not cause physical pain to the animals, but there are observable indicators of behavioral stress when the calf and its dam are separated. This stress can be managed or reduced in a number of ways.

The field or pen in which the weaned calves are placed should be located where olfactory and visual contact with the cow is minimized. Adequate facilities also are necessary. They should allow for feeding and watering the calves, dust control, if necessary, and should be structurally strong enough to prevent the reuniting of the calf with its dam.

Facilities

A well-designed and maintained handling facility can include corrals, pens, processing facilities, scales, and shipping and receiving facilities. With proper design and ongoing maintenance of the facility, cattle can be efficiently handled without stress and injury. Facilities should be designed to accommodate the type and size of cattle processed and/or confined. The number of cattle using the facility and its local environment are also important considerations in its design. For example, if the facility is normally used early in the mornings, it should be constructed so the flow pattern of the cattle will not face to the east or southeast. Cattle may balk if they are facing the sun as they move through the handling facility.

Materials used in construction of corrals and pens can vary greatly. Consideration of environmental conditions is important. For example, in the desert region, wooden fences which restrict air flow may increase heat stress. In colder climates, animals can benefit if there is protection from wind, rain or snow while they are confined.

The design of pens, alleys, and chutes should be as simple as possible to create an efficient flow pattern when moving cattle. Cattle tend to circle and will follow the leader, so they should be allowed to see animals ahead of them. While open-sided chutes can be used satisfactorily by competent personnel, curved solid chutes are more efficient. Cattle will stand more quietly and move more easily through a single-file chute when their peripheral vision is restricted. Solid sides prevent the animals from observing people, vehicles, dogs and other external stimuli or distractions with their wide angle vision.

Private insurance carriers, numerous state laws, and CAL-OSHA also mandate a safe working environment for the personnel handling the cattle.

Facility requirements for confined cattle

Facilities in feedlots are more extensive then those in range operations. The basic needs for handling and processing cattle are similar, but additional feedlot facilities are required to accommodate the needs of large numbers of cattle in a comparatively small area during an extended feeding period.

The space required by feeder cattle in unsurfaced (earth) pens depends on the climate and soil type where the facility is located. In dry climates, 75 square-feet per animal is adequate, but in wet, muddy climates 300 square-feet per animal may be necessary. Feedlots are typically built to accommodate 100 to 300 cattle in one pen but smaller pens can be acceptable.

Feed bunk space should be designed to allow all animals in the pen to consume feed with minimal animal conflict. If feed is always available, 6 to 10 inches per animal is adequate bunk space. If the cattle are limit-fed twice a day, enough space is needed to allow each animal in the pen to stand at the bunk as the cattle are fed. Depending on animal size, 20 to 30 inches per head is usually adequate. A 6 to 8 foot sloped concrete apron for the cattle to stand on while feeding that is adjacent to and behind the bunk can reduce muddy areas near the feed bunk. Cattle should step up to the bunk. The front feet should be about 4 inches above the rear feet. The slope of the concrete apron reduces muddy areas in pens, helping eliminate physical stress.

Cattle should always have access to clean, fresh water. For troughs, one linear foot per ten animals is adequate. Each trough should have a drain to prevent overflows and mud. Each water trough should have a concrete apron to reduce muddy pen conditions. Pipes leading to the trough should be buried or placed out of the sun. Water troughs in northern latitudes or higher elevations should come equipped with water heaters to prevent the water from freezing.

Muddy pens may be as detrimental to cattle well-being as extremely hot or cold temperatures. In areas with greater than 6 inches of annual rainfall, a 3 percent slope should be adequate to reduce muddy surfaces. However, excessive slopes will accentuate surface runoff and erosion potential. State and federal laws regulate feedlot surface runoff and ground water pollution. In California, Regional Water Quality Control Boards regulate feedlot drainage.

To reduce heat stress, feedlots in areas where there are more than 90 days per year of temperatures greater than 100°F should have shades in the pens. Under hot conditions, cattle in confinement require 25 to 40 square-feet of shade per head. Shades should be about 12 feet high. To ensure availability of shade throughout the day, the shades should be built with a north-south orientation and offset toward the west.

Lights may cause stress in a confinement situation. If lighting is required for working cattle before dawn or for security purposes, it should be evenly diffused. It should not create harsh shadows and bright spots nor should it be directed into the eyes of the cattle for prolonged periods.

Equipment and tools used in handling and moving cattle

Animal restraints of some form are necessary for many of the practices involved in beef production to be performed safely. The tools used must quickly and easily restrain the animal without injury to it or the operator. The animal can be restrained securely during the procedure and then easily and quickly released when the procedure

is finished. Depending on the type of facility, restraints can include ropes or mechanical devices. The mechanical device used depends on the size of the animal and the number of animals to be handled.

Calf tables are used by some cow-calf operators to work calves while others prefer using ropes to restrain the animals. As animals get larger, most producers use squeeze chutes of various designs to restrain cattle. The frequency and number of cattle processed determines whether manual or hydraulic squeezes are used. Regardless of which device is used to restrain cattle, only experienced or trained personnel should use these tools to prevent injuring or choking the animal while it is being treated.

Producers occasionally need to move cattle. Since relocation may be stressful, measures should be taken to minimize the potential for stress during the move. Cattle should be moved slowly and not forced to run. Depending on the situation, the move may be made on foot, horseback or by mechanized means. When cattle balk or try to turn back, the judicious use of whips or backslappers of various types or dogs trained to move cattle may be used.

Cattle moving through a chute may balk or lie down. Cattle that balk take longer to work and are more prone to hurt themselves or cause injury to other animals. They may also injure personnel handling the cattle. This risk may be reduced with the judicious use of an electric prod to keep cattle moving forward. The prod should be used only on cattle that balk or otherwise impede movements in the chute during processing or loading and unloading. Personnel should be instructed not to shock all animals in the chutes. Electric prods are generally not useful to move cattle in alleys or pens. In order for the prod to work effectively, the batteries should be changed often to maintain its electric charge and the prongs of the prod need to be kept clean to allow good contact. For the most effective use in the movement of livestock, the prongs of the prod need only light contact on the skin of the animal. The electric prod should not be used to poke or probe the cattle.

Transportation

The transportation of cattle to and from farms, ranches, feedlots, and to processing facilities is an important operation in beef cattle production. Proper handling and transportation are important for the safety and welfare of the animals being moved. Improper handling and transportation can cause illness and/or injury to the cattle.

Commercial livestock transportation companies, which are regulated by state and federal agencies, use trucks and trailers that have the capacity to carry a large number of animals. Producers also transport cattle using their own equipment. Normally this will be stock trailers and/or small livestock trucks that have less capacity than the commercial livestock trucks. Regardless of the equipment used for transportation, cattle should be handled to ensure their safety and welfare through all phases of transport.

In preparation for shipping, cattle should be separated by weight and/or gender. If possible, the different groups should be loaded into separate compartments of the truck or trailer. Sick or injured cattle require special handling which may include separate loading and transporting and care to prevent additional stress or injury.

When loading cattle, personnel should move cattle as quietly and patiently as possible to prevent injury to the animal. When cattle are given the opportunity, they will use their natural herding instincts to move through alleys and chutes leading into the trucks or trailers.

Appropriate sized equipment is important to prevent overcrowding. The cattle need adequate space to allow them to stand again should they fall during transit.

In preparation for moving cattle, attention should be given to weather forecasts. Extreme high or low temperatures can cause stressful conditions for the cattle in transit. Adequate ventilation must always be provided. During transit, the ride for the cattle should be as smooth as possible. To help prevent cattle from falling, the floors of the trucks and trailers should be slip resistant. Drivers should avoid sudden starts and stops and sharp turns at high speed.

It is important to move cattle quickly to reduce transportation stress. Planned stops during transit should be made to ensure that the cattle are well dispersed and standing. All equipment should be mechanically sound before departure. This will help prevent additional stress from prolonged transit time caused by equipment failure.

Upon arrival at their destination, cattle should be unloaded quietly. Cattle have a tendency to rush from a vehicle so additional care must be taken to ensure that cattle unload evenly and slowly.

Shrink, the loss of body weight from excretory losses in manure and urine without intake of feed or water, can occur during transit, at weaning, or other periods when cattle may be stressed for a short time. Temporary losses of 3 to 10 percent or more of body weight can occur during these periods. A more serious health threat occurs when the weight loss is from tissue shrink. This can occur during long periods of fasting caused by hauling cattle long distances.

When unloaded, the cattle should be checked for injury or sickness. Additional care should be provided for sick or injured cattle. After a long haul, fatigued animals should be allowed to rest and have access to hay and water before they are processed or released into pastures.

CONCLUSION

The cattle production practices described in this publication are commonly used in California. The authors consider these practices as the most appropriate and practical of those currently available.

Research involving beef cattle production is ongoing at many universities throughout the United States. New food animal production practices and techniques are being developed to improve efficiencies of production and to minimize stress.

When new information is developed, beef producers have the responsibility to evaluate which husbandry practices they adopt. Decisions should be based on professional judgment, training, and experience in the safe, humane, and efficient production of beef.

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GLOSSARY

Abort	Termination of the pregnancy.
Body condition	The body reserves (body fat) of an animal at specific stages of its production cycle.
Breed	A group of animals that have a common origin and similar genetic characteristics which distinguish them from other groups within the same species.
Bull	Uncastrated male bovine of any age.
Calf	Young bovine of either sex under the age of one year.
Castrate	To surgically remove the testicles or ovaries or to cause the testicles to become nonfunctional.
Colostrum	The milk containing maternal antibodies produced by the cow prior to and during the first few days after calving.
Confinement	For the purposes of this publication, refers to cattle confined for a specific period during production, i.e. feedlots as opposed to occasional confinement in corrals.
Cow	Female bovine that has produced one or more calves.
Crossbreeding	A system of breeding, combining two or more breeds.
Cull	To remove less productive or undesirable cattle from a herd.
Dam	The female parent of the calf.
Energy	The component of feed ration that gives animals the ability to grow, lactate, reproduce, and maintain themselves.
Environment	All conditions of production, including feeding, housing, management, and climate, which affect the life and performance of cattle exclusive of their genetics.
Estrous cycle	The reproductive cycle of the cow.
Feeder cattle	Cattle in feedlots.
Feedlot	A confinement facility where cattle are fed.

Fertility	All factors affecting conception and reproduction.
Gestation	The period of time between conception and calving.
Heifer	A young female bovine that has not had a calf. A "first-calf heifer" has had only one calf.
Morbidity	The incidence of disease.
Mortality	Death.
Necropsy	The examination of an animal after death.
Nutrients	The chemical substances found in feed necessary for the maintenance, production, and health of animals.
Parasite	An animal which nourishes itself by feeding on host animals.
Parturition	The act of giving birth; calving.
Polled	Naturally hornless cattle. Having no horns or scurs.
Process	The act of administering a specific or series of production practices to an animal.
Roughage	Feeds high in fiber content and low in energy and protein digestibility.
Rumen	The first and largest of the four compartments of the stomach of cattle where microbial fermentation of feed occurs.
Ruminant	Animals, such as cattle, that ruminate and digest cellulose.
Ruminate	To regurgitate and remasticate roughages.
Sire	The male parent of the calf.
Squeeze chute	An adjustable restraint device used to safely catch and confine an animal during processing.
Steer	A male bovine castrated before the development of secondary sex characteristics.
Stockers	Cattle which, after weaning, graze forage or are fed roughages until they enter a feedlot.
Wean	The permanent removal of a calf from its dam.

Member's Guide

California

4-H BEEF PROJECT

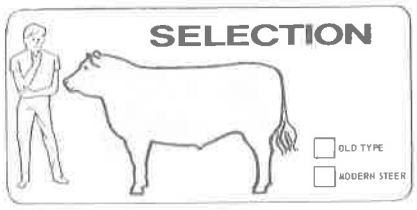
Animal science projects are favorites in California 4-H. The beef project offers you fun while you learn about beef cattle and improve your knowledge and skills.

Your 4-H animal science leader can help you in 14 units.

1. Overview
2. Selection
3. Purchasing and Financing
4. Facilities and Equipment
5. Feeding
6. Health
7. Fitting and Showing
8. Marketing
9. Management
10. Extra Activities
11. Group Activities
12. Public Relations
13. Science
14. California Beef Industry

Discuss with your leader how many units you will cover each year. As you gain experience, you'll want to advance to other project units. You can use the information in this guide for more than 1 year.

BE A CONSERVATIONIST. PLEASE SAVE THIS GUIDE.



In the beef project, you can: own animals; manage but not own animals; or participate by working in related activities, such as consumerism, marketing, public relations, or science.

Before beginning any animal science project, both you and your parents need to find out what's expected. If you want to have a live animal project, you must know what a desirable animal is, what facilities and feed you need for the animal, and the potential costs. The three types of live animal projects are as follows.

The market animal. You select, own, and feed one or more animals to market weight and then sell or use the meat at home.

The breeding animal. You own and raise one or more animals for breeding purposes. If you wish to show any animal, it must be registered in your name.

The jointly owned or nonowned animal. You can do this project no matter where you live, whether in a rural, nonfarm, or urban situation. You and another member can jointly own an animal or you can manage, feed, and keep records on one or more animals that belong to someone else. You can't show jointly owned or nonowned animals at fairs.

The beef project is a part of a total animal science program. You do not need to live on a farm to participate in a 4-H beef project; there are lots of things you can learn and do without owning an animal.

If you wish to enroll in a market animal or breeding project, you and your parents will want to visit a successful 4-H beef project to learn about the costs, facilities, and time involved in the project.

Each of the units in this guide provides you with information about the project. Your leader will assist you in the project. His interest in and knowledge of beef, combined with teaching aids from your county Cooperative Extension 4-H office, will help you have a pleasant experience—and FUN, too.

Market animal. Select a High Good or Choice grade animal that's about 7 months old and weighs 450 to 500 pounds. Choose a modern-type beef animal. The modern beef animal: is more up-standing; has greater length; is moderately heavy boned; stands squarely; is trim in the brisket, dewlap, and belly; shows evidence of muscling throughout; and is free of wastiness.

Breeding animal. Buy a high-quality grade heifer (for commercial purposes) or a registered heifer (required for showing). Buy the heifer by age, especially if you want to show it. Ask your leader about show base dates. Be sure the heifer is registered in your name. If you buy an older heifer and plan to breed her as soon as possible, select a heifer that's about 18 months old and weighs approximately 800 pounds.

Be sure to figure on enough money to feed and care for the animal you purchase. The feed for a market animal will cost 60 to 80 percent of your total project cost. There are three basic sources of money—your own, your parents, or that borrowed from a lender.

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If you plan to borrow money from a lender, arrange the loan **before buying** the animal. (Market animals are usually purchased in the fall. Breeding animals can be bought at any time of year.) A lender will want to know the kind of project you have, how long you'll have it, the amount of money you need, and any assets you have (bank account, other livestock, etc.). Be businesslike. Call the lender for an appointment, arrive neatly dressed and on time, know your facts and figures, and ask questions if you aren't familiar with the terms used in the discussion.

Sources of feeder calves and grade heifers are your parents' herd, purebred or commercial beef ranches, feeder calf sales, and auctions. Purchase registered breeding heifers from purebred breeders.

Animals need living space. Provide about 900 square feet of pen area for the first animal on dry lot; 200 to 300 square feet more for each additional animal.

Shelter. A simple 8- by 8-foot, three-sided lean-to is adequate for one animal; allow more space for each additional animal. **Water.** An animal needs 10 to 15 gallons of clean water a day. **Feeding.** Allow 2½ to 3 feet of trough space per head. You need a trough that's 6 to 8 inches deep, 15 to 18 inches wide, and with the top edge about 20 inches above the ground. Provide a hay bunk; allow 2½ to 3 feet of space per animal. Plan for drainage and be prepared to deal with odors, flies, noise, and other environmental factors.

Fitting and showing. You need: rope halter, leather show halter, tie rope, neck chain for when you wash the animal, scotch comb, rice root brush, mild soap, coat dressing, and clippers, either borrowed or owned.

Before buying an animal, discuss with your leader the kind of ration the animal needs. Plan to buy an economical yet balanced commercial feed or mix your own. Learn the kinds of feeds. Identify them and know their importance in the ration.

After purchase, feed your calf hay free choice and provide water and salt. After **3 to 7 days**, add 1½ to 2 pounds of grain. At **7 to 14 days**, increase grain to 2 to 4 pounds per day. At **14 to 21 days**, increase grain to 5 to 7 pounds per day and set the hay ration at approximately 5 to 6 pounds. Then gradually reduce the amount of hay and increase the amount of grain you feed. At **21 to 30 days**, you can feed grain free choice. Give the animal only what it will clean up in 30 to 45 minutes, then feed hay.

Calves usually eat 2 to 3 pounds of feed for each 100 pounds of live weight. It takes approximately 10 pounds of feed to produce 1 pound of gain. Feed on a regular schedule and be aware of problems, such as bloat, scours, impaction, and any hardware the animal may eat.

Provide your animal with clean pens and equipment, fresh water, and a correctly fed, balanced ration. Also control external and internal parasites and protect against disease. Always be alert! Check your animal's breathing at each feeding. (Normal respiration rate is 20 to 30 breaths per minute; stand at a distance and count the number of in-and-out movements of the ribs.)

If the animal appears sick, work with your leader to check its temperature (normal rectal temperature is 100.5° F.). Observe the stool. (Is it solid, liquid, colored, digested, bloody, or does it contain mucus?) Check for scratching or rubbing (a good indicator of parasites). Treat for grubs and flies.

If your animal is sick, check with your veterinarian, leader, or parents for recommended treatments. When using chemical controls, **be sure to carefully read and follow the application instructions on the container label.**

Become friends with your animal. Gentle it down. Put a rope halter on it. When the animal becomes familiar with the halter, begin to teach it to be led and tied. Tie the animal to a post that is chin height (about 18 inches) with enough slack in the rope so the animal can stand or lie down. Use a slip knot that you can untie easily.

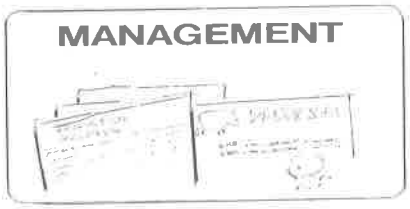
Practice leading your animal to water each day. Walk on the left side of the calf, holding the lead strap in your right hand. Once you can lead the calf without problems, practice setting it up, using a show stick. When walking, carry the show stick and lead strap; then set up the animal.

Remove foreign matter from the hair coat by brushing downward with a rice root brush. Then brush upward with the same brush and a scotch comb. Brush the calf twice a day for at least 10 minutes at a time. Wash the animal once a month. Use a mild soap and rinse the animal thoroughly. About 5 to 6 weeks before showing, start giving baths once a week. Talk with your leader about clipping the animal since there are clipping preferences for each breed.

As a beef project member and as a consumer, you'll want to learn about carcass evaluation, dressing percentage, cutability, and the prices of wholesale and retail cuts of meat.

The ideal beef carcass has a high yield of high-quality muscle (lean meat) and a minimum of waste. Carcass evaluation is determined by the following factors: **conformation**—even balance between front and rear quarters; **finish**—external, internal extra-muscular, and intramuscular; **quality**—marbling, color, texture, and firmness of lean. There are eight grades for slaughter animals: Prime, Choice, Good, Standard, Commercial, Utility, Cutter, and Canner.

If you own, show, and sell a steer at a junior livestock sale, remember that the animal must grade Choice or better. Marketing success depends on the grade of the animal at purchase, your feeding program, dressing percentage, carcass grade, availability of buyers, and demand for beef.



Management includes planning your project, selecting your animal, providing correct facilities and equipment, feeding, maintaining animal health, learning to keep records, and, if applicable, breeding. You'll learn that some management tasks are done at designated times of the year. (For example, treat for cattle grubs in October or November.)

Work with your leader to set up a month-by-month beef management calendar. Such a calendar can help you keep more accurate records and improve your knowledge of the beef industry.

You'll want to participate in the beef project's extra activities. These include demonstrations, livestock conservation, and livestock judging.

A **demonstration** is a planned presentation that teaches something by illustration or example. It may include: an introduction (why the topic was chosen and why it is important); the body (how the job is done); and a summary (what was accomplished, its meaning to the demonstrator and the audience). Plan and give at least one demonstration each year—either by yourself or in cooperation with other members. A junior leader or your project leader can help you with ideas for titles, subject matter, and presentation techniques.

Livestock conservation includes learning about animal protection and safety. Give conservation demonstrations; plan and participate in safety tours and checks; do a research paper on a topic of special interest; or design your own conservation activity.

Livestock judging is the process of analyzing animals and measuring them against a standard that is commonly accepted as the ideal animal. Learn the parts of the beef animal as shown in figure 1.

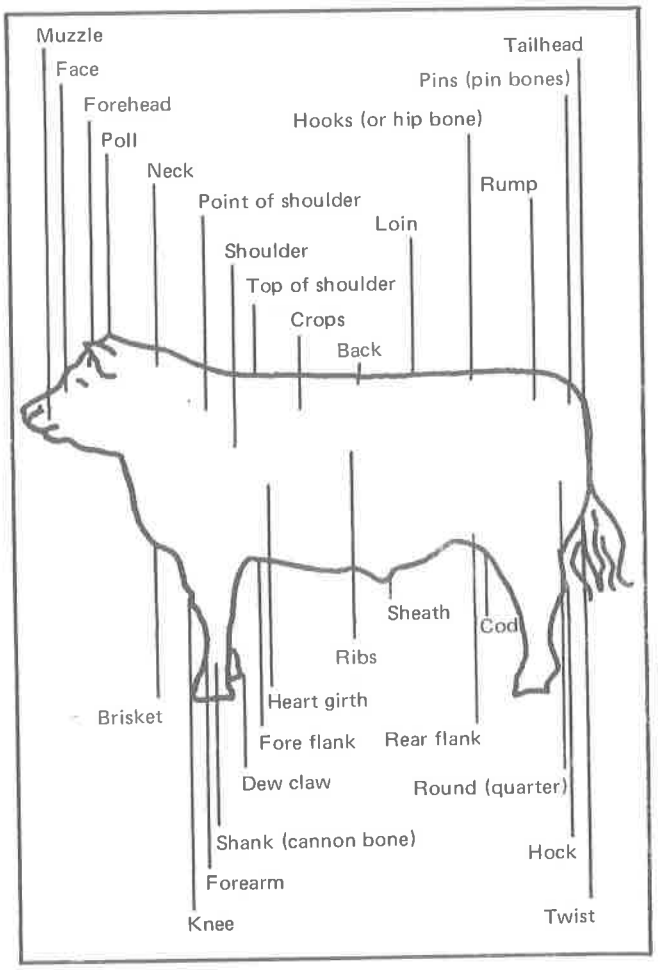
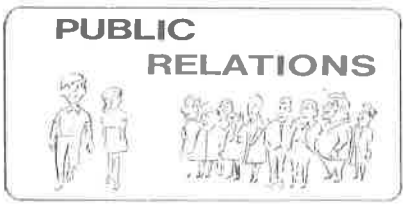


Figure 1. Parts of the beef steer.

Learn to compare animals by developing an evaluation system. View each animal from the side, rear, front, top, and walking; use the same order each time you view an animal. Take notes on why you like each animal and use these notes to practice giving oral reasons.

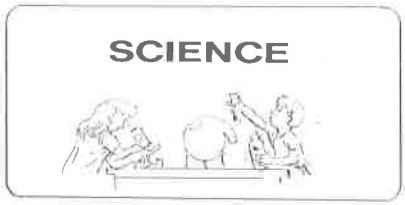
When giving oral reasons, stand 6 to 8 feet away from the judge, look him in the eye, and speak in a conversational tone without using notes. Keep oral reasons to about 2 minutes in length. Use and emphasize comparative terms (more muscled, longer rumped, thicker, deeper, etc.).

Working together to "Make the Best Better" can easily describe group activities. These activities are suitable for all phases of the beef project and help you gain a broader knowledge of agriculture. Discuss and plan with other members what you want to do or learn; study the activity; list and obtain resources to enhance the study or event; find possible solutions to the problem (or event); complete the activity; and evaluate it. In a total animal science program, group activities have no boundaries. (For example, those enrolled in foods and nutrition can explore uses of beef, barbecuing, or whatever else is of interest.)



Public relations is an everyday job with many opportunities to work, learn, and serve. Three needs are to: 1) foster good relations with livestock producers, industries, and organizations; 2) improve public knowledge and appreciation of the animal sciences; and 3) encourage an understanding of the need for raising animals for food, fiber, and recreation--balanced with a concern for the environment.

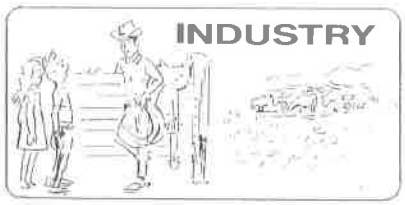
You can become a junior member in a breed association; prepare exhibits on livestock for showing at schools, fairs, or shopping centers; or host a non-4-H member on a visit to a fair, farm, or your home to promote better understanding of the livestock industry. There are many different people you can work with, including urban youth, civic leaders, health and safety groups, businessmen, and others. Improving public relations starts with you.



In this unit, you'll learn about **nutrition** and **genetics**. Animal nutrition is the study of the feeding process and how the animal uses feed. Beef cattle are ruminants, as are sheep, deer, and goats. The ruminant animal has a complex stomach that's divided into four parts--rumen, reticulum, omasum, and abomasum. This type of stomach allows an animal to digest high-fiber diets, such as range, pasture, and hay.

Genetics is the study of how animal characteristics are passed from parents to offspring. As you progress in the beef project, you'll learn more about genetics and its use in improving your herd.

To learn more about science in your beef project: identify feeds and know how they are used by the animal; learn how feeding, breeding, and management of beef cattle relate to the basic sciences of nutrition, genetics, physiology, and animal medicine.



In 1974, Californians consumed more than 145 pounds of beef per person. (U.S. figures showed an average consumption of 117 pounds per person.) California ranks about sixth in the total number of cattle produced. Much of the cattle land is also used for recreation, such as fishing, boating, hiking, and camping.

As a beef project member, you'll want to learn more about the beef industry. Visit your county cattlemen's meetings to hear their concerns, give promotional talks on the beef industry, or study beef cattle markets and prices.

GLOSSARY OF BEEF TERMS

Breed — Animals of like color, type, and other characteristics similar to those of parents or past generations. The common breeds of beef cattle are Hereford, Angus, Shorthorn, and Charolais.

Bull — Male cattle of any age that are uncastrated.

Calves — Young cattle of either sex under 1 year of age.

Castrate — To remove the testes of male cattle.

Cow — Female animal that shows evidence through age, weight, conformation, and udder of having produced one or more calves.

Dam — A female parent.

Feeder — A weaned animal that is ready for feeding or that is being fed for market.

Finish — Degree of fatness and readiness for market.

Fitting — The process of fattening, training, and grooming an animal for show or sale.

Grade animal — A beef animal that has one or both parents not registered with a breed association.

Heifer — Female animal that has not borne offspring.

Parturition — Act of birth.

Pedigree — A table that gives a line of ancestors for an animal; a genealogical tree.

Polled — Cattle born without horns.

Purebred animal — An animal of a recognized breed kept pure for many generations. A purebred animal may or may not be registered, but all registered animals are purebred.

Ration — The total feed given any animal during a 24-hour period.

Registered animal — Purebred animal that has a registration certificate and number issued by the breed association. The animal's name is recorded together with the names of the sire (father) and the dam (mother).

Steer — Male animal that has been castrated before sexual maturity.

Prepared by the Animal Science Materials Committee,
Chairman - W. Dee Whitmire, 4-H Youth Advisor, Sonoma County.

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California

4-H

BEEF PROJECT

LEADER GUIDE

Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

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Prepared by the Animal Science Materials Committee,
Chairman—W. Dee Whitmire,
former 4-H Youth Advisor, Sonoma County.

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

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FOR THE LEADER

Congratulations! You are now a volunteer leader in the California 4-H program. As an animal science leader, you'll want to—

Help 4-H members learn the principles of animal science.

Plan at least four informative project meetings during the year. Each of the units in this series has ideas for things members can learn, do, and explore.

When the need arises or when questions can't be adequately answered in project meetings, make home visits to work with members and their parents.

OBJECTIVES

The animal science projects offer boys and girls opportunities and challenges. Although some members can't participate in all project phases, they'll want to fulfill the objectives of:

- Work (things to do)
- Study (things to learn)
- Personal Improvement (things to become)
- Leadership (ways to help others)
- Service (things to do for others)

PHASES OF THE BEEF PROJECT

The market animal. The member selects, owns, and feeds one or more animals to market weight and then sells or uses the meat at home.

The breeding animal. A member owns and raises one or more animals for breeding purposes. The member must register the animal(s) in his name for showing.

The jointly owned or nonowned animal. This phase is suited to members who live in rural, nonfarm, or urban locales. Members can jointly own an animal or can manage, feed, and keep records on one or more animals that belong to someone else. They can do the project individually or as a group, such as on a 4-H farm situation. Jointly owned or nonowned animals can't be shown at fairs.

AIDS FOR LEADERS

There are many teaching aids available to help you. Leader materials include a slide set with cassette recording for many of the units in this guide; three-dimensional models of animal species; and educational games. You can obtain these materials from your county Cooperative Extension 4-H office. Ask resource people in your community, such as ranchers, livestock buyers, bankers, and others, to assist you.

Please note that you don't need to cover all 14 units in 1 year. Discuss the units with your members and cover only those units that meet their immediate needs. Remember that 4-H'ers learn by doing, but someone must show the way—that's your responsibility as an animal science leader.

THE PROJECT MEETING

Inform members and their parents, in advance, of the project meeting date, time, and place. An established day, such as the third Friday of the month, often avoids confusion. Keep the meetings fairly short; about 1½ hours is good. As part of each meeting, include pertinent information (such as a demonstration of a specific topic), group discussion, record book reviews and helps, summary of the meetings, and recreation.

You may find it helpful to make detailed plans for each project meeting. You may want to use a form similar to the one shown. Discuss and make project plans together with members and those who are to assist you with project meetings, such as junior, teen, or resource leaders. Remember that plans must be flexible; it is important to cover what the members want and need to learn.

The 4-H beef project is part of a total animal science program. It is designed for boys and girls who are keenly interested in livestock, specifically a large animal.

In the beef project, members may own either a market or a breeding animal or participate in some phase of the jointly owned or non-owned project. The jointly owned or non-owned project may or may not involve working with a live animal. This phase is particularly suited to urban and other nonfarm members who may not have the resources necessary for keeping an animal.

Sample Meeting Plan

Date _____ Time _____

Place _____

Project Phase _____

Topic (or skill to be taught) _____

What are members to accomplish? _____

Supplies and Equipment

What Needed?	Who Brings?

Things to do	Who's in charge?	Who's to do it?
Example:		
Introductory remarks		
Demonstration of topic		
Discussion by group		
Group participation		
Record review and help		
Judging or other activity		
Summary		
Recreation		

What can members do before next meeting? _____

What is topic of next meeting? _____

What supplies do members need to bring to next meeting? _____

_____

OVERVIEW

If a member wants to own an animal, both he and his parents need to learn what's expected. You can give them much helpful advice.

In general, it's best if a member enrolls in a market animal project first, then takes the longer term breeding animal project. A young first-year member may not be physically strong enough to handle a beef animal; some members may not understand that funds are required for a beef project; and still others may not have adequate space or facilities for keeping a large animal. Your role as leader, then, is to advise the member and his parents about financing, animal selection, management, and marketing.

If a member wants to enroll in the breeding phase of the project, you'll want to discuss such topics as—

The amount of experience the member has had with beef.

The type of facilities the member needs. The breeding project requires access to pasture as well as a barn or shed and more hay and feed than does the market animal project.

The amount of money and patience the member needs. It takes time and money to establish a breeding herd.

Whether the member wants an open or a bred heifer.

Whether the member wants a grade or registered heifer. A good grade animal costs less than a high-quality registered heifer, but a member may not be able to exhibit a grade heifer at fairs.

Which breed the member wants to buy.

The jointly owned or nonowned project offers many different types of member involvement.

Members who are interested in learning about animal nutrition, physiology, genetics, and health can participate in the jointly owned phase. For example, two or more members might jointly own, feed, and manage an animal as well as keep daily records about growth, health, and financing. The animal could be housed on a 4-H farm. Once the project is completed, the animal could be sold on the open market or slaughtered for home consumption and the assets equally divided and recorded.

Or a member can manage a small herd of beef for a rancher, emphasizing the selection, feeding, breeding, keeping of production records and pedigrees, and marketing aspects of the project. The member must be able to work at the project on a day-to-day basis, just as the rancher-owner must.

Some members may not be able to have an animal at home, on a 4-H farm, or even manage a herd for someone else. However, these young people may wish to learn about animal husbandry, the role of the animal in the environment, and human nutrition as it relates to red meat. You can give these 4-H'ers guidance in the units on *Marketing, Extra Activities, Group Activities, Public Relations, Science,* and the *California Beef Industry.*

The beef project can help a member to—

- accept and learn responsibility
- develop a feeling for living things
- learn patience
- make decisions

You, as a leader, can work with members in all three phases of the beef project to "Make the Best Better."

SELECTION

Selecting the right animal for a beef project is just as important as giving the animal correct feed and care. A member's success depends, to a large degree, on the quality of the animal he chooses. Base animal selection on the project phase chosen—market animal or breeding animal.

Things Members Can Learn

The different breeds of beef cattle.

The nomenclature for the live animal and the carcass.

To compare and relate size to age and gainability.

To recognize market demands (weight, grade, age).

When buying, to relate weight to days on feed, rate of gain, and future show dates.

To review show base dates for breeding projects and to apply these when purchasing or breeding animals.

To be aware of animal health and soundness and be able to relate these factors to animals considered for purchase.

To review production records and pedigrees.

Things Members Can Do

Observe demonstrations illustrating desirable-type animals.

Participate in judging events to improve type concept.

Attend livestock sales (stockyards, auctions, breed sales) to observe animal marketing methods.

Visit feedlots to see animals in various stages of finish and compare to member's project animal.

Prepare facilities for an animal science project.

KEY INFORMATION

Discuss with the member and his parents the six important factors of selection: conformation, age and weight, breed, disposition, health, and price.

Conformation. Conformation and grades go hand in hand when selecting a feeder calf for a market animal project. Grades of feeders are Prime, Choice, Good, Standard, and Utility. Feeders that grade High Good and Choice are most desirable for the project. Lower quality cattle may be found at lower prices, but they may lack the conformation or the potential to reach a desirable grade at market weight.

When selecting a feeder calf, look for—

- length of body, especially from hooks to pins.
- bone size and structure.
- a calf that stands squarely on its feet and legs.
- trimness in brisket and belly.
- degree of muscling throughout or potential for muscle development.

When selecting a breeding animal, look for the following—

- a high-quality, registered or grade heifer or cow.
- the modern-type cow. In comparison to the "old-fashioned" cow, the modern cow has a feminine head; is a bit longer and leaner in

the neck; is longer bodied, not too deep, and stands wide (front and rear) on medium bone; has a long udder from front to rear that's well attached and shows adequate capacity; is correct on feet and legs.

- good production records—her own and those of her dam. Select an animal from herds that have production records available. Ask the breeder for production records if they are not offered.

If the member selects a registered animal, be sure the member registers the animal in his name.

Weight and age. Feeder calves usually weigh about 500 pounds at 7 months of age. When a member is selecting a feeder animal, discuss the number of days until show and the minimum and maximum weight classifications. Use an average of 2 pounds of gain per day to approximate how much the calf must weigh at time of purchase. For example: if a member buys a calf on October 15 and wants to show it the following July 15, he has 270 days until show, or approximately 540 pounds of gain to put on the animal. If the minimum show weight is 950 pounds, the member must buy a steer that weighs at least 410 pounds.

Birth date and age are the most important factors in selecting breeding animals, especially if the member wants to show an animal at fairs and expositions where classes are by age.

Breed. The older known breeds are Angus, Hereford, and Shorthorn. Other breeds, such as Charolais, are being shown more and more in both market and breeding classes. Many outstanding crossbred market animals may also be bought and shown at fairs.

Disposition. Select a steer or breeding animal that appears to have a gentle disposition. Do not buy breeding animals that are wild in temperament.

Health. Healthy calves usually: have bright eyes and are alert; are thrifty and show quality in the hair coat; and are free of diseases and parasites.

Price. Don't pay too much for market or breeding animals. If the member has top pick of a group, he must expect to pay a premium for getting above-average quality. Market animals are usually bought by the hundredweight; breeding animals by the head.

REFERENCES

Slide Sets and Filmstrips

1. *Selecting Your Calf*, 76/104 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.
2. *Selecting Hereford Heifers* (slide set). Order from American Hereford Association, Hereford Drive, Kansas City, Missouri 64105. (There is a charge for these slides.)
3. *Red Angus, the Built in Breed* (filmstrip). Order from Red Angus Association of America, Box 776, Denton, Texas 76201. (There is a charge for this filmstrip.)
4. *Beef Conformation*, No. 491 (slide set with script). Order from Visual Aids, U.C. Davis 95616.

Films

1. *The Giant*. Order from American Polled Hereford Association, 4700 E. 63rd., Kansas City, Missouri 64130. (Charge for postage only.)

Teaching Aids

1. Beef weight tape. Order from county 4-H office.

Printed Material

1. Market reports from newspapers and livestock journals.
2. *4-H/FFA Heifer Selection.* Order from American Hereford Association, Hereford Drive, Kansas City, Missouri 64105.
3. *Get in the Winner's Circle.* Order from American Polled Hereford Association, 4700 E. 63rd., Kansas City, Missouri 64130.
4. *Guide for Future Cattlemen.* Order from American Shorthorn Association, 8288 Hascall St., Omaha, Nebraska 68124.
5. *The Star of the Future.* Order from American Angus Association, 3201 Fredrick Blvd., St. Joseph, Missouri 64501.
6. *Red Angus.* Order from Red Angus Association of America, Box 776, Denton, Texas 76201.
7. *Charolais—For Progress.* Order from American-International Charolais Association, 1610 Old Spanish Trail, Houston, Texas 77025.
8. *Selecting Heifers for Herd Replacements,* Leaflet 2933. Order from county 4-H office.
9. *Weight vs. Shape,* Leaflet 2942. Order from county 4-H office.
10. *The Modern Beef Steer,* Leaflet 2235. Order from county 4-H office.

Other Helps

1. Resource people, such as ranchers, livestock buyers, herdsmen, and others.

PURCHASING & FINANCING

Purchasing and financing are key parts of a beef project. Both the market animal and breeding projects may require more money than the member and his parents first expect. A member usually has three possible sources of money: 1) his own; 2) his parents; and 3) lending institutions. Learning wise use of credit from a reputable lender can be a valuable experience.

Things Members Can Learn

Meanings of: collateral, interest, balance, principal, loan, depreciation, gross income, and net income.

How to figure a budget for a market animal project. (Do this with parents.)

The importance of keeping accurate 4-H records for production expenses and management.

Things Members Can Do

Visit a lending agency, such as a local bank, savings and loan association, credit union, finance company, or farm loan organization, to find out about financing.

Visit a sale of livestock feeder calves or purebred animals to see how purchasing is done (verbal or sealed bids).

Tour cooperative marketing association facilities.

Prepare a written plan to use when applying for a loan.

Arrange for a loan. Ask questions. Understand arrangements. Read the fine print. Cooperate with parents and lender.

KEY INFORMATION

Steer Feeding Budget

A. Cost of feeder calf.

①_____lb. purchase weight x_____¢/lb. =

A _____

B. Cost of concentrate mix.

_____ days on feed x 2 lb. average daily gain =

②_____ lb. gain.

①_____ lb. purchase weight +②_____ lb. gain =

③_____lb. final weight.

③_____ lb. final weight +①_____ lb. purchase weight x .50 =

④_____lb. average weight.

④_____ lb. average weight x .03 =

⑤_____ lb. feed eaten/day.

⑤_____ lb. feed eaten/day x .67 =

⑥_____lb. concentrate eaten/day.

⑥_____lb. concentrate eaten/day x _____¢/lb. =

⑦_____ cost/day of concentrate.

⑦_____ cost/day of concentrate x _____ days on feed =

B _____

C. Cost of hay.

⑤_____ lb. feed eaten/day x .33 =

⑧_____lb. hay eaten/day.

⑧_____ lb. hay eaten/day x _____¢/lb. of hay =

⑨_____cost/day of hay.

⑨_____ cost/day of hay x _____ days on feed =

C_____

D. Miscellaneous costs.

_____ Entry fees
+
_____ Veterinary fees
+
_____ Show equipment
+
_____Other costs = D_____

E. Total cost.

A + B + C + D = E _____

F. Break-even price.

Ⓔ_____ total cost ÷ ③_____ lb. final weight =

F_____

REFERENCES

Slide Set

1. *Purchasing Your Beef Animal,* 76/105 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.

Printed Material

1. *Maximum Credit Charges Allowed in California,* Leaflet 2843. Order from county 4-H office.
2. *Shop for Your Loan,* Leaflet 2840. Order from county 4-H office.
3. *Before You Sign a Contract,* Leaflet 2836. Order from county 4-H office.
4. Livestock market reports.

Other Helps

1. Resource people, such as bankers and money management advisors.

FACILITIES & EQUIPMENT

Help each member decide how to provide the facilities and equipment suited to his project and resources. Good facilities and equipment help the individual do the job more efficiently, effectively, safely, and humanely. Facilities and equipment may be rented, borrowed, purchased, custom-made, or member-made. Before starting a beef project, the member needs to have completed his plans and arrangements for: living space (dry lot or pasture); shelter or housing; feeding and watering; fitting and showing; and handling (see *Management*, page 22).

Things Members Can Learn

Feeding space and watering facilities needed by animals.

Storage space needed for feed and equipment.

Kinds of shelter and housing used in area.

Safety around animals and equipment.

Things Members Can Do

Draw a plan of ground and building layout.

List equipment and facilities on hand and those needed.

Build or obtain items needed.

Maintain facilities and equipment.

KEY INFORMATION

Living space. Cattle need space for exercise and safety for themselves and their handlers. Provide about 900 square feet of pen area for the first animal on dry lot; 200 to 300 square feet more for each additional animal. If you use irrigated pasture, you need ½ to 1 acre per animal. If you use a small pen, you need some space for exercising the animal.

Shelter. A shelter protects the animal from harsh elements, such as sun, rain, snow, wind, or extremes of heat and cold. A simple, well-ventilated, 8- by 8-foot, three-sided lean-to is ample for one animal. Allow 7 feet of head room at the lowest point. The structure can be of metal, wood, or other materials.

During winter or rainy weather, protect cattle from extremely muddy conditions. You may need to provide a hard or raised surface for cattle that are confined in a small lot and that do not have access to pasture.

Water. Cattle require water for digestion, keeping cool, and other body functions. Provide clean, cool, drinkable water at all times. One animal needs 10 to 15 gallons per day. You can use an old bathtub, wash trays, a 50-gallon drum cut in half, commercial tanks, or automatic waterers. Buckets are best used only at fairs. Regularly clean water troughs or tanks.

Feeding. *For concentrates,* you need 2½ to 3 feet of trough space per head. You need a trough that is 6 to 8 inches deep, 15 to 18 inches wide, and with the top edge about 20 inches above the ground. Use small pans or boxes only at fairs. *For hay,* whether baled, cubed, or pelleted, you need 2½ to 3 feet of bunker or manger space per animal. *For minerals,* you need a small box that's about 12 by 12 by 6 inches and protected from rain.

Fitting and showing. Provide a show box for equipment. For more information, see *Fitting and Showing*, page 18.

Handling. Fences, pens, stocks, scales, loading chutes, head gates, and squeeze chutes are all useful and sometimes essential.

Other equipment. Such items as veterinary, dehorning, castration, hoof trimming, and other equipment may be needed. For details, see *Management*, page 22.

Special note. Consider problems of drainage, odors, flies, noise, and other environmental factors.

REFERENCES

Slide Set

1. *Beef Facilities and Equipment*, 75/147 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.

Films

1. *Beef and Health*, No. 27-650. Order from county 4-H office.
2. *Beef: California's True Bonanza*, No. 27-611. Order from county 4-H office.
3. *Beef Rings the Bell*, No. 27-514. Order from county 4-H office.

Teaching Aids

1. *Beef Cattle Guideline*, No. VEP-106. Order from Vocational Education Productions, California State Polytechnic College, San Luis Obispo 93401. (Charge: 25¢.)

Printed Material

1. *Dust Bags for Control of Flies on Cattle*, Leaflet 2294. Order from county 4-H office.
2. *Self-Feeder for Cattle*, Plan No. 6045, M 1124, USDA. Order from county 4-H office.
3. *Portable Calf Pens.* Plan No. 5933, M 1043, USDA. Order from county 4-H office.

Other Helps

1. Lumber yards, libraries, breed associations, farm supply stores, and farm catalogs.

FEEDING

A 4-H member may have an outstanding beef project with excellent facilities, but may not succeed because he has a poor knowledge of what makes a balanced ration for beef. Before getting an animal, the member needs to learn to identify various kinds of feeds and know their importance in the ration. The member can either mix home-grown grains in a balanced ration or buy a complete beef mix. In either case, the member must know the total cost of feed. As a leader, you need to help members understand that the lowest priced feed doesn't always make the best ration.

Things Members Can Learn

Learn feeds and feeding terms.

How to identify common feeds.

What feeding equipment is needed.

How to start an animal on feed.

Daily feed requirements.

Hand- and self-feeding methods.

Feeding precautions.

Most economical ways to obtain a ration.

Pounds of feed needed to produce 1 pound of gain.

About feed additives.

Nutritional deficiency symptoms.

How to figure the number of days an animal will be on feed.

How to keep feed records.

Things Members Can Do

Build or buy feeding equipment.

Purchase feed.

Feed an animal on a regular schedule.

Keep feed and water troughs clean.

Weigh animal at regular intervals.

Keep cost, gain, and other feeding records.

Visit a feed mill and feedlot.

Give a demonstration on feeds or feeding.

Help a younger member with feeds and feeding.

KEY INFORMATION

Feeding Equipment

For information about troughs, watering, storage, and other equipment, refer to *Facilities and Equipment*, page 10.

Feed Terms

Ration. The amount of feed an animal eats in 24-hours.

Balanced ration. A ration that has the correct amounts of protein, carbohydrates, minerals, and vitamins.

Roughage. Feed that is low in digestibility and high in fiber content. (Examples: hay and pasture.)

Concentrate. Feed that is high in digestibility and low in fiber content. (Examples: barley, oats, and other grains.)

Carbohydrates. Those nutrients in a feed that provide energy.

Fiber. That part of a feed that is hard to digest. (Examples: straw and plant stems.)

Minerals. These substances build bones and maintain good health. (Examples: calcium, sodium, phosphorus.)

TDN. Total digestible nutrients or that part of a feed that is digestible (energy).

Vitamins. Food nutrients that animals require in small amounts.

Feeding Tips

Don't change feeds suddenly. Feed at the same times every day. Feed only what the animal will eat without waste. Make sure that clean, fresh water is always available. Always have feed equipment and shade available. Provide sufficient trough space. Keep troughs clean.

Feeds to Know

Identify and know the uses of corn, barley, oats, milo, wheat (whole, ground, and rolled), beet pulp, bran, meat scraps, cottonseed meal, linseed meal, bone meal, iodized salt, alfalfa meal, and the difference between good and poor quality hay.

Sample ration. Feed this mixture with good quality clover or alfalfa hay.

Barley, ground or rolled	75 pounds
Cottonseed meal	5 pounds
Dried molasses, beet pulp	20 pounds
Total	100 pounds

Feeding Rules

Once you get the newly purchased calf home, put it on hay (free choice), water, and salt. *After 3 to 7 days* on feed, gradually add 1½ to 2 pounds of grain per day. *After 7 to 14 days,* increase grain to 2 to 4 pounds a day. *After 14 to 21 days,* increase grain to 5 to 7 pounds and hay to approximately 5 to 6 pounds per day. Then begin to reduce the amount of hay and increase the amount of grain fed. *After 21 to 30 days,* feed grain free choice. Don't feed more than the animal can clean up in 30 to 45 minutes.

Calves usually eat 2 to 3 pounds of feed for each 100 pounds of live weight. It takes about 10 pounds of feed to produce 1 pound of gain. Feed weights in pounds per level quart: barley, 1.1 pounds; whole oats, 1 pound; ground corn, 1.5 pounds; cottonseed meal, 1.5 pounds; and wheat bran, 0.5 pound.

Feeding Disorders

Bloat. Too much gas forms during digestion. Change feeds.

Scours. Diarrhea that may be caused by irregular feeding, by dirty feed troughs, pails, or water, and by some germs.

Impaction. Impaction of the digestive tract is usually caused by poorly balanced rations or roughages.

Hardware. Indicates that the animal has swallowed wire or some other material.

Feed Additives

Vitamin A. A nutrient an animal needs for good growth and health. Rations that contain good, green-colored hay may supply the required amount of vitamin A. Vitamin A may also be given by injection or as a feed additive.

Antibiotics. These are often added to a ration to improve animal health and increase gain. Follow the directions on the container label.

REFERENCES

Slide Sets

1. *Feeding Your Beef Animal,* 4-H-630 (slide set with cassette). Order from county 4-H office.
2. *California Livestock Forages,* 75/195 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.
3. *Animal Nutrition,* 4-H-465 (colored slide set with cassette). Order from county 4-H office.

Teaching Aids

1. Beef weight tape. Order from county 4-H office.
2. Feed sample kits. Order from county 4-H office.

Printed Material

1. Advanced 4-H project record sheets with feed records.
2. Feed companies have a host of suggested feeding procedures.
3. *Get in the Winner's Circle.* Order from American Polled Hereford Association, 4700 E. 63rd., Kansas City, Missouri 64130.
4. *The Young Cattleman.* Order from American-International Charolais Association, 1610 Old Spanish Trail, Houston, Texas 77025.

Other Helps

1. Resource people, such as local feed dealers, ranchers, and feedlot managers.

HEALTH

In this unit, members will: observe a normal beef animal; apply preventive measures to maintain animal health; determine the signs of a sick animal; and gain knowledge of correct treatment methods.

Things Members Can Learn

Normal animal body temperature; respiration rate; characteristics of nasal, eye, and oral discharges, of stool and urination, of healthy skin and hair coat; normal movement and appetite.

Signs of abnormal animal activity and effects on gain and ability to show and sell.

Preventive medicine, including sanitation (water, feed area, and manure disposal); correct, balanced feeding; vaccination and parasite control; good, well-maintained housing; safe handling and shipping techniques.

Treatment methods, including oral, injection, and topical.

Correct drug choices and reasons for selection.

Surgical methods of castration.

Dehorning and prevention of infection.

Things Members Can Do

Use a normal animal to take rectal temperature each day for a week (morning, noon, and afternoon); observe respiration, stool, skin, and hair coat.

Use preventive measures: provide good housing; feed balanced ration on regular schedule; maintain clean, fresh water and feed; provide clean bedding; and dispose of manure.

Vaccinate an animal.

Spray or dust an animal for fly control.

Treat an animal for grubs at the prescribed time.

Train and groom the animal.

Visit a feedlot or dairy and discuss health of animals, including signs of illness and possible treatments, with the manager.

Keep a chart on any illnesses of an animal, on treatments given, and daily or weekly observations.

Visit a slaughterhouse to observe carcass and gross anatomy. Study reasons for condemnation of organs.

KEY INFORMATION

The normal temperature of a beef animal is 100.5°F. and is measured rectally. Respiration rate is 20 to 30 breaths per minute; stand back from the animal and count the in-and-out movements of the ribs. Check the stool for: solid or liquid, color, undigested material, bloody, mucus content.

Treatment methods include oral, injections, and topical applications. *Injections* may be intramuscular, subcutaneous, intradermal, subconjunctival, intravenous, and intraperitoneal. *Topical* applications vary and include: systemic (pour-on grubicide); surface (dust, as for flies); or local (ringworm, eye, cuts). To select the correct drug, consider effectiveness, dosage, treatment intervals, precautions and adverse reactions, residues, and price. See the "Recommended Health and Vaccination Schedule for Beef."

RECOMMENDED HEALTH AND VACCINATION SCHEDULE FOR BEEF

WHAT	WHEN	COMMENTS
Blackleg Malignant Edema	Vaccinate at 4 to 6 months of age.	If done earlier than 3 months of age, repeat vaccination.
Brucellosis	Vaccinate at 4 to 8 months of age.	Heifers only. State provides vaccine, but it must be given by a veterinarian. (Only vaccination that requires services of a veterinarian.)
Infectious Bovine Rhinotracheitis (IBR) (Rednose)	Vaccinate at 4 to 6 months of age.	Recommended for calves to be shown and on ranches that have had this virus disease. **Don't do at same time as Brucellosis vaccination.**
Bovine Virus Diarrhea (BVD)	Vaccinate at 6 to 8 months of age.	Recommended for calves to be shown and on ranches that have had this virus disease. **Don't do at same time as Brucellosis vaccination.**
Parainfluenza (PI_3)	Vaccinate when needed.	Recommended only if respiratory problems occur. Can be sprayed in nose or injected intramuscularly.
Leptospirosis	Vaccinate at 4 to 6 months of age; vaccinate breeding cows each year.	Can be done at same time as Blackleg or IBR. Can vaccinate pregnant cows.
Intestinal worms	Drench at weaning, any time animal appears parasitized, or once every 6 months or each year.	Use Thibenzole®, tetramisole, or Loxene in amount recommended on container label.
Scours and Pneumonia	Medicate when required.	Sulmet boluses or liquid. Call veterinarian if animal does not respond.
Bacterial infections	Medicate when required. Vaccination may help.	Use combination of antibiotics—penicillin and streptomycin. **Boil needles and syringes; don't use disinfectants** since they can kill if injected into animal. Call veterinarian if animal doesn't respond.
Pinkeye	Medicate when required.	Use antibiotics in eye. Place animal in shade and out of dust. Fly control is best prevention.
Lice	Fall and early winter as needed.	Recommend use of spray. Follow directions on container label. Several effective insecticides available.
Cattle grubs (heel flies, warbles)	Treat at end of heel fly season, usually September.	Use organophosphates in pour-on or spray forms. **Follow label directions exactly.**
Foot rot	Medicate as required.	Use antibiotics. Prevent by keeping animals out of mud.

® Registered trade name.

CAUTION

LIVESTOCK
PESTICIDE USE WARNING — READ THE LABEL

CAUTION

Pesticides and drugs are poisonous and must be used with caution. READ the label CAREFULLY BEFORE opening a container. Precautions and directions MUST be followed exactly. Special protective equipment (as indicated) must be used.

STORAGE: Keep all pesticides and drugs in original containers only. Store separately in a locked shed or area. Keep all pesticides and drugs out of the reach of children, unauthorized personnel, pets, and livestock. DO NOT STORE with foods, feeds or fertilizers. Post warning signs on storage areas for all chemicals, pesticides, and drugs.

USE: The suggestions given in this publication are based upon best current information. Follow directions. Measure accurately, to avoid residues exceeding established tolerances. Use exact amounts as indicated on the label, or lesser amounts as specified in this publication. Use a pesticide or drug only on animals listed on the label.

CONTAINER DISPOSAL: Consult your Agricultural Commissioner for correct procedures for rinsing and disposing of empty containers. Do not transport pesticides or drugs in vehicles with foods, feeds, clothing, or other materials, and never in a closed cab with the vehicle driver.

RESPONSIBILITY: The livestock owner is legally responsible for proper use of pesticides, including drift to other crops or properties, and for excessive residues. Pesticides should not be applied over streams, rivers, ponds, lakes, run-off irrigation or other aquatic areas, except where specific use for that purpose is intended.

PERMIT REQUIREMENTS: Many pesticides require a permit from the County Agricultural Commissioner for possession or use. Such compounds mentioned in this publication are marked with an asterisk (*).

ANIMAL INJURY: Certain pesticides or drugs may cause injury, or give less than optimum parasite control if used: (1) at the wrong animal age; (2) at the wrong time of year; (3) on animals under extreme stress or sick; (4) with the wrong formulation; (5) at excessive rates; or (6) in simultaneous use with incompatible materials. Read the label to be sure you are using the chemical properly.

PERSONAL SAFETY: Follow label directions exactly. Avoid splashing, spilling, leaks, spray drift or clothing contamination. Do NOT eat, smoke, drink, or chew while using pesticides. Provide for emergency medical care in advance.

REFERENCES

Slide Sets

1. *Examination and Observation of a Normal Animal,* 75/159 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.
2. *Detecting Illness and Determining Its Cause,* 76/110 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.
3. *Prevention and Treatment of Disease,* 75/146 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.

Films

1. *The Rumen Story.* Special order through county 4-H office from Cooperative Extension veterinarian.

Teaching Aids

1. Collection of bottle labels and insert literature of various drugs, vials, etc. A good responsibility for a junior leader.

Printed Material

1. *Lice on Livestock and Horses,* Leaflet 2298. Order from county 4-H office.
2. *Cattle Grubs,* Leaflet 2293. Order from county 4-H office.
3. 4-H Veterinary Science Project manuals for members and leaders: Unit 1, *Normal Animal;* Unit 2, *Animal Disease;* Unit 3, *Immunology, Zoonoses, and Public Health.* Order from county 4-H office.
4. *The Young Cattleman.* Order from American-International Charolais Association, 1610 Old Spanish Trail, Houston, Texas 77025.

Other Helps

1. Resource people, such as local veterinarians and experienced ranchers and herdsmen.

FITTING & SHOWING

This unit on beef fitting and showing includes information on feeding, leading, brushing, washing, and clipping. Correct knowledge of these points will help the member prepare an animal for fairs and expositions. Discuss fitting and showing topics in project meetings or on home visits. Encourage junior leaders to help members learn correct techniques.

Don't groom a member's animal for a show. Your role is that of an advisor; not a hired hand or herdsman.

Things Members Can Learn

How to correctly feed an animal.

How to overcome feeding problems.

Basic equipment and how to use it.

How to wash and groom animals.

Show weight classifications for market steers and feeding for those weights.

Base dates used in showing breeding animals.

How to read pedigrees.

How to enter an animal in a fair.

How to correctly feed and prepare an animal for showing at a fair.

How to correctly show an animal.

Things Members Can Do

Make a rope halter.

Wash and groom an animal.

If needed, clip an animal for show.

Visit a purebred cattle ranch where animals are being prepared for show.

Correctly train and polish horns on a horned animal.

Have a practice fitting and showing contest.

Read the premium book to find out: date entries are due; arrival time; show schedule; required health and registration papers; entry fees; awards and activities related to showing.

KEY INFORMATION

Feeding. Calves on full feed can gain 2 pounds or more per day from birth to 1 year of age. Most cattle will consume 2 to 3 pounds of dry feed per day per 100 pounds of body weight. Problems that often occur in beef projects can be traced to: feed ground too fine (most grain should be rolled, crimped, or coarse ground); feed intake reduced by a dirty, muddy feed box; dirty water or watering facility not kept filled; and feed that's stale or musty. For more information, see *Feeding*, page 12.

Leading. Gentle the animal. Place a rope halter on it. Tie the halter lead about 18 inches above ground level; tie to the manger for a few days at first. Leave enough slack in the rope so the animal can stand or lie down. Use a knot you can untie easily.

Start practicing by leading the animal to water. *Don't tie an animal behind a vehicle to teach leading*. Lead at least once a week during winter months. When preparing for a show, lead the calf about 1 mile each day—it's good exercise and training. Walk on the left side and hold the lead strap in the right hand. Keep the animal's head up so its topline is level while walking.

Teach the animal to stand in place for at least 10 minutes at a time. Train the animal to stand so its feet are squarely under the body. Practice using a show stick early in the training process. Make all movements with the show stick carefully and quietly. In the show ring, lead in a clockwise direction and leave about 3 feet of space between your animal and the others in line.

Grooming. Frequent brushing and washing are necessary for a clean, attractive hair coat. Wash animal monthly. Then 5 to 6 weeks before show, start giving it a bath once a week. Brushing twice daily for at least 10 minutes each time cleans and conditions the hair. Brush downward with a rice root brush to brush out dirt. Then brush upward from the belly to the topline, first with the rice root brush and then with a scotch comb.

Cool temperatures are conducive to a good hair coat; keep the calf in a cool, shady place during the daytime. You can encourage the growth of extra hair coat by wetting and curling the animal's hair at dusk and by turning the animal out at night during warm weather.

Know the clipping preferences for the breed. Angus heifers: clip head and tail. Hereford heifers: clip tail only. Polled Hereford heifers: clip tail and poll, but not the rest of the face. Shorthorn heifers: do not clip. Polled Shorthorn heifers: do not clip. Horned cattle: clip tail, but never clip head. Steers of all breeds: clip head and tail.

Points showmanship judge may observe. Is the animal clean? Are the feet correctly trimmed? Is the animal correctly groomed? Is the exhibitor correctly dressed? How well does the exhibitor handle the animal? Does he lead the animal quietly and leave adequate space between his animal and the others in line? Does the exhibitor correctly pose the animal? Does he keep the animal between the judge and himself? Does he keep one eye on the animal and one eye on the judge at all times? Does the exhibitor practice good sportsmanship?

REFERENCES

Slide Set

1. *Fitting and Showing Beef,* 76/106 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.

Printed Material

1. *Get in the Winner's Circle.* Order from American Polled Hereford Association, 4700 E. 63rd., Kansas City, Missouri 64130.
2. *Some Tips on Fitting and Showing Club Calves.* Order from American Hereford Association, Hereford Drive, Kansas City, Missouri 64105.
3. *Guide for the Future Cattleman.* Order from American Shorthorn Association, 8288 Hascall St., Omaha, Nebraska 68124.
4. *The Young Cattleman.* Order from American-International Charolais Association, 1610 Old Spanish Trail, Houston, Texas 77025.
5. *The Star of the Future.* Order from American Angus Association, 3201 Fredrick Blvd., St. Joseph, Missouri 64501.
6. Commercial grain and feed companies have several promotional and educational brochures about feeding and fitting.

Other Helps

1. Herdsmen who exhibit purebred cattle at shows.

MARKETING

This unit helps members explore the marketing system and its importance. The emphasis is on the need for decision making, including how to develop marketing plans. Production and marketing are the most important functions of a business. A 4-H beef project is a business enterprise. Profit is the motive for going into business. Financial profit (money) keeps economic wheels in motion; social and human values (honesty, integrity, respect, and cooperation) keep society in motion. This project provides opportunities to share in both returns.

Things Members Can Learn

Where a market is, what makes it, how price is determined. Differences between: commercial livestock and junior fair auctions; auctions and central, direct, and private treaty markets.

How to figure expenses and needed selling price.

Find out about dressing percentage, grades, shrinkage, retail cut-out value, meat inspection and grading, brand inspection, Market News and Livestock Inspection services.

Reasons for animal and carcass condemnation, such as stilbestrol withdrawal requirements to prevent residues in meat.

Things Members Can Do

Develop marketing plan before buying an animal.

Calculate expenses and income.

Line up buyers, get bids, advertise, or promote sales.

Organize record system for sales and ownership documents.

Send note of appreciation to auction buyers for premium prices paid.

Pay off loans and complete records.

See marketing in action. Take field trips to auctions, feedlots, slaughterhouses, meat lockers, and retail markets.

KEY INFORMATION

Marketing. There are no direct, government-imposed limitations on the production and marketing of livestock. It is a free-enterprise, open-market system.

Price. Price is determined by bargaining between buyer and seller. It fluctuates according to supply and demand.

Market information. The Federal and State Livestock Market News Service maintains mailing lists of livestock market news users. 4-H members and leaders may receive this information by writing to any of the following addresses: P.O. Box 675, El Centro 92243; 2321 West Washington St., Suite D, Stockton 95203; or 4747 Eastern Avenue, Bldg. 7, Bell 90201. 4-H members can also watch local newspapers for livestock market reports and cattle feedlot announcements.

Grades. Beef carcasses can be quality graded Prime, Choice, Good, Standard, or Commercial. They may also be given yield grades of 1 through 5. When used, quality and yield grades affect the price of the carcass. Quality and yield grading are optional to the slaughterer. All beef carcasses are inspected for health and cleanliness.

Progress and records. Periodically help members weigh calves, figure gain, cost of gain, and determine if growth progress is satisfactory. Tape measure method to estimate weight: stand calf on level ground with head straight forward. Measure heart girth; then measure length of body from 1 inch behind point of shoulder to center of pin bone. Multiply, in inches, heart girth by body length and then divide by 300. The answer equals the estimated weight in pounds. Have junior leaders help with this exercise.

Animal health. The use of antibiotics, insecticides, hormones, and vaccines is necessary to keep animals healthy and growing efficiently. None of these preparations leaves residues in the finished product when used according to instructions and for purposes intended. The federal Food and Drug Administration approves use of these materials only after exhaustive testing on need and safety. The animal health department and inspection services cooperate in monitoring meats to ensure that harmful chemical residues do not get into the public food supply.

REFERENCES

Slide Sets and Filmstrips

1. *Junior Livestock Auction at Fairs* (slide set with cassette). Order from county 4-H office.
2. *A Quality Wholesome Carcass Guaranteed,* 4-H-637 (slide set with cassette). Order from county 4-H office.
3. *Identification of Cuts of Beef,* No. 298 (script on slides). Order from Visual Aids, U.C. Davis 95616.
4. *Selection of Retail Beef Cuts* (filmstrip). Order from California Beef Council, 463 Brewster Avenue, Redwood City 94063. (There is a charge for this filmstrip.)

Films

1. *Beef Rings the Bell,* No. 27-514. Order from county 4-H office.

Teaching Aids

1. Beef weight tape. Order from county 4-H office.

Printed Material

1. *Federal and State Livestock Market News Report.* California: P.O. Box 675, El Centro 92243; 2321 West Washington St., Suite D, Stockton 95203; or 4747 Eastern Avenue, Bldg. 7, Bell 90201.
2. *The Modern Beef Steer,* Leaflet 2235. Order from county 4-H office.
3. *Weight vs. Shape,* Leaflet 2942. Order from county 4-H office.
4. *USDA Yield Grades for Beef,* MB 45. Order from Publications Division, Office of Communication, U.S. Department of Agriculture, Washington, D.C. 20250.
5. *Illustrations of the Lower Limits of Certain Degrees of Typical Marbling Referred to in the Official U.S. Standards for Grades of Carcass Beef.* Contact your county livestock farm advisor to see if he can loan you these illustrations; or request a copy from USDA Consumer and Marketing Service, Livestock Division, Washington, D.C.
6. You can obtain information and many USDA publications by writing to: GPO Bookstore, 450 Golden Gate Avenue, San Francisco 94102.

Other Helps

1. Resource people, such as livestock buyers, brand inspectors, and others.

MANAGEMENT

Beef management spans most of the subject matter in the animal science projects—planning, selection, facilities and equipment, breeding, feeding, health, marketing, and record keeping.

Things Members Can Learn

The hows and whys of livestock identification.

Value of weighing and evaluating animals.

How to throw or restrain animals safely and securely.

Safety around animals and equipment.

Breeding procedures.

Value of keeping and using records.

Things Members Can Do

Develop a calendar of operations and activities.

Keep and use records.

Identify animals by methods, such as branding, tattooing, ear-marking.

Weigh and evaluate animals.

Castrate bull calves for market use.

Dehorn or train horns.

Trim feet.

KEY INFORMATION

The following calendar plan is a general management guide for beef project members. Adjust dates and operations according to the climate, type of industry, farms, and available resources in your area.

Calendar Plan

October-November

Obtain necessary financing.

Provide needed facilities and equipment.

Select calves that weigh 450 to 500 pounds for market project.

Select high-quality bred heifers for breeding project.

Wean spring calves from breeding project.

Break calves to lead.

Start calves on grain ration to promote growth; increase grain amounts gradually.

Treat for lice and grubs if needed.

December-January

Winter calving problems.

Dehorn, castrate, vaccinate, identify fall calves.

Increase grain level of steers.

Feed roughage to breeding heifers.

Start training horns on horned breeding heifers.

Treat for lice if needed.

February-March-April-May

Weigh calves periodically and adjust feed as needed.

Break calves to lead or continue training.

Brush calves frequently.

Breed females for winter calving.

Spring calving problems.

Dehorn, castrate, vaccinate, identify winter calves.

Plan and present a demonstration.

June-July

Control flies, dust, and odors.

Watch for pinkeye and treat as needed.

Learn fitting and showing techniques.

Provide summer shelter.

Wean winter calves; vaccinate and weigh.

Trim feet as needed.

August-September

Breed females for spring calving.

Wash and curl hair coat on show animals.

Clip hair.

Show animals at county fairs.

Sell market animals.

Dehorn, castrate, vaccinate, identify spring calves.

Complete records and record books.

Make project plans.

REFERENCES

Slide Set

1. *Beef Cattle Management*, 75/145 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.

Films

1. *Your Biggest Advantage* (28 minutes, color, sound). Order from American Angus Association, 3201 Fredrick Blvd., St. Joseph, Missouri 64501. (Pay postage only; give date and alternate date to be shown.)

Printed Material

1. *Beef Cattle Breeding*, AB 286, USDA. Order from county 4-H office.
2. *Beef Cattle Breeds*, F 2228, USDA. Order from county 4-H office.
3. *Beef Cattle: Dehorning, Castrating, Branding, and Marketing*, F 2141, USDA. Order from county 4-H office.
4. *Feeds and Feeding*. F.D. Morrison. 1956. 22nd edition. Ithaca, New York: Morrison Publishing. Book is usually available at local libraries or county 4-H office.
5. Handbooks on feeding from feed companies.

Other Helps

1. Resource people, such as brand inspectors, veterinarians, and others.

EXTRA ACTIVITIES

Extra activities add another dimension to the animal science program, enriching a member's experience in the beef project. These activities may be done by a member (individual judging), by two or three members (demonstration), or, in some cases, by a group (tours, community service activities).

Things Members Can Learn

Different breeds of animals.

Factors in selecting the modern-type animal and how they relate to carcass evaluation.

The wholesale and retail cuts of beef.

Nomenclature of the animal.

To make decisions by judging animal classes and giving reasons. How to be a more effective speaker by giving oral reasons in judging and by presenting demonstrations.

To promote livestock conservation through animal health, loading and hauling safety, and correct facilities, such as pens, housing, etc.

Things Members Can Do

Observe type demonstrations of animals.

Participate in judging events to improve type concept.

Observe other members' demonstrations on beef cattle.

Participate in demonstrations or judging contests to improve speaking ability.

Identify live animal and carcass nomenclature.

Cooperate with breed associations to promote the modern-type beef animal.

Plan and conduct livestock selection schools, demonstration events, and skills days.

Stress livestock conservation through individual study as well as group involvement.

KEY INFORMATION

Demonstrations. One or more members give planned presentations to teach—by illustration or example—specific information about a project or activity. Encourage junior leaders to promote demonstrations within project groups.

The member's first demonstration is best kept simple and about a part of the project he understands well. A young 4-H'er needs guidance, direction, and encouragement. Make practicing fun. Your praise of the member is invaluable and is key to building member self-confidence.

Help the member make a simple step-by-step outline, such as:

1. Introduction—why the topic is important.
2. Body—show and tell about important steps of process.
3. Summary—what was accomplished, what it meant to the demonstrator, and what it could mean to the audience.

Assist members to find the newest references for preparing demonstrations and to be original in title, introduction, body, and summary. Counsel members on steps in developing demonstrations, such as visualizing the audience, choosing a subject, deciding on a goal, gathering information, working out a plan, choosing equipment and visuals, practicing, and delivery. Encourage members to be neat, clean, well-groomed, and appropriately dressed for the occasion. Review demonstration judging sheet with the members.

Livestock conservation. Every beef project leader and member needs to be concerned about livestock conservation. Individual and organized group efforts can provide much knowledge on this often misunderstood subject. Encourage members to: participate in the livestock conservation program "Let's Solve a Problem"; do a research paper about livestock conservation; give a livestock conservation demonstration; conduct a safety check on a rancher's equipment, pens, gates, etc.; or conduct a safety check on how animals are loaded and hauled. These activities may lead older members to develop self-determined projects.

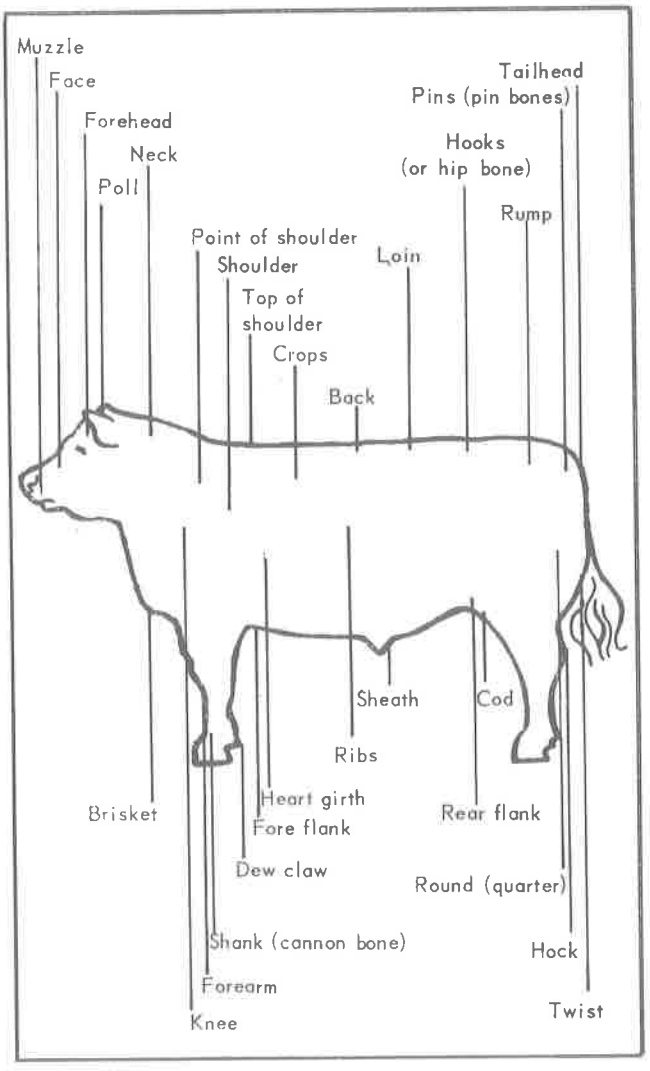


Figure 1. Parts of the beef steer.

Judging. Judging is the process of analyzing animals and measuring them against a standard commonly accepted as the ideal type. In livestock circles today, much is heard about the modern-type steer. Would you know one if you saw it? To recognize the modern-type animal, leaders and members must: have a mental image of the ideal type; know animal nomenclature; develop keen powers of observation; coordinate live animal selection with carcass evaluation; make logical analyses; develop independence of thought and ability to give effective reasons; and practice judging.

The modern-type steer: is a long-bodied, well-muscled animal that has a minimum of waste fat; has high yield of muscle in relation to fat and waste; weighs 1,000 to 1,100 pounds at 12 to 14 months of age; grades Choice; has 2 square inches or more of rib eye area per 100 pounds of carcass weight; has 3.5% or less kidney fat.

Entering judging contests. In project meetings, help each member learn how to do the following things. Enter a contest and correctly mark his placing on a judging score card. Observe a class and animals within that class. (As the member looks at animals from the rear when the class is lined up, the number one animal is on the left and the number four animal is on the right.) Observe the animals from a distance of 10 to 20 feet. Avoid the temptation of standing too close to the animals; judging can best be done from a distance where you can get a full view of the animals.

Develop a system for observing and comparing animals; view the animals from the side, rear, front, top, and while walking and use the same order each time. Study the entire class; make comparisons between one animal and the ideal as well as between one animal and another. (The time element is usually 10 to 12 minutes for judging a class.) Take notes on a class and study these in preparation for giving oral reasons. Follow instructions about where and when to give reasons; deliver reasons without notes.

By developing and presenting oral reasons in livestock judging, the member has an opportunity to justify his evaluations. When giving reasons, remind the member to: keep presentation short (about 2 minutes); stand 6 to 8 feet from the judge (stand erect, feet apart, hands behind back); look the judge straight in the eye; be definite; speak slowly and clearly in a conversational tone; have smooth delivery; and use correct grammar. Stress an animal's good points; use comparative terms to bring out major differences. Deliver concise, final statement and end reasons strongly.

REFERENCES

Slide Sets

1. *Variations in a Demonstration Theme,* 75/190 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.
2. *Livestock Conservation,* 75/192 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.
3. *Steps in Beef Judging,* 75/160 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.

Printed Material

1. *4-H Presentations—Leader's Manual,* 4-H 8046. Order from county 4-H office.
2. *Livestock Judging and Evaluation.* Order from Audio-Visual Production Department, Memorial Center, Purdue University, Lafayette, Indiana 47907. (Charge: $1.50 plus postage.)
3. Materials on animal conservation. Order from Livestock Conservation, Inc., 19 West Chicago Avenue, Hinsdale, Illinois 60521.
4. Miscellaneous animal selection materials are available from beef breed associations.

Other Helps

1. Invite livestock judges to project meetings to discuss judging.

GROUP ACTIVITIES

Working together to "Make the Best Better" describes this unit. Some group activities may require that several members work together toward a common goal. (Example: provide a petting zoo for urban youth.) Other activities may involve the efforts of only one or two members. (Example: two members own the same animal and learn nutrition, health, etc.; or two or more members in a nonownership project manage a few head of animals for a rancher, feedlot operator, or other person.)

Group activities are applicable to rural, nonfarm, suburban, and urban youth projects. In a total animal science program, group activities have no boundaries. For example, those enrolled in foods and nutrition, woodworking, electricity, entomology, or other projects can easily participate in group activities related to the beef project.

Things Members Can Learn

How to work with a group—the role of the individual and that of the group.

Steps required in problem solving. (Example: an outbreak of a disease, its cause, control measures, and prevention.)

Conduct a survey, find possible solutions, execute a plan, and evaluate the results.

The animal and its environment, including animal selection, management, and feeding.

County zoning regulations that pertain to keeping animals.

Management, including genetics, selection, and production records.

Things Members Can Do

Participate in group tours—feed yards, livestock auctions or sales yards, veterinary clinics, technical schools (such as artificial insemination workshops), livestock symposiums or clinics, college or university animal science departments, farms, meat markets.

Cooperate with local government, civic groups, and others to provide a livestock petting zoo for urban youth.

Plan, design, construct, and maintain a local 4-H farm where suburban and urban 4-H members may keep animals.

Two or more members may purchase, feed, manage, and sell an animal.

Plan, conduct, and evaluate group activities, such as livestock judging schools, show-and-tell events related to animals, livestock conservation, demonstrations.

Coordinate group activities with *Public Relations*, page 29.

KEY INFORMATION

Group activities and public relations are first cousins. However, not all group activities are for public relations purposes and vice versa.

If you as a leader are responsible for helping members set up a 4-H farm, animal petting zoo, or other project, be sure to: 1) check with the organization leader of your club; 2) discuss the feasibility of the project, insurance coverage, etc. with the county 4-H Youth Advisor; 3) contact the individuals who own the property, note practicality for intended purpose,

rental cost, and insurance; 4) consult with the county planning commission about zoning regulations; 5) develop a tentative plan and discuss it with members and parents; and 6) work out an equitable plan of duties (contruction, general maintenance, clean up).

For group tours, you'll want to work with the individual or committee planning the tour. Review the purpose of the tour and remind all members about good conduct while on the tour. Make plans for evaluation and wrap up, including a thank you note to the host.

Other youth groups in the community may be interested in some of your ideas and ventures. Encourage cooperation and work toward reasonable goals.

REFERENCES

Slide Sets and Filmstrip

1. *Group Activities in Beef*, 75/158 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.
2. *Planning Your Exhibit*, No 354 (slide set with script). Order from Visual Aids, U.C. Davis 95616.
3. *Careers in Animal Industry*, No. 183 (filmstrip with illustrated script and taped narration). Order from Vocational Education Productions, California State Polytechnic College, San Luis Obispo 93401. (Charge: $7.95.)

Printed Material

1. Materials on animal conservation. Order from Livestock Conservation, Inc., 19 West Chicago Avenue, Hinsdale, Illinois 60251.
2. 4-H project leader guides. Order from county 4-H office.

Other Helps

1. Cattlemen's groups in your area.
2. Local civic and governmental groups.
3. Toastmaster's clubs.

PUBLIC RELATIONS

There are many opportunities to work, learn, and serve in this public relations unit. Three basic needs are to: 1) foster good relations with livestock producers, industries, and organizations; 2) improve public knowledge and appreciation of the animal sciences; and 3) help other people understand the need for raising animals for food, fiber, and recreation—balanced with a concern for the environment.

Things Members Can Learn

About breed associations (local, county, state) and their purpose.

Find out about junior memberships in breed associations, including fees, activities, benefits, etc.

About industry organizations, such as the cattlemen's associations (local, state, national) and cattle feeders associations, their purpose, and how they function.

Become better informed. Watch press/TV for news about industry improvements, issues, prices, and weather as it affects markets, pollution, and manure disposal.

About experts in your area who are willing to give talks or demonstrations on specific animal science subjects.

Which individuals or organizations in your area are concerned with promoting good public relations for the livestock industry. Find out what kinds of help these individuals or organizations need.

The different steps or processes involved in preparing meat from time of animal marketing until sold for home use.

Things Members Can Do

Join and become active in junior group of breed association.

Inform other 4-H members about how to become junior members of breed associations.

Assist organizations in promoting public relations or giving programs at fairs, public events, shopping centers.

Participate in breed association events, field tours, and other activities.

Work on junior fair boards and sales committees; find sponsors for events and other activities.

Use models and other teaching aids to give demonstrations on uses of meat or give cookout or barbecue demonstrations at fairs, schools, shopping centers.

Solicit industry support (money, meat, printed materials) for other 4-H members to use or to give out in visits or demonstrations.

Arrange livestock field days or tours for members.

Arrange animal fairs at schools.

Arrange for school or other youth group to tour a feedlot, farm, meat counter, or butcher shop. Help explain the operation and meat use.

Host a non-4-H member on a visit to a fair or farm to promote better understanding of the livestock industry.

Visit livestock-related industries—feedlots, slaughterhouses, rendering plants, pharmaceutical houses, veterinarians—to become better informed about various facets of animal science.

KEY INFORMATION

Public relations is an everyday job. Each activity can contribute to a personal store of information for use in conversation, formal talks, or demonstrations. Help the 4-H member always be alert to how he can help improve the public image or internal relations of the animal science industries. Learn to find and ask for assistance, whether time or other resources. People like to respond—as individuals or as organizations. Remember that an essential part of good public relations is acknowledging any type of assistance or participation. That can be done by letters, phone calls, or recognition at meetings or through press releases.

REFERENCES

Slide Sets

1. *Public Relations-Animal Science,* 75/161 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.
2. *Man-Animal Relationships,* 75/191 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.

Teaching Aids

1. *The 4-H Beef Carcass.* Special order from county 4-H office.

Printed Material

1. *The 4-H Reporter,* 4-H 8012. Order from county 4-H office.
2. *Shopping for Meat, Fish, Poultry, and Eggs,* Leaflet 2408. Order from county 4-H office.
3. *Freezer Beef—How to Buy It,* Leaflet 2234. Order from county 4-H office.

Other Helps

1. Chamber of Commerce, Farm Bureau, Grange organization.
2. Leading farmers.
3. Bankers.
4. County Cooperative Extension advisors.
5. Vocational agriculture teachers and departments.

SCIENCE

By working with cattle, you are really studying applied biology: how nutrition relates to feeding; the role of genetics and reproduction in breeding; and the importance of health to disease prevention. This unit provides a deeper look into how an animal grows, produces food, and reproduces.

Things Members Can Learn

How feeding, breeding, and management of beef cattle relate to the basic sciences of nutrition, genetics, physiology, and animal medicine.

The nutrient requirements of beef cattle.

How to meet these nutrient requirements, using available feed (range, pasture, hay) and necessary supplements.

The basics of a good breeding program.

About performance record systems—how they work and their value.

Cattle performance (daily gain, feed efficiency, etc.) and what beef carcasses look like.

How to increase the number of calves through better breeding practices.

Things Members Can Do

Study nutrition and feeding requirements of beef cattle.

Conduct feeding trials with the help of your county livestock farm advisor.

Explore the use of supplemental minerals and vitamins when they are deficient under local field conditions.

Study the genetics of beef cattle.

Explore the use of systematic breeding practices, including crossbreeding.

Contact breed associations and the California Beef Cattle Improvement Association for information about performance records.

Use a performance record system to measure the results of a sound breeding program.

Enter steers in the California feedlot and carcass evaluation program.

Study the reproductive functions of beef cattle.

Visit a college or university animal science department.

KEY INFORMATION

Genetics: the science of how characteristics are passed from parents to offspring.

Genes and chromosomes: complex chemical compounds that exist in pairs and are the carriers of inheritance. Each parent contributes one-half of the offspring's chromosome and genetic make up. Most animal characteristics are determined by several sets of genes; a few characteristics by a single gene.

Inheritance of sex: governed by chromosomes from the male. One-half the sperm cells contain x chromosomes; one-half contain y chromosomes. The eggs from the female contain only x chromosomes. There is a 50-50 chance for an xy chromosome matching, which produces a male offspring, and a 50-50 chance for an xx chromosome matching, which produces a female.

Heritability: the variation among animals caused by inheritance (from parents). Heritability is a measure of the resemblance of an offspring to its parents and can range from 100% (exactly like parents) to 0% (unlike parents). Animal variation can also be influenced by environment—differences in feed, climate, and other factors.

Traits: characteristics that animals can inherit. Traits are usually grouped into classes: low heritability (below 20%); medium heritability (20% to 40%); and high heritability (over 40%). Some important heritability estimates are:

Fertility	10%
Weaning weight	30%
Rate of gain in feedlot	45%
Rate of gain on pasture	30%
Yearling weight/day of age	45%
Carcass grade	30%

Animal nutrition: the study of the feeding process and how the animal uses feed.

Digestion: the process the animal uses to break down feed for use by the body.

Digestive tract: the route feed follows as it is broken down—mouth and teeth, stomach, small intestine, large intestine, anus.

Ruminant: an animal that has a complex stomach divided into four parts—rumen, reticulum, omasum, abomasum. This type of stomach allows the animal to digest high-fiber diets. Examples of ruminants are cattle, sheep, goats, and deer.

Nutrients: types of chemicals—water, proteins, vitamins, minerals—that animals must get from feed for good growth and health.

Nutrient requirements: the amount of each nutrient needed for growth, fattening, reproduction, and lactation. These nutrient amounts vary with the sex of the animal, species, and environmental influences.

Crude protein: all the nitrogen-containing compounds in a feed.

Digestible protein: the amount of usable protein in a feed. For roughages, digestible protein is approximately 60% of the crude protein; for high-concentrate feeds, 75% of the crude protein.

Ether extract: a measurement of fat in a feed. Fat has 2.25 times the energy value of carbohydrates.

Fiber: hard-to-digest carbohydrates made up of cellulose.

Nitrogen-free extract: an indicator of the more easily digested carbohydrates—mostly starches and sugars.

REFERENCES

Slide Sets

1. *Animal Nutrition*, 4-H-645 (colored slide set with script). Order from county 4-H office.
2. *A Lesson in Genetics*, 76/112 (colored slide set with cassette). Order from Visual Aids, U.C. Davis 95616.

Films

1. Contact feed dealers, breed associations, and others for available films.

Printed Material

1. *Introduction to Livestock Production*. H.H. Cole. 1966. San Francisco: W.H. Freeman and Company. Purchase at local bookstores.
2. *Beef Cattle*. Neumann and Snapp. 1966. New York: John Wiley and Sons. Purchase at local bookstores.
3. Federal, state, and local publications available from county 4-H office.

CALIFORNIA BEEF INDUSTRY

The beef industry is a major part of California's total agricultural economy. Californians consume more beef than any other meat, yet raise only one-half of what is consumed in the state. Cattle graze millions of acres of land; even more land is used to grow crops for livestock feed. Much of the land used for cattle is used for other purposes, such as recreation (hunting, fishing, camping, hiking), timber production, and watershed areas.

This unit looks at the scope of the livestock industry, its relationship to our environment, and the varied types of production methods.

Things Members Can Learn

The contribution of cattle sales to your county's total agricultural income.

About people and businesses involved in producing meat for home use.

Purposes and activities of cattle organizations.

Importance of cattle in using by-products and feeds not used by man (forage, nonprotein nitrogen, crop wastes).

Different types of production methods used to grow and finish beef cattle.

The important role of beef animals in maintaining the quality of the environment.

How beef production and recreation may often be two sources of income.

The many products gained from cattle, other than beef—leather, medicines, other.

Things Members Can Do

Contact organized state groups that represent the beef industry.

Talk to officers of county cattlemen's associations.

Visit operating ranches and feedlots.

Visit allied industries (feed mills, auctions, slaughterhouses, retail stores, institutional processors).

Study and learn the significance of beef cattle market figures distributed by the California Crop and Livestock Reporting Service.

Prepare and present demonstrations showing the importance of the beef industry.

KEY INFORMATION

In 1975, Californians consumed a total of 5 million head of beef cattle—more than 150 pounds of beef carcass weight per person. The average per person consumption in the rest of the United States was 120 pounds. The actual annual consumption of edible beef was about 65 pounds per person or approximately 1.7 ounces per day of cooled weight.

California produces approximately 800,000 to 900,000 calves each year; it feeds about 1¼ million head per year. Nationally, California ranks about seventh in the total number of cattle produced; about fourth in the number of cattle fed; and about third in the number of head slaughtered.

REFERENCES

Slide Sets

1. *California Beef Industry*, 75/188 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.
2. *California Livestock Forages*, 75/195 (slide set with cassette). Order from Visual Aids, U.C. Davis 95616.

Films

1. *The Changing Cowboy* (16 mm., 25 minutes, color). Order from American Hereford Association, 6613 N. McKelvey, Clovis 93612. (Charge for postage only.)
2. *Your Best Beef Buy* (16 mm., 11½ minutes, color). Order from American Angus Association, 3201 Fredrick Blvd., St. Joseph, Missouri 64501. (Charge for postage only.)
3. *Beef: California's True Bonanza*, No. 27-611. Order from county 4-H office.

Printed Material

1. *The Brand of a Boy*. Order from California Beef Industry, 463 Brewster Avenue, Redwood City 94063.
2. *Facts from the California Beef Industry*. Order from California Beef Industry, 463 Brewster Avenue, Redwood City 94063.
3. *California Livestock Report; Cattle on Feed Report;* and *California Livestock Annual Report*. Order from California Crop and Livestock Reporting Service, P.O. Box 1258, Sacramento 95806.
4. *A Steer's Not All Steak*. Order from California Beef Council, 1436 Rollins Road, Burlingame 94010.

= 22 RULES OF BEEF SHOWMANSHIP =

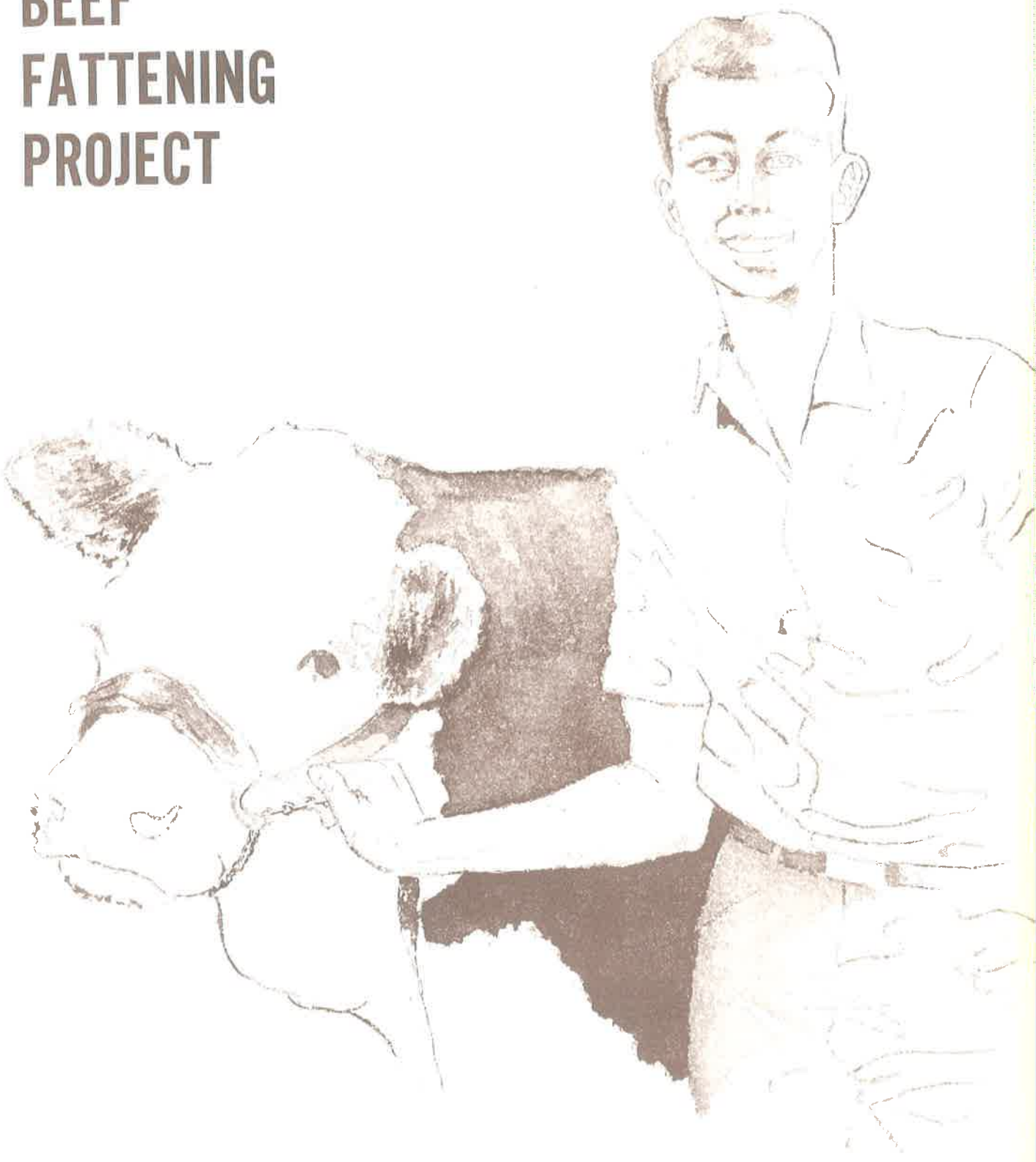
A good beef showman wears his 4-H uniform, and:

1. Makes sure the nose strap of a leather halter is midway between the eyes and nose.
2. Places the halter over-strap behind the calf's ears.
3. Has clipped the heads of polled and well-dehorned calves to a point about 3 inches back of the ears. The ears are trimmed on the back side only. The heads and ears of stub-horned and long-horned calves are left untrimmed. Never trim the inside of the ear.
4. Has the horns, if any, clean, shaped, and polished.
5. Has the tail clipped from the twist to and including the rough hair on the tail-head. Telltale clipper marks should not be in evidence. Clipping should be done at least 5 days before a show.
6. Has the tail switch brushed out and made as fluffy as possible. Do this last, before going into the show ring.
7. Makes sure the hair coat is dry and clean. If oil is applied, it should never be enough to cause 2 hairs to stick together. Oil should be applied to head first.
8. Shows the hair coat smooth or curled depending on the length of the hair and which type of hairdo improves the appearance most. A smooth coat of hair emphasizes smoothness and quality. A curly coat emphasizes thickness and frequently camouflages weakness in conformation.
9. Carries a brush or comb in a handy rear pocket.
10. Holds the lead strap in his right hand while parading his calf. Keeps elbow bended so walks beside, not in front of, animal. Never pull your animal.
11. Leads his calf from the left side and holds the lead strap in the right hand from one or two feet from the head and at the height of the top of the calf's head. Keeps calf's head high enough to give stylish, alert appearance. The extra length of lead strap is carried in the form of several large loops in the same hand or in a roll. Walks forward...never backwards!
12. Faces the calf and holds the lead strap in the left hand while showing at a standing position.
13. Makes sure his calf stands with his back level, head up and alert, and with a "foot under each corner," like the legs of a table.
14. Always uses a lightweight show stick about 4½ ft. long. A small blunt nail protruding about a half inch from the lower end makes the stick more useful.
15. Places the hind feet before any effort is made to place the fore feet.
16. Turns the calf's head slightly in the direction of the same side handled by judge.
17. Steps aside if the judge indicates a desire to make a front inspection.
18. Presses extended finger tips against the calf's shoulder vein when requested to back him out of line. Backs his calf out of line and leads him into the new position when requested to move his calf from one place in a line to another.
19. Always walks around his calf leading it in a clockwise direction when it is necessary to move his calf from one place in a line to another. Never turn the calf around yourself!
20. Does not fight his calf, should it become restless. In a large class, when the judge is working at the further end, it's entirely permissable to rest the calf, even back it out of line, turn it around, and set it up again. Is careful to keep his calf in true line with the others in the class.
21. It is permissable and desirable to dress up the calf's hair with comb or bush, after the judge has finished his inspection, if its coat has become messed up.
22. And, do not forget that the feet should have been properly trimmed before show time, and blackened, if Angus.

Learn and practice these 22 rules of a good beef showman!

UNIVERSITY OF CALIFORNIA AGRICULTURAL EXTENSION SERVICE

4-H CLUB COMMERCIAL BEEF FATTENING PROJECT



4-H Ag—19a

Co-operative Extension work in Agriculture and Home Economics, College of Agriculture,
University of California, and United States Department of Agriculture co-operating.
Distributed in furtherance of the Acts of Congress of May 8, and June 30, 1914.
George B. Alcorn, Director, California Agricultural Extension Service.

AUGUST 1965--2M Rerun

4-H CLUB COMMERCIAL BEEF-FATTENING PROJECT

This project offers 4-H members the opportunity to purchase three or more feeder animals, raise them to market weight, and sell them. You will be expected to buy wisely, feed economically, manage properly, and market to your best advantage.

You will learn to:

- Purchase the type of cattle fed by commercial feedlot operators.
- Feed your cattle in a practical business-like manner.
- Develop your own feeding and management programs and evaluate the results.
- Use home-grown feeds efficiently, including forages.
- Keep good records of buying, feeding, and marketing.

How to Enter

Complete the application form at the end of this manual. Have it signed by your parents and your local 4-H leader and return it to your farm advisor.

Rules and Regulations

- A 4-H member who has raised at least one beef animal to market weight is eligible to participate in this project. He must complete the entry form and have it approved.
- The project consists of a minimum of 3 steers or 3 heifers, any breed. Final summaries will be figured on a "per-animal" basis. All animals will be identified at the time of purchase. No substitutions will be allowed.
- A project leader or committee will help locate animals for this project. The animals in each pen should be of uniform quality and weight.
- The 4-H project member will provide transportation of his animals to his own feedlot. The animals in this project must be kept and fed separately from other animals.
- Cattle must be on feed by the date determined within each club or county. The feeding period will be approximately 150 days. The project member may use any amounts of feed or combinations of feed that he wishes.
- Each project member must keep an accurate and complete current feed record in the book supplied for this purpose.
- The marketing date will be determined by the member and the project leader. The date will depend upon the weight and grade of the animals and the market situation.
- Animals in this project need not be halter broken. These animals cannot be exhibited individually.
- Exceptions to these rules can be made only at the discretion of the project leader or committee.

Procedures

- The project member must make a businesslike arrangement with his parents or others for the purchase of feed, use of equipment, and other costs involved. If he makes his arrangements for financing the project through a local bank, production credit association, or other lending agency, he will have the opportunity to become acquainted with local businessmen and credit procedures.

- The 4-H project leader or committee will visit the project about every 30 days to compare management and feeding practices, check records, and weigh the animals, if possible.
- The 4-H project member should take out insurance on his animals. (Use care in loading, unloading and moving cattle to avoid bruises and injury.)
- The project member must attend meetings of the project group. The members and the project leader or committee will decide how often these meetings will be held.
- Each member is responsible for marketing his own animals with the help of his project leader or committee. He should make every effort to follow the cattle through the slaughter and obtain a "killing" report.
- The project member will make a summary of his project at the conclusion of the project year.
- Recognition of individual accomplishment may be scored as follows:

Net return	25%
Rate of gain	15%
Cost per pound of gain	15%
Project management	15%
Neatness, completeness, accuracy	25%
Project story (not more than 300 words)	5%

Feeding Your Animal

There is no one way to feed beef cattle. There are several systems of feeding cattle that can be adapted to this beef-fattening project. You will need to plan for and provide feed that will make your calf grow and put on weight quickly. Consider the feeds raised on your farm and buy those feeds necessary to balance your feed rations. Study the cattle market and feed situation to help you decide on a system of feeding.

The relative amounts of grain and roughage fed are important considerations. Here is a suggested basic concentrate ration that can be fed with alfalfa or a mixture of alfalfa and oat hay:

Barley	70–75%
Molasses beet pulp	20%
Cottonseed meal	5–10%
(if roughage is part oat hay, use 10%)	

The following variations of this basic ration are suggested systems or guides for feeding calves and yearlings in the feedlot. These systems may be modified to suit conditions, methods, and feed available.

Dry Lot (in corrals with no pasture) – Same mix throughout feeding period.

a. **Feed with alfalfa hay.**	pounds
Barley (ground or rolled)	60
Dried molasses beet pulp	20
Corn (ground)	15
Cottonseed meal	5
	100

b. **Feed with oat or other nonlegume hay.**	
Barley (ground or rolled)	55
Dried molasses beet pulp	15
Corn (ground)	15
Cottonseed meal	10
Alfalfa meal	5
	100

c.	
Corn silage	10
Corn or milo (ground)	10
Alfalfa hay	2
Protein supplement	1.5

Evaluate your feed from the standpoint of cost. Protein feeds cost more than those low in protein. You may wish to make substitutions to reduce the cost of your concentrate. Consult your project leader on this subject.

Start by feeding each calf one or two pounds of grain per day and increase the amount about one pound every two days until the animals are on full feed. Feed them as much as they will clean up between feedings.

Your project leader and/or farm advisor will advise you on the use of feed additives and hormones.

Some Rules of Thumb on Feeding

1. A steer on full feed will gain an average of 2 to 3 pounds per day. He will consume 3 per cent of his body weight per day—two-thirds of this will be concentrate and one-third will be hay.

2. Animals need minerals to maintain good health. If minerals are deficient in your ration, feed your animals mineral supplements.

3. Daily rations listed are averages. A calf that weighs 500 pounds at the beginning of the feeding period will consume less than half the amount he will require when his weight approaches 1000 pounds.

4. It is important to feed your cattle regularly if they are to make good gains. Many feeders feed one-half of the ration in the morning and the other half in the evening.

5. Your animals require an ample supply of clean, fresh water. Clean troughs regularly to keep them free of algae and debris.

6. Heifers normally return a good profit when fed. They should be put on full feed in the fall and marketed when they weigh 750 to 850 pounds. They usually gain more slowly than steers but finish earlier.

7. Profits from cattle feeding depend on wise buying, skillful feeding, and careful marketing.

More Feeding Hints

1. Keep a salt lick available for the cattle at all times.

2. Avoid overfeeding.

3. Do not feed moldy or spoiled feeds.

4. Feed at regular times.

5. Avoid sudden changes in feed.

Shelter and Equipment

Expensive buildings are not required for cattle feeding. An open shed or lean-to attached to a barn is satisfactory if it is properly bedded.

Cattle need adequate room. Good feed bunks will pay for themselves in feed saved. Allow at least 2½ feet of feeding space per steer along the grain bunk. Protect the contents of mineral and salt boxes from wind and rain.

References

Farm Feeding Beef Cattle To Market Home-Grown Feeds, Agricultural Publication Circular 453, is available at your farm advisor's office.

4-H CLUB COMMERCIAL BEEF FATTENING
PROJECT RECORD

Name_____ Age_____

Address_____ County_____

Table I BEGINNING INFORMATION

Breed_____ Total number purchased_____

Date calves purchased and project started_____

Average weight when purchased_____ Total weight when purchased_____

Purchase cost per cwt $_____ Handling cost $_____ Total cost $_____

Estimated grade_____
(Fancy, choice, good, medium)

Individual identification of animals and weights:

	IDENTIFICATION	WEIGHT	FEEDER GRADE
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Purchased from_____

Describe ***in detail*** the system of feeding you plan to follow:_____

Table II FEED RECORD

MONTH	GRAIN* (Corn, oats, barley, mixed feeds)				SUPPLEMENT (Soybean, linseed, etc.)				ROUGHAGE (Hay, silage, etc.)				PASTURE	
Date	Kind	Lbs.	Price per cwt.	Cost	Kind	Lbs.	Price per cwt.	Cost	Kind	Lbs.	Price per cwt.	Cost	Unit price	Cost

MINERALS AND SALT

Kind	Lbs.	Price per cwt.	Cost
TOTALS			

TOTAL FEED COSTS

	Amount (lbs.)	Cost
Grain		
Supplement		
Roughage		
Mineral and salt		
Pasture (days)		
TOTAL		

*When commercially mixed complete feed (grain and protein together) is used, enter in GRAIN section.

Keep a record of feed purchases made during the month on a separate work sheet. Transfer the monthly totals to this table at the end of each month.

Table III

OTHER EXPENSES IN ADDITION TO FEED COSTS

Date	Item (Trucking, veterinary fees, commission, interest, etc.)	Amount
	Total	$

VISITS BY LEADERS

Date	Visitors (Extension agent, leader, or others)	Remarks

Table IV FEEDING BUDGET

Review Section – Feeding Points to Consider

A. COST OF FEEDER STEER

_____ lbs. weight x _____ ¢ per pound = _____
(1) (A)

B. COST OF CONCENTRATE MIX

_____ days on feed x 2½ lbs. average daily gain = _____ lbs. gain
(2)

_____ lbs. beginning weight + _____ lbs. gain = _____ final weight
(2) (3)

_____ final weight + _____ beginning weight = _____ lbs. = _____ average weight
(3) (1) 2 (4)

_____ average weight x .03 = _____ lbs. feed eaten per day
(4) (5)

_____ lbs. feed eaten per day x 2/3 = _____ lbs. concentrate per day
(5) (6)

_____ lbs. concentrate eaten per day x _____ ¢ per lb. = _____ cost per day of concentrate
(6) (7)

_____ cost per day x _____ days on feed = _____
(7) (B)

C. COST OF HAY

_____ lbs. of feed eaten per day x 1/3 = _____ lbs. of hay per day
(5) (8)

_____ lbs. of hay x _____ ¢ lb. of hay = _____ cost per day of hay
(8) (9)

_____ cost per day x _____ days on feed = _____
(9) (C)

D. MISCELLANEOUS COST

_____ Veterinary fees +

_____ Trucking costs +

_____ Other costs = _____
(D)

Total cost A + B + C + D = _____

Break-even price

$$\frac{\text{Total cost}}{\text{Final weight}} = \text{_____ ¢ per lb.}$$
(3)

PREPARING A BEEF FEEDING BUDGET
JOB BREAKDOWN

Important Steps	Key Points
I. Know the thumb rules	1. Average gain per day for a steer is 2½ pounds. 2. A steer will eat 3 per cent of his body weight per day. 3. A steer on full feed will eat ⅔ concentrates and ⅓ hay.
II. Figure cost of steer	1. Multiple weight of steer at time purchased by price per pound. 2. If from your own herd, figure fair market value.
III. Figure cost of concentrate mix	1. Find average weight: a. Multiple days on feed by estimated daily gain to find pounds gained. b. Add total gain to beginning weight to find final weight. c. Add beginning weight to final weight and divide by 2 to find average weight. 2. Multiply average weight by .03 to find average pounds of feed eaten each day. 3. Multiply average pounds of feed eaten each day by ⅔ to find pounds of concentrate eaten each day. 4. Multiply pounds of concentrate eaten each day by the total days on feed to find total pounds of concentrate eaten. 5. Multiply total pounds of concentrate by cost per pound to find total cost of concentrates.
IV. Figure cost of hay	1. Multiply average pounds of feed eaten each day by ⅓ to find pounds of hay eaten each day. 2. Multiply pounds of hay eaten each day by the total days on feed to find total pounds of hay eaten. 3. Multiply total pounds of hay by cost per pound to find total cost of hay.

SUMMARY

CONVERSION (Lbs. feed/lb. gained)																
COST/CATTLE DAY																
COST/LB. GAIN																
LBS./DAY GAIN																
LBS. FEED/ CATTLE DAY																
CATTLE DAYS (Feed days x No. of cattle on feed)																
NET GAIN																
FEED COST																
LBS. FEED																
FEED DAYS																
HEIFERS (NO.)																
STEERS (NO.)																
DATE IN																
OUT WT.																
IN WT.																
Animals on Feed (description)																

Table V CLOSING INFORMATION

Date marketed_____ Days on feed_____

Final individual weights and grades:

Identification_____ Weight_____ Final grade_____

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Final total weight_____ lbs. Average weight per head_____ lbs.

Starting weight_____ lbs. Average weight per head_____ lbs.

Gain per day per head_____ lbs.

TOTAL GAIN_____ lbs. AVERAGE GAIN_____ lbs.

Total gain divided by days on feed = _____ lbs. average daily gain

Total gain divided by total costs (Feed, labor, veterinary bills, etc.) = $_____ cost per pound of gain

Selling price per cwt $_____ Gross sale return $_____

Table VI

1. Gross sale return of all animals (Table V) $_____
2. Cost of all animals at start (Table I) $_____
3. Feed costs (Table II) $_____
4. Other expense (Table III) $_____
5. Total expenses (add lines 2, 3 and 4) $_____
6. Net return from project (line 1 minus line 5) $_____

SAMPLE APPLICATION FOR JUNIOR PROJECT LOAN

_____, California _____, 19____

To _____ Office

I, _____, residing at _____

P.O. _____, County of _____, California, hereby

apply for a loan of _____ for a term of _____ with interest at _____%,

payable _____ for the following purposes, to-wit:

1. To buy _____ head of _____ at $_____ per head.

2. To buy breeding stock as indicated below:

_____

3. To finance following crop production operations:

_____

My financial statement is as follows:

Assets		Liabilities	
a. Cash on hand or in bank	$_____	a. Notes and accounts payable	$_____
b. Accounts receivable (what others owe me)	$_____	b. Other liabilities (list)	
c. Market value of livestock owned	$_____	_____	$_____
d. Market value of crop products, feed, seed, supplies on hand	$_____	_____	$_____
e. Market value of real estate, buildings, equipment owned	$_____	_____	$_____
f. Cash surrender value of life insurance	$_____	_____	$_____
g. Stocks and bonds owned	$_____	Total liabilities (Sub total)	$_____
h. Other assets (list)			
_____	$_____	My net worth is (total assets minus total liabilities)	$_____
_____	$_____		
Total Assets	$_____	Total liabilities and net worth	$_____

A budget of my proposed operations follows:

ESTIMATED RECEIPTS		ESTIMATED EXPENSES	
a. Product and by-product sales list:		a. Purchase of stock	$_____
	$_____	b. Total feed needed	$_____
	$_____	c. Hired labor	$_____
	$_____	d. Seed and supplies	$_____
b. Miscellaneous credits (describe)		e. Equipment	$
	$_____	f. Rent	$_____
c. Value of closing inventory	$_____	g. Interest	$_____
d. TOTAL ESTIMATED RECEIPTS		h. Miscellaneous	$_____
		i. Opening inventory	$_____
	$_____	TOTAL LABOR INCOME (Total receipts minus total expenses)	$_____

Father's name _____ Father's business _____

Our farm consists of _____ acres and _____ head of livestock.

I am a student at _____ . My age is _____ years. I will keep an accurate record of my project and will furnish a copy of the record at the end of the season for credit file in your bank.

Dated _____ , Signed _____

RECOMMENDATION OF 4-H CLUB LEADER

I have known the applicant, _____ , for _____ years

and I recommend him for the loan requested. His record of completed projects follows:

_____

_____

Dated _____ , Signed _____

4-H Club Leader

APPROVAL OF PARENTS

I have considered the project which my son/daughter desires to carry on under the supervision of the club leader mentioned above and I consider that he/she has the ability to carry it out successfully and repay the loan applied for herein.

Dated _____

_____
Father

and _____
Mother

or _____
Guardian

Story
Record Book Insert

My 4-H Experiences with the 4-H Club Commercial Beef Fattening Project for the year 19_____.

(*Story*)

4-H Club Commercial Beef Fattening Project Pictures and Clippings, 19____.

Include pictures of yourself and your project. If possible, have pictures at the start and also at the end of project. You may include pictures of other 4-H Club activities.

The authors are Alex Gibson, Farm Advisor, Merced County and Richard E. Fleming, former Farm Advisor, Stanislaus County, assisted by William Mason, Farm Advisor, Stanislaus County; Horace Strong, Extension Animal Husbandman; and Jack E. Herr, County Director, Placer County.

4-H CLUB COMMERCIAL BEEF FATTENING PROJECT

Entry Form

Date _____

Name _____ Year in 4-H _____

Address _____ Phone _____

Age (Jan. 1 this year) _____ Date of birth _____

4-H Club _____ County _____

Size of farm _____ acres _____ Main crop _____

No. years you have carried a beef project _____ No. animals desired for this project _____

APPROVAL OF PROJECT ENTRY

_____ _____

(Signature of parent or guardian) Date

_____ _____

(Signature of project leader) Date

4-H

BEEF PROJECT

Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

REPRINTED NOVEMBER 1977

4-H—2004

To get the most out of your beef project —

- Attend club meetings regularly.
- Give demonstrations.
- Attend 4-H field days.
- Participate in county 4-H camps and other countywide 4-H events.
- Work with your leader and other 4-H members.
- Keep your record book up to date.
- LEARN BY DOING.

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture, James B. Kendrick, Jr., Director, Cooperative Extension, University of California.

5m–11/77–BT/LAM

BEEF FEEDING

In this project you may choose to feed either a steer or a heifer. However, before you select your calf, you should first decide where and when you want to show and sell your animal.

CHOOSE A BEEF-TYPE FEEDER CALF

The most popular beef breeds in California are Angus, Hereford, Shorthorn, their crosses, and these breeds crossed with Charolais. All of these breeds have good beef qualities. **Choose a calf with a purebred sire.**

When you select your calf, choose one that weighs 400 to 450 pounds. You can assume that it will take 180 to 200 days of drylot feeding to finish your animal to Choice market grade, although a 550- to 600-pound feeder should finish in 120 to 150 days. If you feed a steer, it should weigh about 1,000 pounds or more when it is finished; a finished heifer should weigh between 800 and 900 pounds.

HOW TO SELECT A CALF

Weight for Age

A 7- to 10-month-old calf should weigh from 450 to 600 pounds or more.

Grade

Your calf should be a feeder grade Choice or better. Dehorn it if necessary.

Disposition

Select a calf that is quiet and gentle. It should be easy to handle and should go on feed readily. A nervous or wild calf may be hard to handle and may not gain weight as rapidly as it should.

Health

Naturally you want a thrifty and healthy animal. Choose a calf that looks alert and has quality and style.

Do not select a calf with droopy ears, a runny nose, languid appearance, or extremely rough hair coat.

SELECTING YOUR CALF

If you are selecting your calf from a group of animals, stand a short distance away. This will give you a better idea of the general appearance of the calves. Look for a calf that is —

- above average in weight for its age
- exhibits excellent muscling and is long in the body
- stands wide in front and behind

Do not choose a calf that is unthrifty, small for its age, or that appears too short bodied or compact. Look for animals that have the characteristics exhibited in the following drawings.

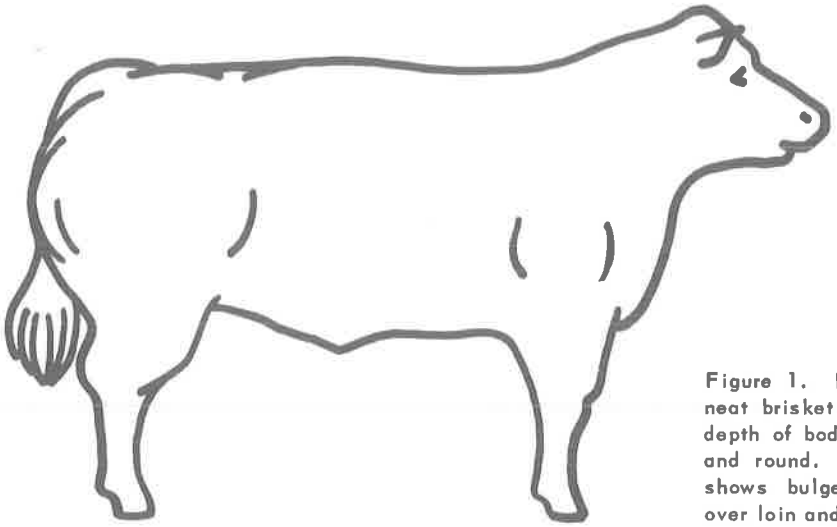


Figure 1. Long bodied and longer legged. Clean, neat brisket and dewlap. Trim middle and moderate depth of body. Cut up in the rear flank. Long rump and round. Muscular shoulder and forearm. Round shows bulge midway down. Strong top may bulge over loin and rump.

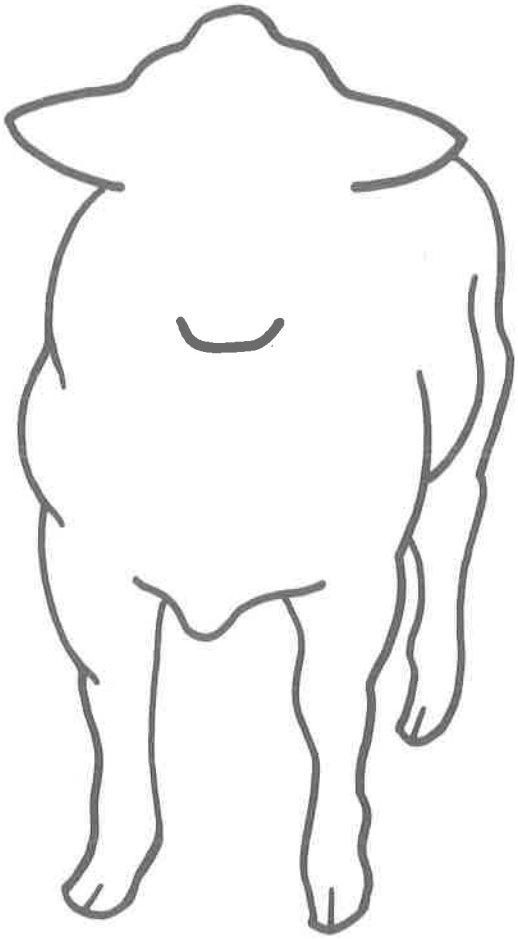


Figure 2. Shows muscle in shoulder and forearm by bulges. Trim brisket and dewlap. No excessive finish. Wide between the front legs.

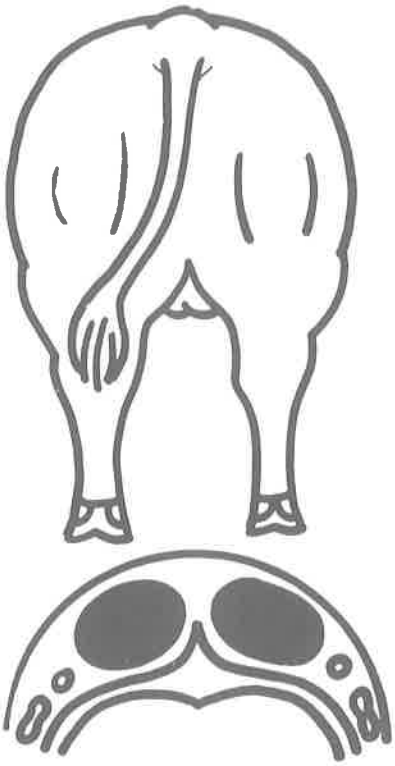


Figure 3. Thick and wide through middle of the rounds, halfway between tailhead and twist. Wide at pins. Stands and walks wide on hindlegs. Wide thick back, loin and rump with correct quonset shape (◠) turn over top. Carries muscling well down on legs. Tailhead may be prominent — no excessive fat deposits. Muscle creases evident.

Large ribeye muscle with minimum covering of finish.

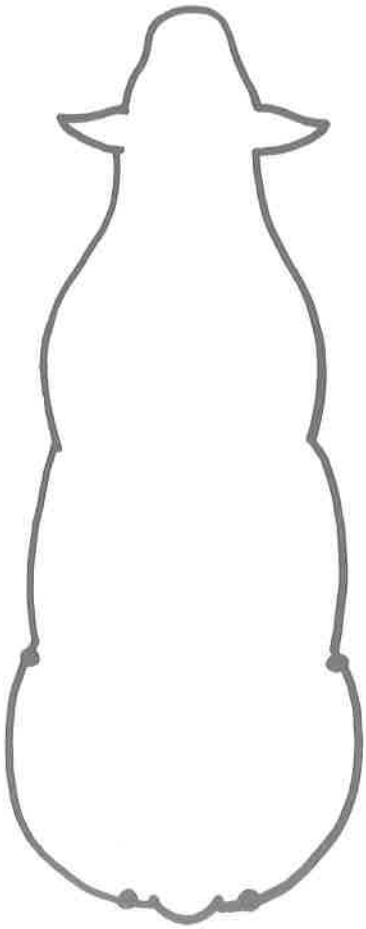


Figure 4. Indicates muscling in the shoulder and is not full and smooth back of the shoulders. Shows length through the back and from the hooks to the pins. Thickest through the rear quarters.

EQUIPMENT

Build or fix some kind of shelter to protect your calf from winter storms and summer sun. An 8-foot by 8-foot box stall or lean-to building is big enough for one calf, but it should be well-ventilated and free from drafts.

Feed Storage

Have enough storage space to protect feed from the weather. You should have enough space to store at least one week's supply, although you can save money — if you have the space — by buying in quantity.

Strong Pen

Make the pen about 900 square feet so that you can exercise your calf. Be sure to make it strong enough so that your calf cannot get out.

Rope Halter

You need a ½-inch-thick rope halter to tie up your calf and to use in teaching it to lead. It is more economical to make your own halter. See pages 19-21 for directions on how to make a rope halter.

Bedding

You can use straw, shavings, or sand. Clean the stall every day and add clean bedding when needed.

Feed Scales

You should have scales so that you can weigh your calf's feed.

Water Trough

This must be large enough to keep the water cool and to supply enough water for your animal for 24 hours. The top of the trough should be no higher than 20 inches from the ground.

Feed Trough

For one calf you will need a trough that is 30 inches long, 18 inches wide, and 6 to 8 inches deep. The top of the trough should not be over 20 inches from the ground.

Brush

Brush your calf often with a good rice-root brush to gentle it. This also keeps the hair and skin in good condition.

Show Equipment

The equipment you will need to prepare your calf for showing is illustrated in figure 7.

FEEDING YOUR BEEF CALF

You need to provide feed that will make your calf gain weight rapidly. Consider first the feeds you raise on your farm. Plan to buy only those feeds that you will need to balance the ration.

For best results, feed half the concentrate ration in the morning and the other half at night. If you have had feeding experience, or if you use a complete milled ration, you can self-feed your animal when it is on full feed.

A good ration should have —

- Balance — right amounts of proteins, carbohydrates, minerals, and vitamins.
- Roughage provided by hay, silage, etc.
- Concentrates such as corn, barley, oats, other grains, and meals.

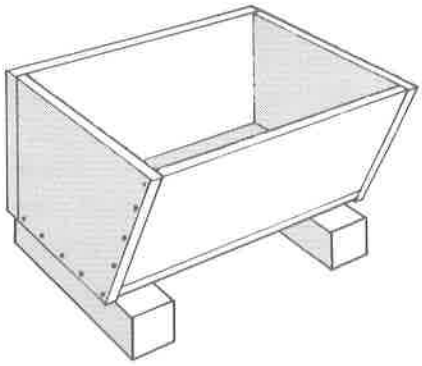


Figure 5. Feed trough for a single animal.

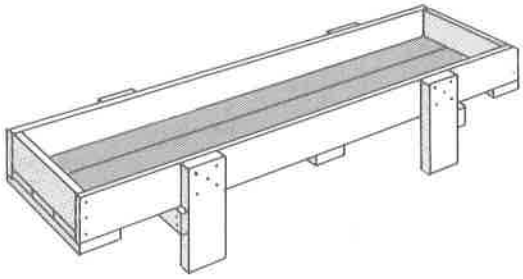


Figure 6. Feed bunk for several calves.

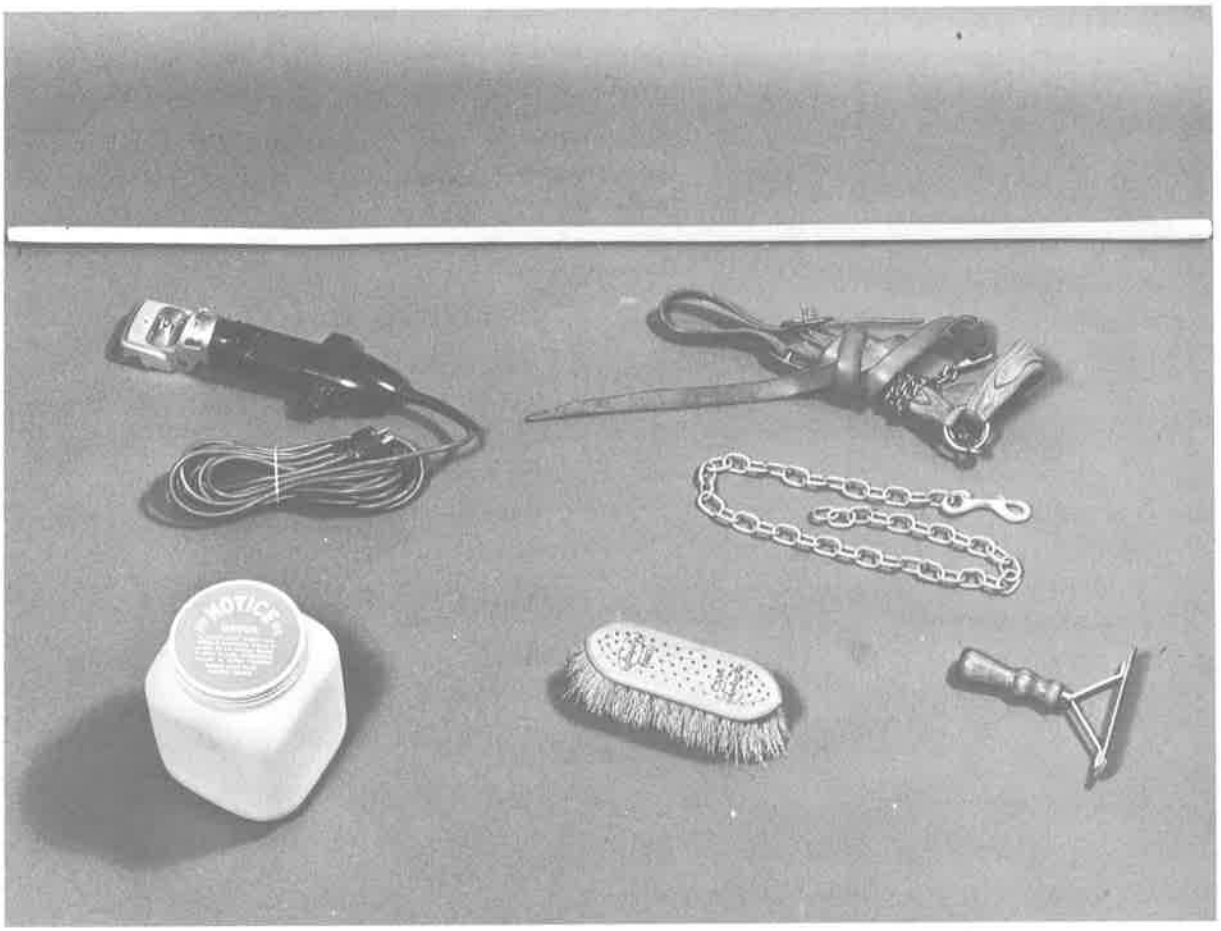


Figure 7. Equipment for grooming your calf includes clippers, soap, leather show halter, chain, lining comb, brush, and show stick.

- Protein to make your animal grow. Proteins build muscles and are found in cottonseed, soybean and linseed meal, and in alfalfa hay.
- Carbohydrates to produce energy and make animals fat. Barley, milo, wheat, corn, oats, molasses, and beet pulp are high in carbohydrates.

- Minerals to aid in digestion and body functions. Salt is usually the only mineral that you must supply. If good legume hay is fed with a well-balanced ration, no supplementary minerals except salt are needed. Otherwise, feed equal parts of trace-mineralized salt mixed with bonemeal or dicalcium phosphate.

A good ration must meet all your animal's needs for growth and fattening. The ration must be palatable — that is, your animal likes it — it should have variety, and it should be economical (low in cost).

Here are some concentrate mixtures that meet these requirements.

Feed this mixture with alfalfa hay —

Barley (ground or rolled)[1]	75 pounds
Dried molasses beet pulp	20 pounds
Cottonseed meal	5 pounds
	100 pounds

OR

Feed this with grain hay or nonlegume hay —

Barley (ground or rolled)[1]	70 pounds
Dried molasses beet pulp	15 pounds
Cottonseed meal	10 pounds
Alfalfa meal	5 pounds
	100 pounds

AND

Salt may be added to the ration — 1 percent of the mixture — or fed free choice in a separate box or salt block.

[1]Fifteen pounds of ground corn or milo can be substituted for the same amount of barley. Or either corn or milo can make up most or all of the grain fed, depending on price and availability.

HOW TO FEED A RATION

If you mix the feed for your calf, you will know better what it is fed and can watch the results as your calf gains. While there is no one way to get your calf started on feed, here are a few general suggestions.

Gradually start your calf on feed. You may start feeding just a double handful of concentrates daily with all the hay it wants to eat.

As your calf gets used to the feed, gradually increase the concentrates — it will then eat less hay.

When the calf is on full feed, the total feed will be about 3 percent of the calf's live weight, or 3 pounds of feed for each 100 pounds of the animal's live weight. This feed should be about 20 percent hay and 80 percent concentrates.

> Feed concentrates to the calf only at regular feeding time. Give only what it will clean up in 30 to 45 minutes — then feed hay.

Rules for Feeding Your Calf

Feed at regular times (twice daily).

Feed at the same time each morning and evening

Keep feed and water troughs clean.

Do not change feed suddenly.

Have plenty of fresh cool water available at all times.

Feed hay after grain.

Stilbestrol

Stilbestrol is a hormone that will increase your calf's daily weight gain by ⅓ pound to ½ pound per head per day when the animal is on full feed. Here is the best method for using stilbestrol.

- Implant 24 to 30 milligrams of stilbestrol under the skin of the ear of your steer.
- Heifers can be implanted with 12 to 15 milligrams of stilbestrol — no more. Do not implant heifers kept for breeding.

Vitamin A

It is a good practice to inject your calf with 1 million units of Vitamin A, preferably at the ranch before you ship it home.

GENERAL CARE AND MANAGEMENT

Gentle your animal as soon as you get it. Any calf will fight the halter and object to being tied up at first. After the calf is gentle, teach it to lead.

A Checklist of Management Practices

- ☐ Halter-break and gentle the calf.
- ☐ Avoid unnecessary disturbance around animals.
- ☐ Feed at regular times.
- ☐ Provide some exercise.
- ☐ Keep pens and stalls clean.
- ☐ Keep accurate records.

Your calf depends on you for the care that will keep it strong and healthy. Treat it for stomach worms (round worms) as soon as possible after you buy it.

NOTE

For instructions on treating your calf for parasites and diseases, refer to pages 11 to 12.

MARKETING YOUR FAT BEEF ANIMAL

During the time you have your animal on feed, keep in mind where you are going to sell it. Your animal should look as presentable as possible to the buyer, so be sure that your calf is washed, clipped, and groomed[2]. You should also have your animal trained to lead and show well.

There are several ways you can market your fat steer or heifer. You can sell it to a local buyer or at an auction, or you might sell it at your own local fair, Cal Expo, the Grand National Junior Livestock Show at the Cow Palace in San Francisco, or the Great Western Livestock Show in Los Angeles.

RECORDS

Keep records of the amount of feed required and your project expenses and income. You can use your calendar record to keep daily information.

At the end of the club year, you should complete your 4-H project report and give it to your leader so that he can sign and verify project completion.

If you wish to be eligible for any national awards or other 4-H awards, you must complete your project report.

[2]See pages 13 to 23 for information on fitting and showing.

BEEF BREEDING

You should have 2 years experience in a beef feeding project or comparable experience before you start a beef breeding project.

If your parents are in the cattle business, they can tell you whether or not it is a good idea to start a breeding project. If they are not cattle ranchers, ask your 4-H leader or farm advisor for advice.

If you decide on a breeding project, you will need the following things.

- Enough money to purchase a bred heifer or a cow with calf at side.
- Enough pasture to graze a herd that will increase in size.
- Hay and feed for your stock.
- Shed or barn for shelter in winter and shade for summer.
- Feed troughs and racks.
- Halter.
- Brush, comb, scotch comb, liner comb, show stick.

CATTLE DEFINITIONS

Bull – breeding male, any age

Cow – mature female that has had a calf

Heifer – female under 3 years of age that has not produced a calf, or has produced her first calf

Calf – young animal under 1 year old

Steer – male castrated when a calf

Yearling – any animal 1 to 2 years old

SELECTING YOUR BREEDING ANIMAL

Decide whether you should buy a registered purebred or a grade heifer or cow. Always buy a high quality animal, whether it is registered or grade.

Be sure the heifer or cow you buy has a conformation score of 88 or higher and that she has sufficient weight for her age. Always breed her to a registered bull that scores 89 or better.

Keep these points in mind when you select your heifer or cow.

The modern cow has a feminine head and is a bit longer and leaner in the neck than the old-fashioned cow. She is longer bodied, not too deep, but stands wide front and rear on medium bone. Her udder is long from front to rear, well-attached, and shows adequate capacity. She is correct on her feet and legs. She is selected on the basis of production records — her own and those of her dam — from herds with production records.

If you buy registered animals, make sure they meet breed requirements for color and markings.

Select a breed common in your community.

Get assistance in selecting your animal from your beef project leader, your farm advisor, or a successful breeder.

Purchase either a bred heifer or a cow with calf at side.

Beef cattle are scored on appearance and conformation. In addition, their weight for age is considered in their final evaluation.

The following score card may help you judge or grade your animal. Observe all the points listed on the score card.

UNIVERSITY OF CALIFORNIA
BEEF CATTLE GRADING AND INDEXING SCORE CARD*
(Score for Animal Number)

Value	1	2	3	4	5	6	7
1-15 Structural soundness, including legs and feet (correct and free from defects; adequate bone)							
1-10 General type, appearance, size and scale							
1-20 Thickness of body, muscling							
1-10 Length of body, trimness							
1-10 Loin (deep, long)							
1-10 Rump (long, wide)							
1-10 Round (thick, bulging, long)							
1-5 Ribs (well sprung)							
1-5 Neck and shoulders (smooth, refined-females; rugged, masculine-males)							
1-5 Sex character, including head, udder, testes							
TOTAL							

*Score cards are available at your farm and home advisors' office.

WEIGHT FOR AGE GUIDE

AGE	WEIGHT	
	Bulls	Heifers
180 days	440	390
240 days	560	480
15 months	1000	730
25 months	1400	1000
30 months	1450	1030
6 years	2000	1220

BREEDING YOUR HEIFER

Have your heifer bred to a high-grading, registered bull that is typical of the breed. Check with your leader or farm advisor about the best time to breed.

The heat period — the time during which your heifer will breed — will last about 24 hours. She will usually repeat the heat period about every 21 days until with calf. The gestation period — the time after breeding until the calf is born — is about 9 months or 283 days, depending on the breed.

Your heifer should be in good condition before she is bred, and should weigh at least 650 pounds. Fourteen to 18 months is the suggested age to breed her, provided she is well grown out. Some breed associations do not permit registration of a calf born to a dam (mother) under 24 months of age. Wean her calf when it is 6 to 8 months old.

FEEDING YOUR BRED HEIFER

Your heifer should weigh over 800 pounds when she has her first calf. To be sure your heifer continues to grow after she is bred, feed her about 2½ percent of her body weight in hay and grain each day, or about 20 pounds a day.

Pasture Rations

If good range pasture or irrigated pasture is available, no other feed is necessary. When the range feed becomes dry, supplement it each day with 1½ pounds of cottonseed meal fortified with vitamin A.

Hay Rations

Feed your heifer about 15 pounds each day of meadow hay, cereal, or grass hay free choice, combined with 1½ pounds barley (ground or rolled) and ½ pound cottonseed meal.

OR

Feed her about 15 pounds each day of alfalfa hay or grass and clover hay free choice in combination with 2 pounds of barley (ground or rolled).

A mixture of 50 percent loose salt and 50 percent bonemeal or dicalcium phosphate should be available for the animal at all times.

After the Calf Is Born

If you have good pasture, that is all that is needed. Otherwise feed all the good hay the cow or heifer will eat. If your hay is of poor quality or is lacking in protein, feed ½ to 1 pound of cottonseed meal daily. Discontinue the supplement when the cow and calf go on pasture.

IDENTIFICATION AND REGISTRATION

All registered animals must have a definite and distinct identification. Most breeders identify their animals by tattooing numbers in the ear.

To tattoo your calf, clean the inside of the ear where the numbers will be placed. Be sure the numbers and/or letters are in the tattoo pliers correctly. Place the tattoo in the center of the ear on an even surface between the veins. Squeeze hard to be sure the pins of the tattoo are driven well into the ear. Then vigorously rub the ink into the pinholes. Use plenty of ink. Record the tattoo number in your record book with the number of both the dam and the sire.

To register your animal, get an application blank from your project leader. Most breed associations furnish these blanks. Fill it

out properly and mail to the association with the necessary fees. 4-H Club members often receive lower registration rates.

Give your animal a name.

PARASITES AND DISEASES

Here are some simple treatments you can give your animal to keep it healthier and more comfortable.

Cattle Grubs (Ox Warble) or Heel Fly

Start control as soon as the heel fly season is over in the summer, usually July to September. Treatments made too late in the season, such as in late October or November after the grubs have reached the esophagus or the spinal column, may cause serious injury to the animal.

Treat with Ruelene® or trichlorfon (Negu-von®).

CAUTION

When using any of these materials, read and carefully follow the exact directions and precautions on the container label. These chemicals are dangerous if used incorrectly or carelessly. The pour-on treatment is the easiest.

Horn Flies, Lice, and Ticks

These pests can be controlled by using one of several materials. Malathion, ronnel (Korlan®), or coumaphos (Co-Ral®) will control all of these pests if properly applied. A methoxychlor spray will help to control horn flies and lice.

Dust bags are an easy way to control horn flies, lice, and ticks. Ask for Dustbags for Control of Flies on Cattle, Leaflet 2294, at the University of California Cooperative Extension office in your county.

WARNING

When preparing and applying any of these chemicals, carefully follow the directions and precautions on the container label. Do not overdose or apply more frequently than is suggested. If the animal is to go to market, treat as much time before marketing as the label suggests.

Spinose Ear Tick

Control this pest when ticks are abundant, usually late in the fall. A 5-percent Co-Ral® dust is effective. An easy way to apply the material is to inject it into the ear with a squeeze bottle duster as prepared by the manufacturer.

Korlan® emulsion concentrate, when used according to the manufacturer's directions, will also control this pest.

For more information about controlling livestock pests, consult your local farm advisor or your veterinarian.

Worming and Vaccinations

Vaccination programs recommended by your local veterinarian may include the following.

1. Blackleg Malignant Edema
2. Leptospirosis
3. Parainfluenza (PI_3)
4. Infectious Bovine Rhinotracheitis (IBR)
5. Pasteurella bacterin

® = Registered trade name.

Optional vaccinations are:

1. Bovine Virus Diarrhea (BVD)
2. Clostridium perfringens (overeating or enterotoxemia)
3. Clostridium hemolyticum (Redwater)

To reduce vaccinal stress administer viral vaccines (PI_3 and IBR) at the ranch of origin.

The pasteurella bacterin should be given three times. Give the first two shots about 2 weeks apart, with a booster 7 to 10 days before showing.

Discuss BVD with your local veterinarian. If there is no problem in your area, perhaps you should not vaccinate for BVD.

Overeating disease may be a problem with some calves, but it is not very common.

Redwater is found in calves from the mountains and indicates liver fluke infestations. Valley cattle are rarely affected.

A fecal count for worms is suggested. If this is not feasible, drench your animal with thiabendazol (Thibenzole®) at 5 grams for each 100 pounds of body weight.

See your local veterinarian for complete recommendations and immunization.

Current recommendations for external parasites are contained in Control of External Parasites of Livestock, Leaflet 2854.

This publication is issued every 2 years by the University of California Cooperative Extension and is available at your county farm and home advisors' office.

CAUTION

Insecticides are poisonous to man and animals. Always keep all chemicals stored in a locked cabinet or shed, away from food or feeds, and out of the reach of children, pets, livestock, and irresponsible persons. Carefully follow all precautions given on the container label.

Read the label carefully before use!

Do not allow waste and spillage from dipping and spraying procedures to drain into lakes or streams because most chemicals are toxic to fish and other beneficial aquatic life.

Livestock should be fenced off from pools or vats of chemicals to prevent them from drinking the material. Before you dip livestock, it is recommended that you allow them to drink water.

Protect feed and water from contamination by chemicals.

MARKETING

Before you offer an animal for sale or exhibit it in a show, be sure it is healthy, thrifty, and in excellent condition.

Cleaning and grooming make an animal more attractive and appealing to prospective buyers. Train your animal to lead and to stand so that it can be shown quietly and to an advantage.

BEEF SHOWING

FITTING YOUR ANIMAL FOR SHOW

When you lead your animal into the ring, it should be clean, well-groomed, and trained to lead and stand properly. Wash your animal several times during the weeks before the show to help put its skin and hair coat in good condition. Be sure to rinse thoroughly to get all the soap out of the hair. Wash soon enough before showing to allow the hair to dry and to be groomed and brushed. Sponge off any stains that appear after the last washing. Do this well in advance of entering the show ring.

HOW TO WASH YOUR CALF

Use a chain instead of a halter to hold your calf for washing. Brush the calf as clean as possible before wetting it down. When washing the head, hold the ears shut to prevent water from getting in them. Scrub the back using a stiff brush and lots of soap — liquid, flakes, or bar soap. **Do not use a detergent.** Scrub hard.

Scrub the back completely, then the neck, throat, and brisket. Next scrub the shoulders, along the sides, and underneath the animal; then the rear quarters, tail, and legs. Wash the head last. Rinse the head first, then the neck and back. Rinse from top to bottom so that no dirty water will get on the clean areas.

After the animal is thoroughly rinsed, mix a little sheep dip in a pail of clean water and dash this solution on the animal to prevent lice and to help curling. Use the back of the scotch comb to scrape off the

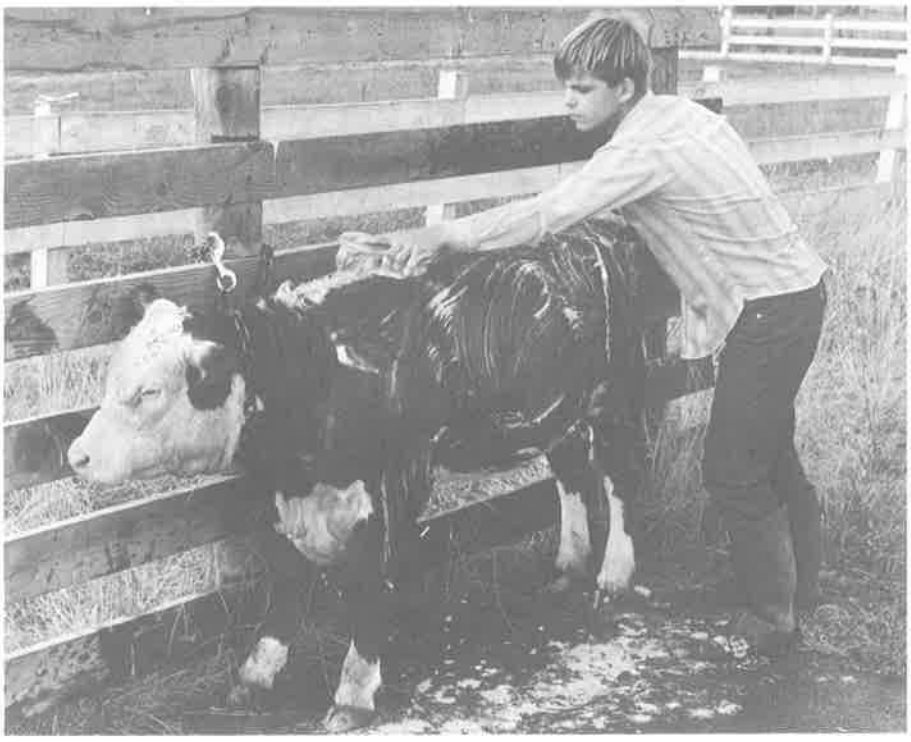


Figure 8. Use plenty of soap and water to get the hair clean.

excess water from the animal. Then curl the animal's hair in the preferred way. If you have an extremely well-muscled animal, consider showing it with the hair brushed smooth or clipped.

CLIPPING

Clip the heads of polled and well-dehorned animals to a point just behind the jaw and far enough behind the ears and poll to clear the halter line. Trim the ears on the backside only. Only the poll of Polled Herefords should be clipped.

Heads of stub-horned and long-horned cattle should be left untrimmed. Horns on breeding animals should be shaped and polished before showing. Fat animals should have been dehorned before going on feed.

Clip the tail from a point just above the twist up to the tailhead. A neat clipping job shows no tell-tale clipper marks. High hair on the tailhead may be trimmed with shears. Brush out the tail switch and make it as fluffy as possible.

Figure 9. Clipping the hair on the head.

Figure 10. Fluffing the tail.

BRUSHING AND COMBING

The hair coat may be either smooth or curled, depending on the length of hair and the breed of the animal. The hair can improve appearance by emphasizing the animal's strong points. The wave method used on Herefords is probably the most popular method of fixing the hair for showing animals.

Wet the animal down with a solution of 1 tablespoon of sheep dip to 3 gallons of water. Brush the wet hair smoothly downward. Use the round comb (curry comb) to wave the hair in a vertical zigzag motion along the sides from top to bottom, and horizontally along the back from the crops to the tail setting. Then brush the hair up on the sides. Brush the hair forward along the top, and from the twist out on the rear. After brushing, follow the same pattern using a scotch comb. Keep combing until the hair fluffs nicely.

Part the hair on the crest back to the swirl on the crops. Brush the switch out so it will be fluffy too.

If you have a breeding animal, comb the hair on the head straight down from the poll to the muzzle. If the hair on your calf is short or straight and refuses to curl, you might brush it down smooth all around.

In grooming an Angus calf, you might let the hair on the sides lie flat and use a liner comb on the shoulders and rear quarter, or line the whole animal. If an Angus has long hair, it is often just fluffed out by brushing upwards and around, or curled by the wave method.

Shorthorns are either lined with a liner and then brushed up, or curled in the same way as the Herefords. The hair on a Shorthorn is waved over the entire animal.

To add gloss, lightly apply a prepared coat dressing with an oil-dampened rag or a spray gun.

Figure 11. Combing up with scotch comb to make the hair fluffy.

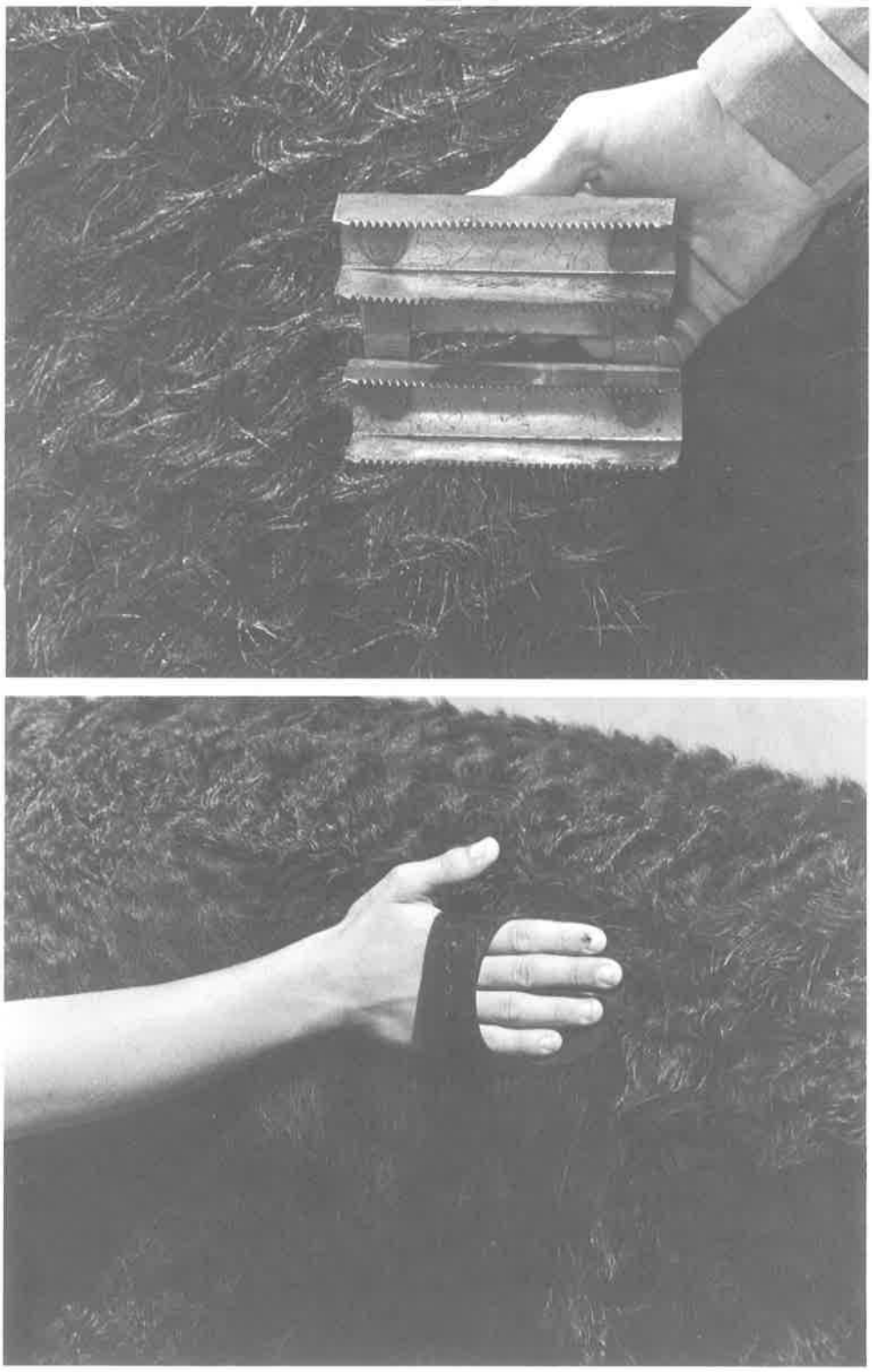


Figure 12. Waving a Shorthorn: a) using a liner comb; b) brushing up.

TRIMMING THE FEET

Trim your calf's feet several weeks before showing, if needed. If you do not have stocks in which to trim your animal's feet, you can throw the calf the way a veterinarian does. If you have never thrown a calf, ask someone who knows how to help you. Choose soft ground or bedding on which to throw your calf. Hard surfaces might injure it.

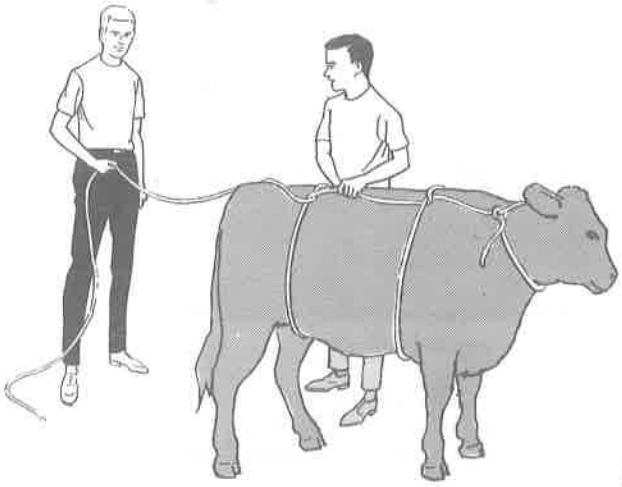


Figure 13. Rope in position for throwing calf.

How To Throw a Calf

To throw your calf, tie one end of the rope around the animal's neck with a bowline knot.

Put the rope around the animal's body just back of the front legs and make a half-hitch over the withers.

Put the rope around the animal's body in front of the hindlegs. Pull the rope up into the flanks and make another half-hitch in front of the hip bone.

To throw the animal, pull to the rear and to the side on which the animal is to be thrown.

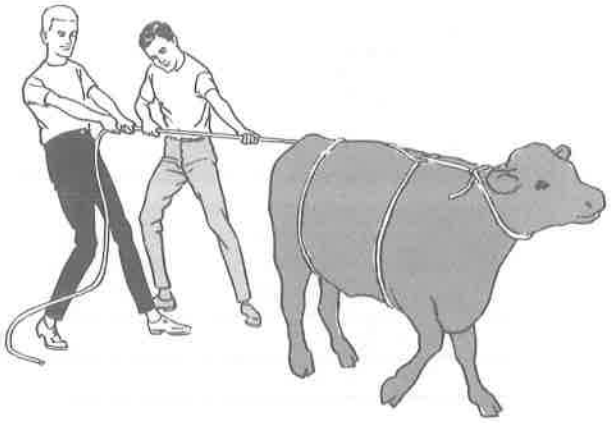


Figure 14. Pull back and in direction you want calf to fall.

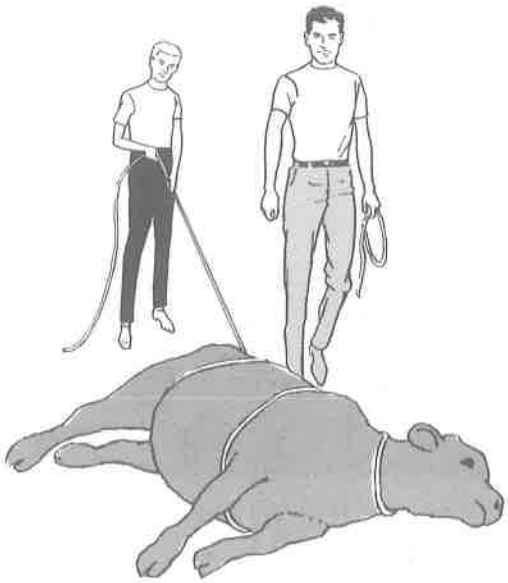


Figure 15. Choose a soft spot for the calf to fall.

Figure 16. Calf in position for trimming feet.

MAKING A ROPE HALTER[1]

Most 4-H Club members as well as professional herdsmen make their own halters. Homemade halters are both economical and efficient. Do not use rope that is too fine because it may scar the head, or that is too heavy since it is cumbersome and unsightly. It is best to use ½-inch, 3 strand manila rope. Twelve feet of rope is enough for making a standard halter.

The size of your calf makes a difference in the size halter that you need. If you get it too large or too small, you can easily take it apart and correct the size.

To prevent the rope from unraveling while you are either making or using the halter, wrap both ends with friction tape or with string.

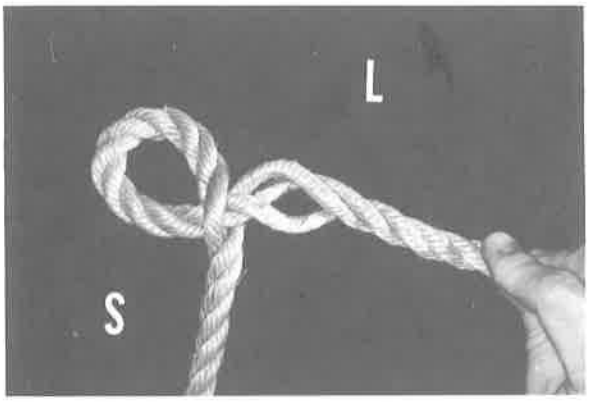


Figure 19. Untwist long end next to loop.

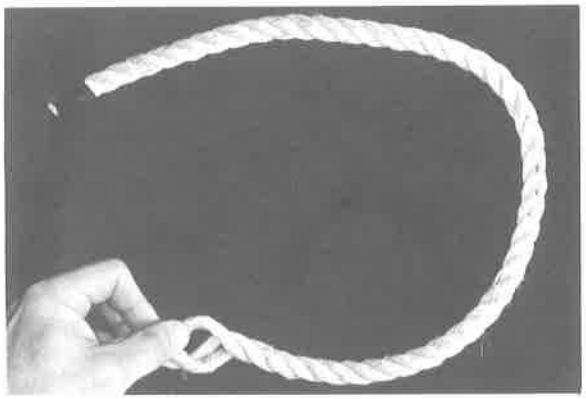


Figure 17. Untwist rope about 14 inches from one end.

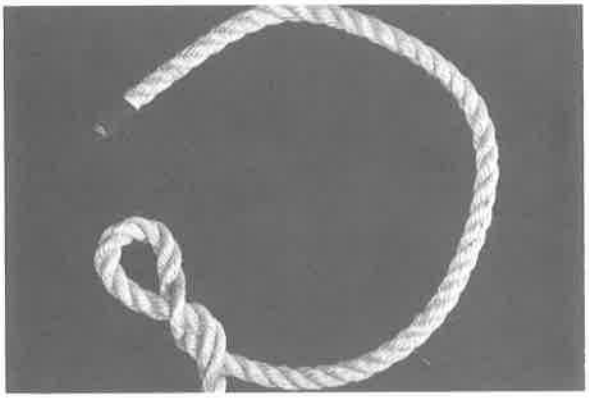


Figure 20. Pull short end through.

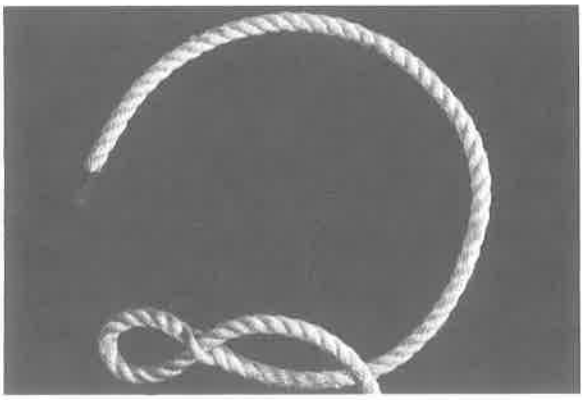


Figure 18. Pull long end through to form loop.

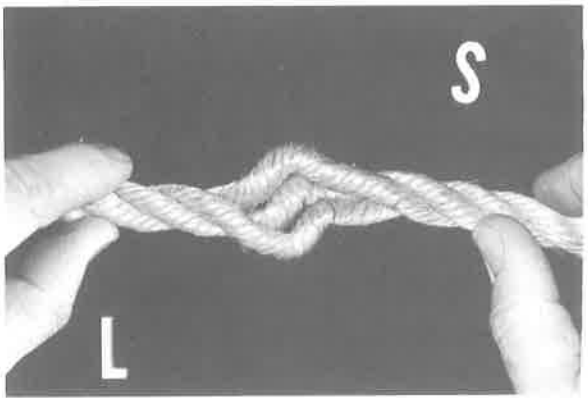


Figure 21. Untwist rope about 4 inches from short end.

[1]Based on publications by Oregon State University and New Mexico.

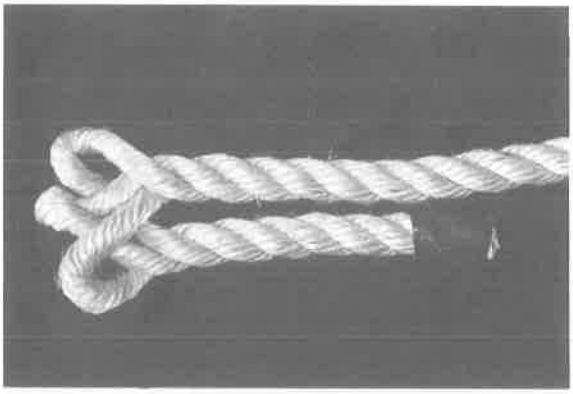


Figure 22. Form three small rings.

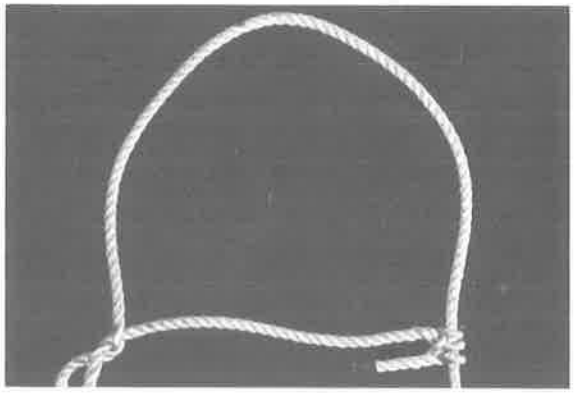


Figure 23. Put long end through each ring and pull to fit calf's head.

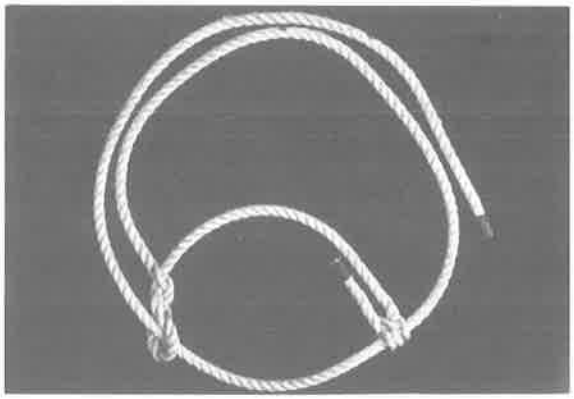
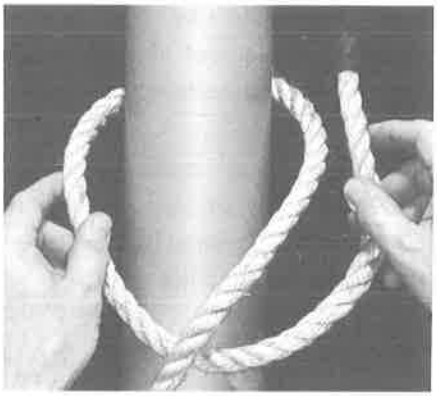


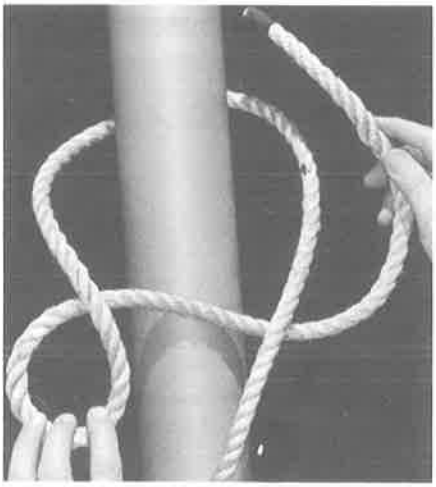
Figure 24. Pull long end through the first loop to fit calf's chin.

TYING YOUR ANIMAL

Here is how to tie the halter properly so that it will hold and can still be easily untied. Put the end of the rope, from right to left, around the post, board, or eye bolt to which you are going to tie the calf.

Bring the loose end around and under the rope and hold it in your right hand. Using the first two fingers of your left hand, take the rope and twist. Then make a loop in the loose end as shown and pull it through the twist. Finally, put the loose end through the loop for added safety.





If you are tying your calf so that you can groom it, tie it at chin level. If you are tying it as you would at a fair, put a post about 30 inches from the headstall and tie the calf about 18 inches from the ground. This allows the calf to lie down without having the halter pull its head.

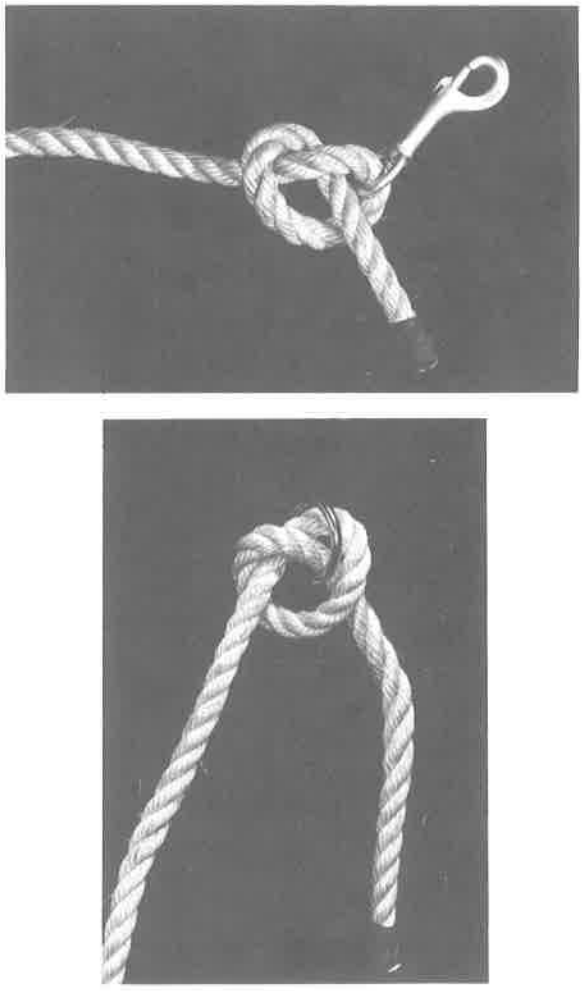


Figure 25. Use a ring and snap for a neck rope.

Neck ropes or neck straps are often used to teach cattle to stand correctly in the stall and to prevent them from rubbing their halters off. For an economical neck rope, use 10 feet of ½-inch rope. Use a ring and snap as shown. Just a simple knot is used to hold the ring in place. Never have the ring loose on the rope because the calf might choke itself. Adjust the rope to fit the neck so that it is not tight but is small enough so that it cannot be rubbed over the head. The neck rope is always tied on the animal's right side and the halter is tied on the left, with 30 to 36 inches separating the two.

SHOWING YOUR ANIMAL

You want to show your animal to bring out its best points. Use a halter and a lead strap. A special show halter is preferable, if you have one. Be sure the nose strap of the halter fits midway between the eyes and nose. Place the halter strap behind the animal's ears. The lead strap should come off the left side of the animal's head.

Rules of Good Showmanship

Bring your animal into the ring promptly so you won't keep others waiting.

It is your responsibility to know when your animal is to be judged. Show your animal all the time it is in the ring.

Walk on the left side of your animal. Walk forward holding the lead strap in your right hand — about 1 or 2 feet from the animal's head and even with the top of its head.

Keep the animal's head high enough to give it a stylish, alert appearance. Carry the extra length of lead strap in several large loops in your right hand. Carry your show stick in your left hand.

While showing your animal at the standing position, face your animal and hold the lead strap in your left hand. The show stick is now used and held in the right hand. Set your animal up with his back level, head up, and with a "foot under each corner." If your

animal has a tendency to be a little easy (droopy) in the back, keep its feet well under it.

You should practice these positions many times before you and your calf reach the show. This training should start while the calf is still small. Practice every day.

Get your animal in position and ready for the judge before he looks at it — not during the judge's inspection.

Step aside if the judge wants to make a front inspection. Step to the head of your animal when the judge is inspecting the left side; stay in the normal showing position at all other times. Move quickly but smoothly.

Always know where the judge is. Never allow your body to obstruct the judge's view.

When instructed to take a new position in line, back your animal out of line by pressing

Figure 26. Show your animal at its best.

your extended fingertips against its shoulder. Always turn in a clockwise direction.

After the judge leaves, if the animal's coat has become mussed, it is permissible to dress the hair with a comb. Keep one handy in your pocket.

Keep your animal in line with the others and don't allow him to "let down" after the judge has finished. Keep showing until you are out of the ring. (An exception to this may be in a very large class when the judge is working at the farther end. If your animal becomes restless, you may rest it and even back it out of line, turn it around, and set it up again.)

Don't let your animal come in contact with other animals; it may throw them out of position or control.

Always allow enough room for the judge to walk between your animal and others.

Leave the ring in the order of your placing.

PERSONAL APPEARANCE AND CONDUCT

Be courteous at all times, particularly to the judge and to competing showmen.

Keep alert and follow exactly any instructions given by the judge, the clerk, or the ring-master.

Give your animal and the judge your undivided attention while you are in the ring.

Be prepared to give prompt answers to any questions about your animal.

Be proud of your animal — but don't overdo it. The judge knows a good animal and a good showman when he sees either one.

It is a poor practice to point to any part of your animal to draw attention to a strong feature. Your good showmanship will make it convenient for the judge to see such features well.

Never make comments about competitors' animals.

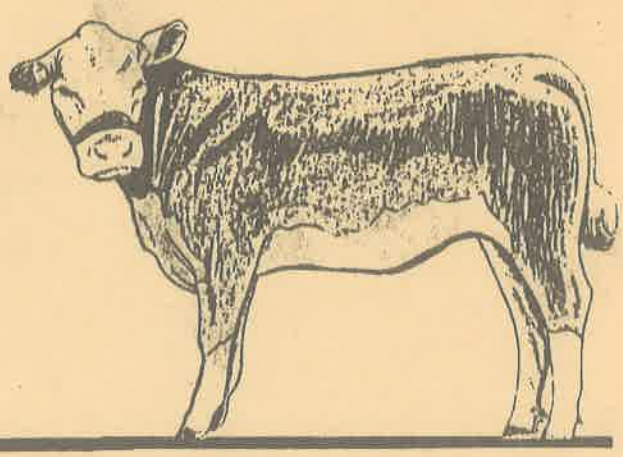
Always be a good sport. Winners of the runner-up honors should offer congratulations to first prize or championship winners. Everyone likes a good winner and a good loser.

You should be suitably dressed. If uniform dress is called for, it should be as complete as required. Be as neat and clean as possible in both your person and your clothing.

Remember both you and your calf are in a SHOW. Have the calf properly fitted and be sure you look and act your part.

4-H BEEF PROJECT

Member's Guide



Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

AUGUST 1986 4-H/XXXXX

4-H BEEF PROJECT MEMBER'S GUIDE

Beef cattle played an important role in the settlement of the west; and beef still remains the favorite item in the American diet. Now that you have enrolled in a beef project, you have become a part of this vital industry and will need to increase your knowledge and experiences in it. You should gain a thorough understanding of beef cattle production. You should also have an appreciation for the role that beef cattle play in providing food for modern man.

Beef production is both an art and a science, and therefore, the authors have identified many skills and knowledge subjects that will help you understand the beef cattle industry. These topics have been divided as to their complexity into novice, intermediate, advanced and master cattleman sections. Many of the skills listed in the novice and intermediate sections will be developed and improved over several years through the 4-H way of "Learning By Doing." These knowledge and skills topics are not meant as "requirements" in the sense that if they are not all completed after a certain time, the project is not complete; but rather as a highly recommended guide to continued growth in knowledge and experience in 4-H beef project work.

It may take two or three years to complete a section. Some of the recommended items in the advanced and master cattleman sections may seem difficult or may require more time than you have. But for the very interested member who wants to truly be a "master cattleman," the challenge is within these pages to become one.

Your 4-H leader may not always be fully trained in each topic. Therefore, members will need to rely more and more through the years on other resource people and materials. To help, a list of information sources is included with this guide. Many of the references should be available from your Cooperative Extension office for nominal cost.

# #

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The authors appreciate the advice of John Emo, State 4-H Specialist, Emeritus; Ken Willmarth, 4-H Advisor, Stanislaus County; the several 4-H Leaders who commented on early drafts of the manuscript; and to Pam McDonald, Secretary Stanislaus County for typing it.

NOVICE CATTLEMAN

The number/s following each item is a reference listed in the back of this publication (Bibliography). L=Leader; FA=Farm Advisor.

General

Know the parts of a beef animal. 21.

Be able to define these beef cattle terms: bull, steer, heifer, calf, yearling, cow, herd, breed, feeder, stocker, market steer. 7.

Learn the amount of living space, and the shelter required by:

a) a small calf
b) a growing steer or heifer
c) and a breeding cow when kept in confinement. 7.

Be able to train a calf to lead. 22.

Know why and how cattle are branded. 2, 23, 25, 32.

Know two methods used to individually identify beef cattle. 2, 7, 23, 32.

Be able to develop a set of records on your beef animal/s showing

a) income and expenses
b) beginning and ending weights
c) rate of gain
d) labor involved (hours)
e) amount of feed fed

If possible, visit a commercial beef cattle ranch.

Breeds and Breeding

Name 10 breeds of beef cattle. 7, 38, 39.

Be able to define crossbreeding. 7, 8, 17, 32, 42.

What breed/s is your project animal?

Contact a breed association represented by your project animal and ask for information about their breed. 38, 39.

Know three characteristics you should look for in selecting a market steer. 24.

Know three characteristics you should look for in selecting a replacement breeding heifer. 2, 15, 32, 42.

Economics

Find the market report section of a newspaper and write down the price of feeder steers and heifers, slaughter cows and bulls, and the price of slaughter weight steers. Keep an accounting of their prices for four weeks during the fall, winter, spring and summer. Do you notice a pattern?

Visit a food store and list the retail cuts you find there and the prices charged for them. Keep an accounting of the prices for each of the seasons to see if they fluctuate with the live and slaughter cattle market. 5.

Find out what the age and weight are for market steers that will be sold for slaughter in your area. Are there breed differences? If so, how would you explain that? 2, 3, 4, 7.

Feeding and Nutrition

Learn three types of feed and be able to identify one of each type. 2, 7, 26, 30.

Learn and identify three by-product feeds used in cattle rations. 7, 26, 30.

Learn three nutrients required by cattle. 2, 7, 26, 31.

Learn three important functions of water in animals. 2, 26, 34.

Health

Know at least three people or groups of people who could help you with animal health problems.

Be able to identify one piece of veterinary equipment used to: give oral medicine; give injections; castrate, dehorn, identify cattle.

Define or describe how to castrate and dehorn. Why castrate and dehorn? 25.

Know the:

a) respiration rate, and

b) body temperature for a normal, healthy beef animal. 1, 17.

What is stool? Know what normal stool looks like.

Know how to take the temperature of your calf.

Reproduction

Learn the meaning and purpose of artificial insemination. 7, 32.

Find the average calf crop percent in California. 33.

Know the normal position of calves at birth. 32.

Know the age replacement heifers are normally bred.9, 15, 32, 35.

Showmanship

Know why we show beef cattle. 22, 44.

Know the difference between market class and breeding class. 44.

Know why beef cattle are fitted for the show ring. 22, 44.

Know what safety precautions you should take when hauling your project animal. L, FA.

Know what safety precautions you should take when handling your project animal. L, FA.

Name the tools you should have in your fitting equipment box. 22.

Explain how each tool in your fitting equipment box is used. 22.

General

Be able to describe a highly desirable market steer. 24.

Know how to read a scales and obtain the correct weight of an animal.

Know how to safely operate a cattle squeeze chute.

Know how to move a beef animal from pen to trailer or truck, how to move the animal to a squeeze or headgate and how to keep gates properly latched.

Know how to brand and eartag cattle. 25.

Know how much water a beef animal will need when it weighs 200 pounds; 500 pounds; 1,200 pounds. 26.

Describe the purpose of a purebred cattle operation. 2.

Describe the purpose of a commercial beef breeding herd. 2.

Describe the purpose of a stocker cattle operation. 2.

Describe the purpose of a feedlot. 2, 7, 26.

Interview at least one person employed in the beef industry. Learn the duties of that person and the education and experience required for the position.

Breeds and Breeding

Know the country/s of origin for the breed of your project animal/s. 38, 39.

Name 8 breeds of cattle and their country of origin. 38, 39.

Describe an important economic trait your project animal best demonstrates. 8, 38, 39, 41, 42.

Know why this trait is important. L, FA.

Name three more important economic traits and why they are important to today's beef industry. 8, 41.

Know three reasons for registering purebred cattle. 8.

What does "rate of gain" mean to a cattle producer? Name three things that will effect a calf's rate of gain. What is a good average rate of gain or a steer, heifer and bull? 2, 3, 4.

Economics

From USDA publications or beef cattle textbooks, learn what the grade standards are for feeder calves, slaughter cattle, and carcass beef. Why do you think it is important to standardize these grades? 2, 24.

With your project leader visit a livestock auction and learn how cattle are sold by the auction yard. What fees do producers have to pay? Are there advantages or disadvantages to selling through an auction yard? What other ways do cattlemen sell their stock in your area? Name two other ways. Do they work better? 2, 3, 4, 7.

On paper, figure what it would cost you to raise a 4-H beef calf project. Consider the cost of the calf, how much hay and grain it would take to finish the calf to slaughter weight, cost of supplements, salt, veterinarian fees, interest if you had to borrow the money, and miscellaneous costs such as equipment needed and other supplies that should be charged against the project. 2, 3, 4, 6, 7, 10.

Feeding and Nutrition

Learn and describe the different ways in which grain may be processed for beef cattle. 26, 30.

Be able to name the four compartments of the stomach of cattle. 2, 26, 34.

Learn how most cattle feeders formulate their rations. 30.

Learn the nutrients required by beef cattle. 7, 26, 30, 31.

Learn which makes a better quality hay; legume or non-legume. Why. 7, 26, 30.

Health

Know three ways and the tools used to castrate a bull. 25.

Know three different tools used to dehorn. 25.

Know the signs a cow would show if she had a respiratory disease. 20.

Know the signs a cow would show if she had a digestive disease. 2, 20.

Describe what a bloated animal looks like. 2, 7, 17, 20. 26.

Know how to restrain your calf if you are going to give a vaccination and/or oral medication.

Know what vaccinations your project calf will need to protect it from disease. (See your Leader, a local veterinarian or cattleman for help).

Describe the sign of a an overheated calf or a calf that is too hot. 2.

What is the difference between internal and external parasites. 2, 9, 36.

Define a bovine.

Reproduction

Be able to define the following: 7, 32.

a) gestation
b) ovulation
c) estrus
d) estrus cycle

List some advantages and disadvantages of artificial insemination 2, 7, 32.

Know why pregnancy testing is important at the end of the breeding season. 2, 7, 9, 30.

Learn the factors that affect puberty in heifers. 32.

Define reproduction efficiency. 32.

Showmanship/Judging

Make a training halter for your project animal using the recommended method. 6.

Name 5 characteristics you would look for in today's ideal market steer. 24, 44.

Name 5 characteristics you would look for in an ideal replacement bull. 32, 44.

What are performance records? 8, 32, 41, 44.

How are performance records used? 8, 32, 41, 44.

Know what performance records you should use when placing a class of market steers. 44, L, FA.

Know what performance records you should use when placing a class of replacement breeding heifers. 44, L, FA.

Know how long before your first show you should start training your project animal. 22, L.

Know what tools you will take into the show ring. 22, 44, L.

Be able to use these tools to show your animal to its best advantage. 22, 44, L.

Place a class of market steers (use performance records). Give reasons for your placings. 44, L, FA.

Place a class of breeding heifers (use performance records). Give reasons for your placings. 44, L, FA.

General

Know how to handle and manage bulls safely.

Know how to obtain, record and use weaning and yearling weight records. Submit weaning and yearling weight records on your breeding project to your leader at the end of each year. 8,29,32.

Explore by interview or study of job opening announcements two beef industry careers for skills, knowledge and education required, salary expected, duties performed and employment opportunities.

Define compensatory growth in cattle. Know how it helps a cattle feeder. 7, 27.

Know how to calculate percent calf crop. 2, 8.

Prepare a 12 month calendar of operations for a beef breeding herd in your area of California showing when breeding, calving, pregnancy testing, vaccinations, parasite control, weaning, weighing, marketing, pasture movements, branding, eartagging, castrating, etc. should be done. 9, 15, 32.

Visit a commercial beef slaughter and packing house. If possible, watch the carcasses being graded.

Name three important differences between veal, calf and beef carcasses. 2, 3, 4, 5.

What is dressing percent and how do you think that it effects the selling price of a steer? How do you figure dressing percentage? 2, 3, 4, 5.

Shrinkage can cost a producer a lot of pounds lost if not handled right. What are three causes of shrinkage and how would you calculate it? Can shrink be reduced or prevented? 2, 3, 4, 32.

From an 1,100 pound slaughter steer that dresses at 64%, how much should the carcass weigh and about how much retail meat should the housewife get from the carcass? 3, 5.

Can showing a market calf affect the quality of the carcass? Find out about dark cutting beef and what causes it. 5.

Breeds and Breeding

Contact a breed association and request a sample registration form and pedigree. Explain to your club how to use them. 38, 43.

Describe a crossbreeding system used in your area. L, FA.

The differences in performance between individual animals or groups of animals are due to either genetic or environmental causes. Know which of these differences performance records allow us to measure and record. 8, 32, 43.

Contact an AI company and request a semen catalog. L, FA.

Read a beef magazine; find an advertisement for a bull sale; request a sale catalog. L, FA.

Write a short report on the performance information you find in the semen catalog and in the bull sale catalog. Which has better information? 41, L, FA.

Feeding and Nutrition

Be able to name the major nutrients required by beef cattle and their functions. 26, 31, 34.

Visit a commercial feedlot and be able to describe their record system.

Learn three feed additives used in beef cattle rations and why they are added. 26, 30, 32.

Know the important functions microorganisms perform in the digestive tract of cattle. 26, 31, 34.

Describe how to sample feed and forage for nutrient analysis and what would be included in a typical analysis. If possible, visit a laboratory where feed analyses are made. 26, 30.

Health

Be able to recognize veterinary tools used in helping a cow calve.

Name three methods of treating bloat. 2, 7, 17, 24.

Know 6 internal parasites. 2, 17, 20.

Know 6 external parasites. 2, 7, 17, 20, 36.

Know 3 kinds of injections (i.e, where the drug is deposited in relation to body tissue). 20.

Know how to cool an overheated beef animal.

Know the relationship between pasture management and internal parasite control. 2.

Know how to read drug and vaccine labels and how to calculate dosages.

a) What is withdrawal time?

b) Why is it important?

Reproduction

Outline a system for growing replacement heifers. 15, 30, 35.

Describe the factors responsible for a low calf crop. 9, 30.

Outline management factors to follow in getting a high percentage calf crop. 9, 32.

Name the reproductive organs of the cow. 32.

Name the reproductive organs of the bull. 32.

Showmanship/Judging

Learn at what rib carcass fat cover is measured. 40, 44.

A grand champion market steer should meet the industry standards. Learn the standards for weight range (live and carcass), fat thickness, USDA quality grade, rib eye area, yield grade, frame size, and minimum average daily gain. 40, 44, L, FA.

Know the classifications and judging system used in your county fair. L, FA.

Learn four ways you can locate and purchase a project steer. 1, 7, L, FA.

Know the criteria for groupings in the danish system of judging. 44.

A "frame score" is often assigned to beef animals as well as weight. Know what the frame score tells us about cattle that weight alone does not indicate. Know what linear measurement is used to calculate frame score. 8.

Measure the hip height of your project animal/s and from formulas or charts available from your breed association or from the Beef Improvement Federation, determine its frame score. Is your animal/s larger or smaller than the breed type average?

List the U.S. slaughter steer quality grades from highest to lowest. 8, 39.

General

On a scale of 1 to 10, rank the relative importance of reproduction rate, growth rate and conformation or carcass merit to the economic success of a breeding operation. Be able to tell the reasons for your rankings. 8, 32.

On graph paper, draw the growth curves for a heifer calf and a bull calf from birth to maturity. Note the typical slaughter weight on the curves. Be able to explain the curves and their implications to management. For real mastering of the subject, do the same for small, medium and large breeds of cattle. 7.

Develop a list of careers and/or occupations in the beef industry. Know briefly the functions of each.

Visit your county Livestock Farm Advisor to learn what he/she does and how they help beef cattle producers and feeders.

Breeds and Breeding

Through your club leader or Farm Advisor, review the guidelines for uniform beef improvement programs and B.I.F. fact sheets. 1, 2. Use them to answer these questions:

(From fact sheet 1)

a) What is the B.I.F?

b) What is breeding value?

c) What is economic value?

d) Define EBV and EPD.

e) What is the national sire evaluation program?

f) Define heritability.

g) What is heterosis?

h) Define weight per day of age (WDA).

(From fact sheet 2)

a) What is a performance pedigree?

b) Define phenotype and give two measurements of your project animal's phenotype.

c) Define environment and give two environmental factors that have affected your project animal's phenotype.

d) What is genotype?

(From fact sheet 3)

a) Why is sire selection one of the most important decisions made by a cow-calf producer?

b) How can you obtain a sire summary?

c) How can a commercial producer benefit from using a sire summary?

d) How could selecting for only one trait in a breeding program create a problem?

e) How can you continue genetic improvement?

(From Guidelines For Uniform Beef Improvement Programs)

a) What are five principal features of effective records of performance programs?

b) A ratio is used for what?

c) How do you calculate?

1. percent palpated pregnant,

2. live calving percent,

3. weaning percent

d) How do you calculate computed 205-day weight?

e) How does a performance breeding program for a purebred breeder differ from that of a commercial producer?

f) How do you make genetic progress in a straight-bred herd?

g) What are the advantages in crossbreeding for the commercial producer? Give examples of two types of crossbreeding systems.

Economics

A cattle producer must at least break even to stay in the business; figure out the break even price you must get to cover the costs of your calf project. 1, 2, 6.

Can you name four factors that influence the selling price of cattle? Do they vary from area to area? 2, 3, 4, 5, 6, 7, 8.

The value of a beef animal changes from live to carcass to wholesale to retail. List the values for an 1,100 pound beef as a live animal, carcass, wholesale and retail cuts from a store in your area. Why do these values change so much? 2, 3, 4, 5, 7.

What percent carcass weight in boneless, closely trimmed, retail cuts from round, loin, rib, and chuck would you expect on a yield grade 2 carcass? What percent for a yield grade 4? If the average price of retail cuts was $2.50/pound, how much more would a 600 pound yield grade 2 carcass be worth than a 600 pound yield grade 4 carcass. 40, 44.

From market reports, learn the price discount between choice and good carcasses. L, FA.

From a market report, calculate which is worth more, a 600 pound yield grade 2 good carcass or a 600 pound yield grade 3 choice carcass. L, FA.

Records are an important part of a successful producers business. Put together a set of records that would help you as a producer to keep track of a cow-calf operation. Think of the many costs and records that are involved. To name a few such as:

> cows bred, feed costs, number of heifers and steer calves, how many replacement heifers to keep, cows to be culled, fencing, bulls, equipment, and so on. You'll be surprised! 3, 4, 7, 9, 10.

Visit a financial business such as the PCA or a bank and find out what they require to borrow money on a ranching enterprise. Put together a financial plan to buy a 100 head cow-calf operation. Consider costs and incomes, how much you think you will need to borrow and for how long. 6, 10, 32.

For an interesting marketing project that will certainly open your eyes to what the cattle business is really like, buy 100 stocker calves (on paper). Using current market prices, manage them as you would if you owned them. Take them to grass, at the right time move them to the feed lot, feed to slaughter weight and sell to a packer. Are there alternatives to management of this set of calves? What about retained ownership in the feed lot, is it feasible to keep them or sell them? Decision, decisions! 2, 3, 4, 7, 9, 11.

Health

Know life cycle of 6 internal and 6 external parasites.

Know how to break the cycle through management and/or use of drugs in order to control the parasite. 20, 36.

What is stress? How does it affect an animal's health? Know 5 factors and management practices that can cause stress.

Know 3 diseases that cause abortion; know how to prevent these diseases. 2, 9, 17, 20.

Know 4 respiratory diseases and how to prevent them.

Know 5 diseases other than respiratory or abortion that affect cattle and how to prevent them. 20.

Learn how to determine the age of a bovine by looking at its teeth. 17.

Be able to identify 5 plants that are poisonous to cattle and know what type of poison each contains. 2, 36, 37.

Showmanship/Judging

Learn the purpose of carcass evaluation. 7, 40, 44.

Be able to explain quality grade.

What are the five maturity groups and the corresponding ages?

What are the nine degrees of marbling? 40, 44.

What is the quality grade of a 25 month old steer with modest marbling, normal coloring, and texture. 40, 44.

Know what factors determine yield grade. 7, 40, 44.

Learn the major factor that determines quality grade. 7, 40, 44.

Learn how quality grade affects consumer satisfaction. 7, 40, 44.

What yield and quality grade do you expect your project animal to be at show time? Will it meet industry standards? 40, 44, L, FA.

As a master showman, you have probably prepared several project animals for showing. What do you consider the most important phase of having a champion? Selection, feeding, fitting, or ring showmanship. Explain why. L, FA.

L = 4-H Leader
FA= Farm Advisor

BEEF PROJECT RESEARCH SUGGESTIONS

1. Among your herd or a friend's or neighbor's herd of cattle, study the tendency for individual animals to dominate others. Record on at least four different days by animal number, age and sex and size:

   a) Which animals eat first--which animals are crowded away from feed or water? Rank them.

   b) Which animals butt or fight most, 2nd, 3rd, etc?

   c) Which animals lead the herd or group when they are traveling in a lane or field?

   d) Which animals seem to get the most comfortable resting area? The least?

   e) Do many of the same animals seem to be dominant in each situation?

   f) Does size seem to influence dominance? What does your recorded data show?

   g) Does sex influence dominance?

   h) Suggest ways that the problems of dominance can be avoided.

2. Compare the weight gains of steers that are implanted with those which are not. Steers should all be about the same weight at the start and fed together during the test period. This experiment should be planned with your leader or Farm Advisor.

3. Observe and record all the behavior and body changes of a cow from two days prior to calving until 4 hours after the calf is born.

4. Obtain some freshly chopped corn, grass or other forage to be ensiled. Put it in five wide mouth 1 gallon jars.

   a) In jar #1 just fill it loosly and leave it open.

      In jar #2 pack it very tight and full and leave it open.

      In jar #3 fill it loosly and close the lid tight.

      In jar #4 pack it full and tight and close the lid tight sealing out all air.

      In jar #5 pack it full, tight and close the lid tight as in #4 and also completely cover the jar or paint it to omit all light.

b) Leave all jars alone in a dry place for 60 to 90 days. Then open and record what has happened to the forage in each jar.

c) From your observations, which would be the best way to make silage for beef cattle? Should any of the methods not be done at all?

5. Interview (4?) several families to determine how many times beef is served each week, what cuts are used, how it is cooked, and why they use beef.

6. Clip four 1-square foot samples of growing pasture. Keep each separate and weigh them immediately. Spread each out to dry in the sun on paper or plastic. Weigh each day and record the weights for 14 days.

   Do the weights change? If so, what accounts for the weight change?

   Did the weights ever stop changing? On what day?

   Does each sample change the same amount?

   What is the difference between the beginning and ending weights?

   Based on your results, how much pasture would a beef animal need to eat to get the same amount of dry matter that it would get from hay?

7. Relationship between air temperature and body function.

   a) Record body temperature of your project animal.

      1. Early morning
      2. Midday
      3. Early afternoon

   b) Record respiration rate of project during same time.

   c) Is there a relationship between body temperature and respiration rate.

   d) Will shade influence body temperature and respiration rate?

   e) What is a normal body temperature for your project animal on a hot day?

   f) Do you think the color of an animal will influence respiration rate and body temperature?

g) Also, do you think breed of cattle will influence these two functions?

8. Observe rumination in your project animal.

a) Define eructation

b) Define rumination

c) Observe your project animal and be able to tell when it eructates or ruminates.

d) Observe when and how often your animal ruminates, when you first get it (eating a lot of hay) and just before going to market (when it is eating more grain).

Is there a difference?

e) What is the chewing rate (chews per minute) of your animal when it is eating and when it is ruminating?

9. Beef cattle herd health.

You need to visit a rancher, veterinarian or Farm Advisor to complete this project.

a) Discuss the health history of a herd of beef cattle in your area.

b) What is the health program for this herd?

c) How could it be improved?

1. Use of vaccines.

2. Management of herd.

10. Anatomy

a) Learn all the bones in the skeleton of a cow.

11. The rumen

    a) Know the names of the four stomachs of a cow.

    b) What are rumen bacteria?

    c) What are rumen protozoa?

    d) How do they aid the cow in digesting her food?

    e) How does the rumen function affect nutritional requirements of the beef animal as opposed to single stomached animals?

12. Know the different body systems in a cow (i.e. respiration, skeletel).

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Note:

University of California, Division of Ag. Sciences publications are available at Cooperative Extension offices in each California county.

USDA publications may possibly be available from some county Cooperative Extension offices. If not available locally, order from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

Most other references may be found in libraries; perhaps borrowed from someone who has one, or purchased from the publisher or a book store.

E V A L U A T I O N

4-H BEEF PROJECT MEMBER'S GUIDE

To be filled out by Leaders and/or Jr. Leaders by September 1987.

1. Do you find the Beef Project Guide useful for members?

2. Do you find the Beef Project Guide useful for leaders?

3. Should it be published and made available to all 4-H Beef Project members?

4. Are some changes needed?

5. What changes, additions, or deletions would you suggest? Please list and explain.

6. Would it be helpful to include spaces to check off completed items?

7. Would it be helpful to include boxes or spaces for members to check yearly goals? Would they really do that?

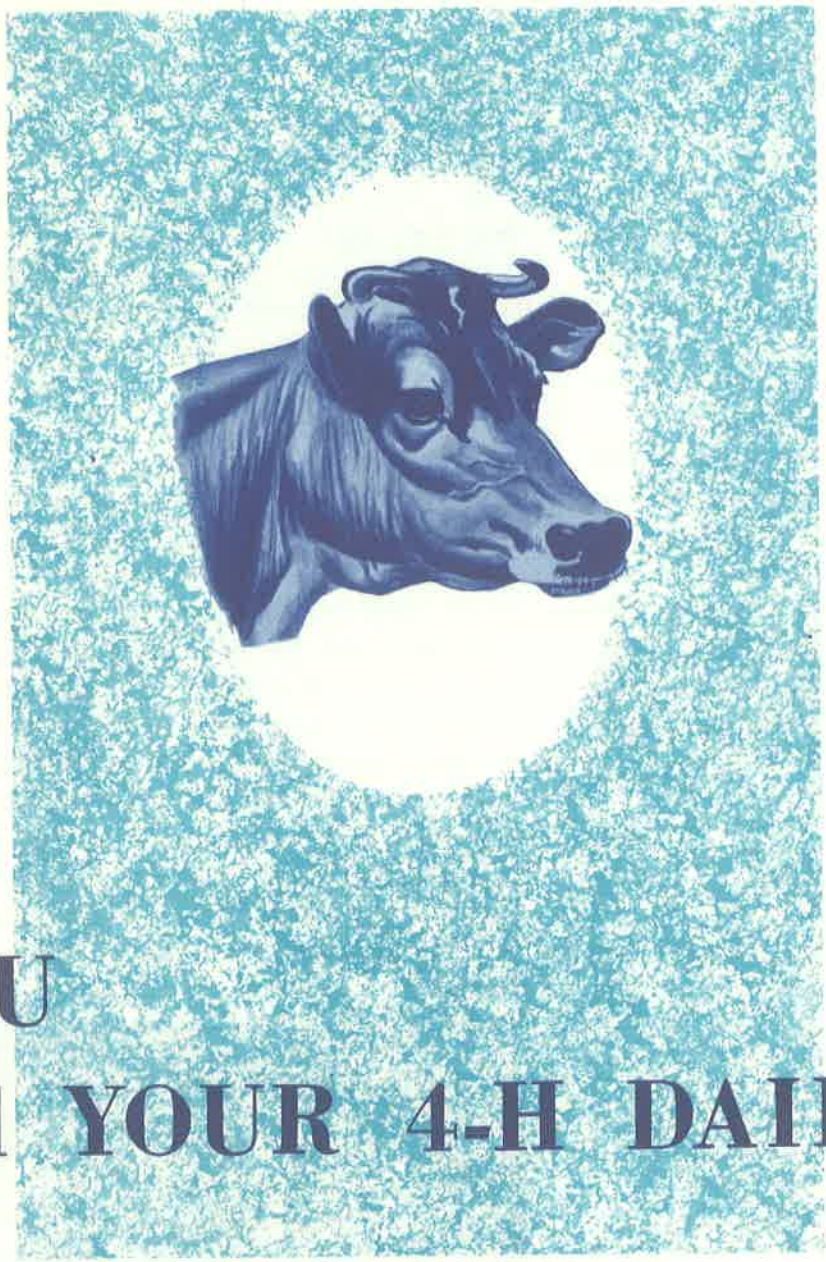
8. What problems did you or your members have with the Guide?

9. Other comments:

Mail to:

Bill van Riet, Farm Advisor
Cooperative Extension
733 County Center III
Modesto, Calif. 95355

BV:pm



YOU and YOUR 4-H DAIRY COW

University of California ... Agricultural Extension Service

4-H-Ag24

GETTING STARTED

WHEN YOU BUY A COW

As a 4-H Club member you will want a cow that can be a high milk producer.

Before buying a cow, ask about her milk and butterfat production record. Ask about the production of her dam (mother) and grand dams (grandmothers). You do not want "boarders" in your herd. You want cows that will produce lots of milk and butterfat. A good cow should produce more than 400 pounds of butterfat per year.

Look in her ear. Make sure she has a CV tattoo. That means she has been vaccinated for Bangs' disease. Ask about her tuberculosis or TB test.

If your cow is a purebred, transfer her registration paper to your name. The fee for this is usually included in your purchase price. If you have a question, write to the secretary of your breed association.

BREED ASSOCIATIONS

Holstein-Friesian Association of America
Brattleboro, Vermont

American Jersey Cattle Club
1521 East Broad Street
Columbus 5, Ohio

American Guernsey Cattle Club
Peterborough, New Hampshire

Ayrshire Breeders' Association
Brandon, Vermont

Brown Swiss Cattle Breeders' Association
Beloit, Wisconsin

American Milking Shorthorn Society
313 South Glenstone Avenue
Springfield 4, Missouri

WHEN YOUR COW HAS HER CALF

Watch your cow carefully for a day or two before she calves. Be on hand when the calf is born. You are partners. You need the help of your cow. Your cow needs your help, too.

Clean all the mucus which often interferes with breathing from the calf's mouth and nostrils. Use a clean cloth or clean feed bag to wipe the calf dry. Provide a clean, dry place to keep the calf.

The colostrum, or first milk of the mother cow, contains necessary food for the baby calf. When the calf can stand by itself, wash the cow's udder clean and let the calf nurse.

Your cow should be given all of the fresh warm water she will drink soon after the calf is born. Bran with a little water and molasses is recommended as the first light feeding for your cow after calving. Gradually change over to your dairy ration after three or four days. Make your change by mixing the two feeds (reducing the bran and increasing the dairy mix) over a period of three or four days. If there is old feed left, clean it out of the feed box or manger before feeding the new.

TRAINING YOUR COW

Train your cow properly and she will be a gentle, easy-milking cow the rest of her life. To train her properly, you should:

1. Wash her udder carefully with warm water, about one minute before you start milking.
2. Milk a few streams by hand into a strip cup to see if the milk is of good quality.
3. If you have no milking machine and are hand-milking, be sure to milk your cow out as fast as possible, massaging the udder as you milk. Milk her out completely.
4. If you have machines, start your cow milking with them right away. Put the teat cups on carefully. Stay with your fresh cow for the first milkings. Be sure she is milked out completely, but do not leave the teat cups on after she is milked out.
5. Your cow will like it and milk much better if you are regular in your milking time each day and follow the same routine at each milking.
6. If you don't get excited, your cow won't either. Be patient, she has a lot to learn in this new cow world – and besides, that swollen, caked udder is sore and tender.

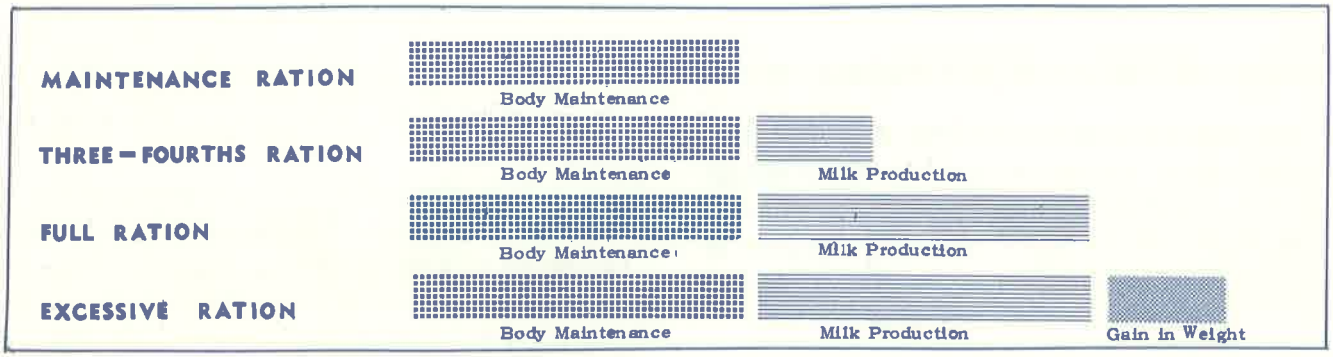
FEED YOUR DAIRY COW ALL SHE NEEDS

All food that is eaten has a certain amount of food value. This food value is called digestible nutrients. There are six kinds of nutrients which are needed by a dairy cow. These are: (1) Proteins, (2) Carbohydrates, (3) Fats, (4) Water, (5) Minerals, (6) Vitamins.

Dairy cattle must have nutrients every day to supply two definite needs – body maintenance and milk production.

If we know how much a cow weighs and how much milk of a known butterfat percentage she is giving, we can figure exactly how much hay and concentrate we must feed her daily to take care of her nutrient requirements. By feeding a balanced ration which meets these requirements, we can keep the cow in good condition while she produces that amount of milk. If we feed her less, she will first drop off in milk production, then she will start to lose body weight.

If we feed her more, she probably won't produce more milk, but will put on body weight. Except at the end of her lactation, this gain in body weight means food and money wasted.



THE THREE MUSTS OF MILKING

1. Stimulate milk flow by washing and massaging the udder just before milking. This is called preparing, or priming.
2. Your cow's udder is a perfect place for germs and infections to grow. It is warm, there is moisture and food (milk), and there are openings to the outside. For these reasons, you should be very careful with her. When you milk, be sure to take the machine off as soon as you have all the milk. The action of the machine on the tender tissues of the udder will bruise it and cause infection.

   When you are through milking, be sure the teats, and especially the ends of the teats are dry. This will cut down the chance of any bacteria growing at the end of teat and entering the udder through the teat canal.
3. Milk out all four quarters completely at each milking. If you do not do this, your cow will gradually dry up in one, or all, of her quarters.

EXAMPLES OF DAIRY CONCENTRATE RATION TO BE FED WITH DIFFERENT TYPES OF HAY

PROTEIN HAY Alfalfa		MIXED HAY Oats and Vetch		CARBONATIOUS HAY Oats or Barley (Grain Hay)	
FEED	LBS.	FEED	LBS.	FEED	LBS.
Beet pulp	600	Beet pulp	500	Beet pulp	400
Barley	500	Barley	500	Barley	400
Oats	300	Millrun	400	Millrun	350
Coconut meal	300	Coconut meal	300	Coconut meal	400
Cottonseed meal	150	Cottonseed meal	150	Soybean meal	100
Rice bran	150	Rice bran	150	Cottonseed meal	150
Salt	20	Salt	20	Linseed meal	200
				Salt	20
TOTAL LBS.	2,020		2,020		2,020
DIGESTIBLE PROTEIN	212		250		333
TOTAL DIGESTIBLE NUTRIENTS	1,494		1,512		1,524

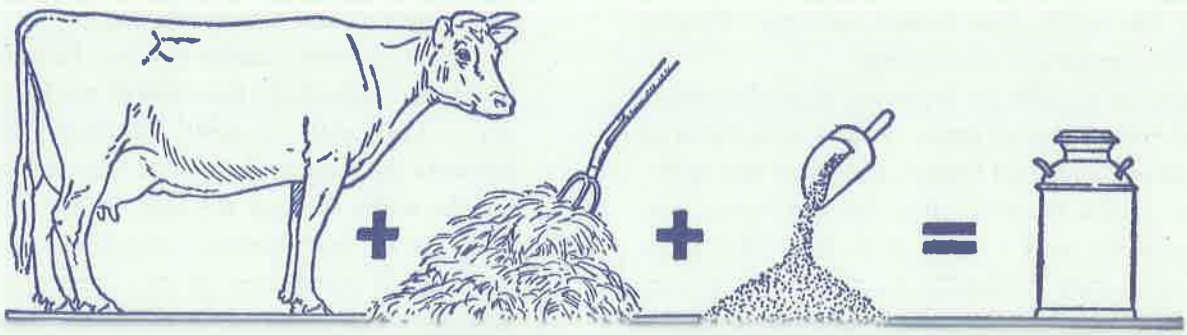
These are only examples of concentrate rations. It is possible to use many other feeds in the balanced ration. Many by-product feeds may also be used with good results. Ask your dairy leader or farm advisor to help you select a balanced ration that fits the feeds available in your locality.

FEEDING YOUR COW FOR PRODUCTION

The first rule in all feeding practices is to give your cow all the good quality roughage (hay, silage, pasture) she will eat. These are the least expensive feeds and they will take care of the body maintenance part of her diet as well as a portion of her milk production requirements.

If your cow is producing 30 lbs. of butterfat per month, she will get all the required nutrients for body maintenance and milk production if she is eating all the good quality alfalfa hay she wants.

It is when your cow is producing at a high level that she cannot get enough nutrients from hay alone to meet these requirements. From the first through the 8th or 9th month of lactation your cow should be producing enough more milk and butterfat to require supplemental feeding in the form of concentrates.



Fine quality roughage **Correct amount of concentrate** **Highest possible daily milk production**

HOW DO WE FIND OUT HOW MUCH TO FEED?

If you are not testing your cow for production (and you should be), there is a "rule of thumb" which says to feed one pound of concentrates for every six pounds of milk produced daily.

If you are testing your cow's milk for butterfat production through DHIA work you will know what she is producing every month. There are two ways you can find out how much concentrates to feed. Select one and stick to it. Let's assume your cow is producing 45 lbs. butterfat per month.

METHOD NO. I

$$\frac{\text{Monthly B. F. Production}}{6} = \text{lbs. of concentrates to feed daily}$$

Example: $6\overline{)45}$ # B. F. per month = $7\frac{1}{2}$ # concentrates to feed daily

METHOD NO. II

$$\frac{\text{Monthly B. F. Production} - 30}{2} = \text{lbs. of concentrates to feed daily}$$

Example: 45 # B. F. − 30 = 15; $2\overline{)15}$ = $7\frac{1}{2}$ # concentrates daily

POINTS TO REMEBER

DRY COWS NEED GOOD CARE

After your cow has produced for you for ten months, she deserves a good rest. She has worked hard, but she is still working. During that six to eight week rest or dry period, she is preparing herself to have another calf as well as produce milk for another year.

Watch her carefully. Plan to have her gain weight. Feed her from two to five pounds of concentrate daily during this dry period. She will pay you back after she freshens in greater milk production.

THINK BEFORE YOU HAVE YOUR COW BRED

The future of your dairy herd depends a lot on the kind of calves your cow has. Strive for a calf which will develop into a better cow than her mother. Here are some things to keep in mind:

1. If she is a purebred cow, breed her to a purebred bull.
2. If she is a grade cow, you should get a better calf if your cow is bred to a purebred bull.
3. Artificial insemination is an excellent way to breed your animal. It eliminates the expense of a bull and increases the possibilities of your cow producing an offspring which is capable of higher production than hers.

WHAT ABOUT BUILDINGS AND EQUIPMENT?

One of the greatest items of expense, when you are getting started with a dairy cow is that of housing and equipment. A smart thing to do, if you are going to start with a dairy cow project, is to get the necessary equipment and provide the proper housing before you get your cow.

A lot of what you do will depend upon what you have at home to start with. You should have a clean, light, airy place to stanchion your cow for milking. You should have a shelter for her during the stormy winter days. It will be necessary for you to have some dry storage space for hay and concentrates and other pieces of equipment.

Your Farm Advisor has plans you can use for building your own barns and stanchions. Ask him to show them to you.

You will need a good milk bucket, milk strainer and milk holding containers, watering trough, feed boxes, and, of course, a milk stool.

It is important to take good care of anything you own. You will have considerable money invested in your equipment. Be sure to keep it clean and stored properly when not in use.

PRODUCTION RECORDS ARE IMPORTANT

Good dairymen all over our nation join their local Dairy Herd Improvement Association or cow testing association in order that they may know month by month what their dairy animal is producing. "Don't whistle in the dark." By weighing and sampling and testing your milk for butterfat each month, you know exactly how well your cow is doing. A cow tester will run this test for you. He will give you a cow record form on which month by month he will keep a running account of the amount of milk, the amount of test, and the amount of butterfat your cow produces. From this you can tell:

1. If your cow is paying for the feed you feed her.
2. How much concentrates you should feed her.
3. If you should keep heifer calves from your cow to increase the butterfat average of your herd.

In these days, a dairy cow should produce at least 350 pounds of butterfat in order to pay for her keep. Any production above that is to your advantage. You should strive for a herd average of at least 400 pounds of butterfat yearly. Each month after the cow tester has finished testing your cow for butterfat production, change your concentrate feeding schedule so that she will get the right amount of feed to maintain her body and produce the milk she is capable of producing.

KEEP YOUR 4-H RECORD BOOK UP-TO-DATE

In order for you to become a top-notch 4-H member, or a good business man, it is necessary that you keep track of all of the things that you do. A clock without any hands is like a record sheet without any entries. You can not tell whether your project is making a profit or loss. The 4-H record tells how you are doing financially with your projects, the activities and events you have participated in, and your achievements and accomplishments. It tells the story of your 4-H Club career.

The most important management practice of any enterprise is that of keeping good records. Keep your record book handy and make entries in it regarding everything you do in 4-H Club work.

DISEASES CAN BE COSTLY

Dairy animals are just like people. They, too, get sick. Sometimes you can hardly tell it, other times they are very ill. They should be watched carefully and in almost every case when there is something wrong, you should call your veterinarian. He can tell much better than anyone else what the problem is and what should be done. Your 4-H Club leader or your Farm Advisor can tell you of some of the diseases of dairy cattle, such as Mastitis, Brucellosis (Bang's disease), Ketosis, and Anaplasmosis. There are many others.

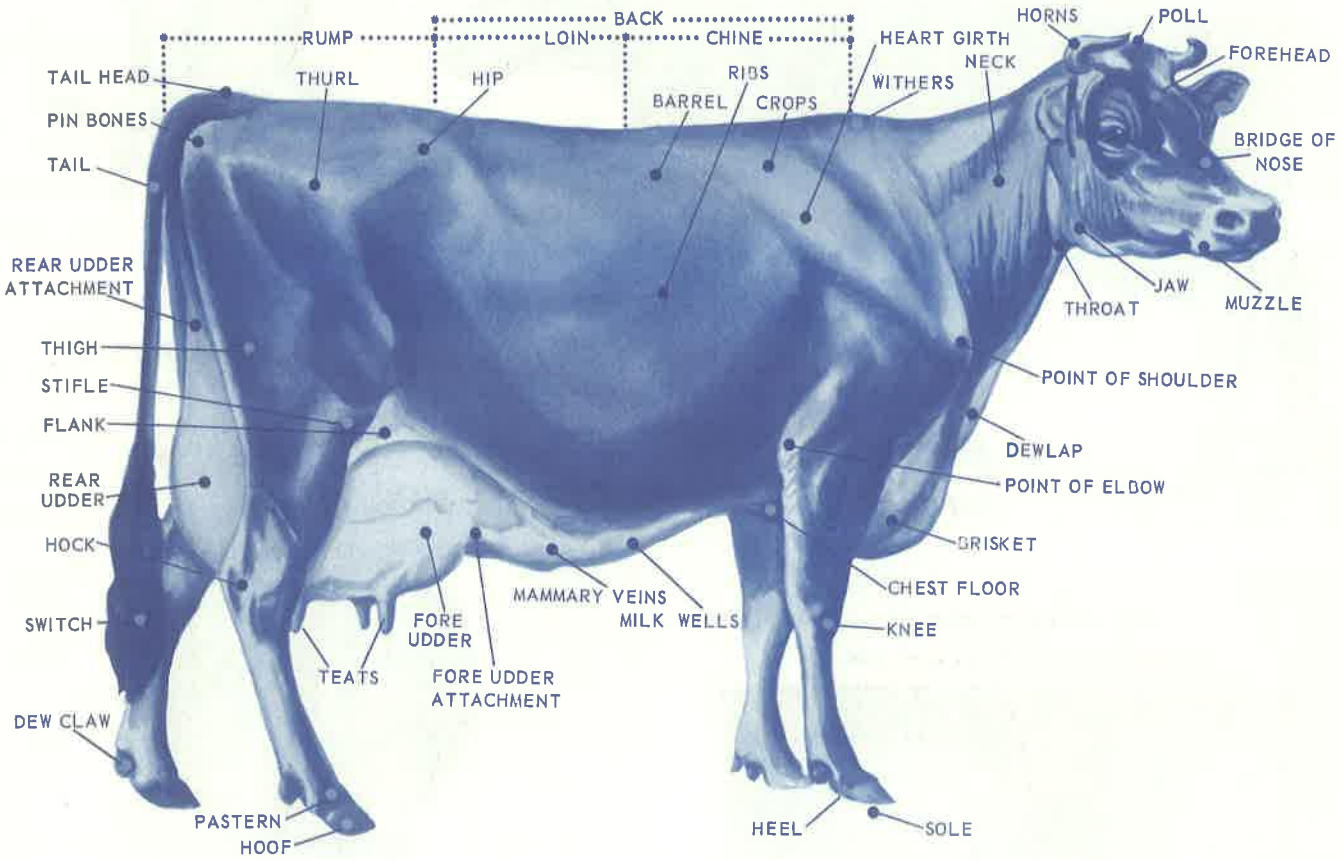
Some of the things that you can and should take care of are lice, flies and cattle grubs. Lice usually appear on cattle in the fall and early winter. Horn flies appear and should be treated during the warm months of the year. Ticks appear generally in the spring and fall. Cattle grubs appear in the backs of the cattle from December through April. These parasites should be controlled to insure the good health of your animal. Because of the many different conditions under which you operate, contact your 4-H leader or Farm Advisor to find out what to do.

WHEN ITS TIME TO JUDGE

HIGH POINTS OF SELECTION

One of the events you'll enjoy the most in your project is taking your cow to the fair. You will learn more and have more fun if you understand the points of selection the judge uses in making his decisions.

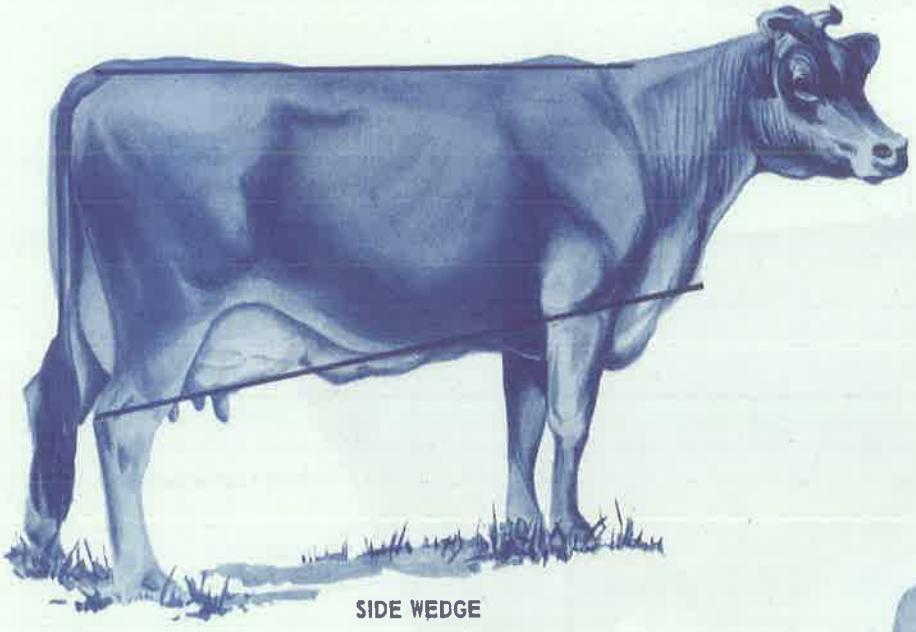
The chart shows the parts of a dairy cow. You should learn them.



SELECTION POINTS

The five main points used in selecting or judging dairy cattle are: dairy character, body capacity, udder or mammary development, feet and legs, and general appearance.

These are some of the things you will want to look for.



SIDE WEDGE

FRONT WEDGE AND TOP WEDGE

MAMMARY DEVELOPMENT

Udder has uniform teats and level floor.

FEET AND LEGS

SHOW YOUR COW AT ITS BEST

IN STARTING

You and your cow are going to the fair! Both of you need to get ready. You'll be off to a good start if you begin to fit your cow at least a month before the show. However, this is only the finishing touch. Proper feeding and the right kind of care from birth are necessary if your cow is to do well in the show ring. Remember that your job is to help your animal make the best showing possible.

CARE OF THE HAIR

Some warm sunny day about a month before the show, give your cow a bath. Use plenty of soap to remove the dirt from the hair. Rinse the soap away with clear water. Brush the hair the way you want it to go, while it still is a little damp. Brush it down from the center of the back. Then, blanket your cow and put it in a barn or shed and provide plenty of straw bedding to keep it clean.

Brushing your cow every day will pay off on show day. After brushing, rub the hide gently with your hands. If your cow has a lot of long, dead hair you can take this off by brushing with sand paper placed over a block of wood.

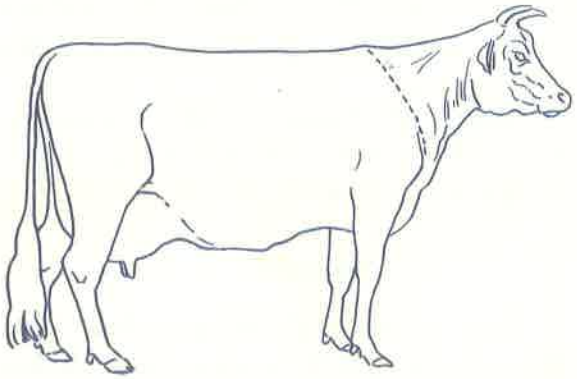
If white spots on the cow get stained with manure, wash these away as soon as possible. You may have to do this several times to remove the stain. Wash the tail switch often, especially if it is white.

CLIPPING

Some clipping improves the appearance. However, it is unnecessary to clip the entire body if enough time has been allowed for fitting. The time to clip the hair on your cow is about a week ahead of the show. Remember, use the hair to make your cow look its best, just as veteran showmen do.

As an example, Jerseys and Guernseys should have "dish faced" heads. If your animal belongs to one of these breeds, but has a flat face, it can be improved by leaving the hair around the eyes. Clip clean between the eyes. On other breeds trim all the hair from the face.

As another example, a good dairy animal should have a wide muzzle. Emphasize this by leaving the hair about the mouth.

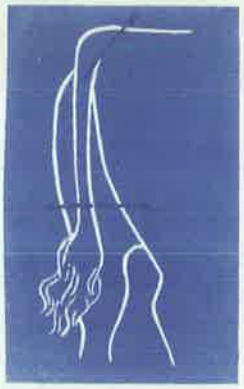


The neck should be clipped back to an imaginary line running from the point of the shoulder to the withers. If your cow happens to be U-necked leave the hair in the notch to fill it out.

Do not clip the belly of dairy heifers. Leaving this hair gives the appearance of greater depth of body.

TAIL

Clip the hair on the tail from the top of the switch to the tail head. This will help the tail to appear long and thin.



HORNS AND FEET

4-H Club cattle do not need horns to win in the show ring. Good herd management suggests taking them off. The dehorning job should be neat and clean.

However, some persons prefer to leave horns on show cattle. If you decide to leave the horns you will want to know how to polish them. Remove scratches on the horns and feet by taking off the surface with No. 1½ emery paper. First, tear the paper into strips ½-inch wide. Then pull these across the horn or hoof, like a shoe polishing cloth. Follow this with fine sandpaper. Don't take off too much at one time. If blood starts to show, stop.

If the hoofs are long, trim them back with a pair of hoof clippers. Smooth the hoofs with a light cutting wood rasp. Take off enough so your cow stands squarely on its feet. You will want your dad or 4-H Club leader to help you with this, the first time.

Make a horn-and-hoof polish by mixing pumice stone with enough olive oil to make a paste. Use it like shoe polish.

TRAINING

You can teach an animal to lead when it is only a few days old. A cow will never forget even a few lessons.

A cow that is to be shown needs several training periods. Ten minutes of teaching every day are better than an hour a week, all at one time. However, several longer lessons, along with shorter ones, will best prepare your cow for shows. You will want to give it enough practice so it can stand well for quite a long time. Sometimes, there are many animals in the ring at one time. You don't want your cow to sag out of shape while waiting for the judge to line up the class. So, give it plenty of practice.

Use a show halter, if possible. Work with your cow until it will stand straight, with its head erect, and all four feet squarely underneath. It should move easily at the slightest tug on the lead strap.

FEEDING

If you are going to use feeds at the show that are different from those you provide on the farm, start the change when you begin fitting your cow. Sudden changes may throw it off feed, and it will not show well. Your cow will not show at its best unless it feels well.

Reduce by half the amount of grain provided at the last feeding before loading your cow for the fair. Continue to limit the grain the first two or three feedings away from home. Doing this will help keep your cow on feed.

GIVE YOUR COW A SHINE

Your cow should already be clean from the baths and brushings you have been giving it during the fitting period. Make the last brushing before the show an extra good one. Finish with a soft cloth slightly dampened with olive oil – not enough to make the hair oily but just enough to make it shine and keep the hair in place.

IN THE RING

Do your final fitting work early enough so you can go to the ring as soon as your class is called.

Show your cow from the time you leave the stall until you get back. The judge is usually somewhere in the middle of the ring at the start. He will have all the animals walk in a circle. If you and your cow are first into the arena, circle clockwise. This will put your cow between the judge and yourself.

Walk backward and on the left side of your cow. Lead with your left hand. The extra part of the lead strap should be coiled in the right hand. You should be slightly ahead of the animal.

Pay close attention to your cow, but keep an eye on the judge, too. That way you can be quick to do what he asks.

Walk your cow slowly and smoothly. The hours of training before the show pay off here.

When you are standing in the ring, see that your cow is squarely on all four feet with its back straight and its head up.

When the judge tells you to move into the side-by-side line-up, leave some space between your cow and the next one.

To change position when side-by-side, circle your cow around the others and come to the place the judge indicates. Don't try to have your cow walk backward.

Most dairy animals appear best at a standstill, just when they are ready to take a step. It is hard to train an animal to pose this way, but it is worth the effort.

Remember, if the floor of the show ring is uneven, keep your cow from placing its front feet in low places. If you must choose, get the hind feet in the low place and the front ones on higher ground.

Sometimes you will be leading the winner—but not always. At times you may place last. But remember, keep on showing all the time. You have a good cow and you want everybody to know it.

This leaflet can help you get started showing dairy cattle. There are many things you have to learn by doing. Here is a score card often used in fitting and showing contests. Look it over. It tells you what the judge will expect of you.

FITTING AND SHOWING SCORE CARD
TOTAL 100%

FITTING 40%	
CONDITION OF ANIMAL	15
Animal in good flesh	5
Hair smooth, soft and glossy	5
Hide soft and pliable	5
CLEANLINESS	15
Free from stain	5
Hair clean	5
Ears clean	5
CLIPPING	10
Smooth job of clipping	5
Animal clipped in right places	5

SHOWING 60%	
TRAINING OF ANIMAL	10
Animal leads well	5
Ease of posing	5
HANDLING	15
Leads slowly	5
Makes long turns	5
Keeps animal posed easily	5
CONTESTANT	35
Dressed in 4-H Club uniform	5
Continuous attention to animal	5
Keeps animal properly posed	5
Keeps eye on judge	5
Obeys orders of judge promptly	5
Ease of showmanship—not nervous	10

Your 4-H Dairy Project Calendar

Here are examples of calendars like the ones you should plan and make at the beginning of the year to remind yourself what to do, and when to do it.

JANUARY	LICE CONTROL.
FEBRUARY	CATTLE GRUB CONTROL. LICE CONTROL.
MARCH	CATTLE GRUB CONTROL.
APRIL	CATTLE GRUB CONTROL. PUT CATTLE ON IRRIGATED PASTURE. START FITTING CATTLE FOR EARLY SHOWS.
MAY	FLY CONTROL. FIT CATTLE FOR SUMMER SHOWS.
JUNE	FLY CONTROL. PROVIDE SUMMER SHADE. COMPLETE 4-H RECORD BOOK. SECURE WINTER HAY SUPPLY.
JULY	FLY CONTROL. START NEW 4-H RECORD.
AUGUST	FLY CONTROL.
SEPTEMBER	FLY CONTROL.
OCTOBER	PROVIDE FOR PROTECTION DURING WINTER. TAKE CATTLE OFF IRRIGATED PASTURE.
NOVEMBER	DEVELOP 4-H CLUB DAIRY DEMONSTRATION. WATCH MILKING PROCEDURE TO CURB MASTITIS INFECTION. CLIP FLANKS, UDDER AND TAIL TO ASSURE CLEAN MILK DURING WINTER.
DECEMBER	LICE CONTROL.

DATE COW FRESHENS	
1st MONTH	START SLOW, THEN BUILD UP CONCENTRATE FEEDING. TEST COW FOR B.F. PRODUCTION. FEED ALL THE GOOD QUALITY ROUGHAGE COW WILL EAT EVERY DAY – HAY OR PASTURE.
2nd MONTH	TEST FOR BUTTER FAT PRODUCTION.
3rd MONTH	BREED COW. TEST FOR BUTTER FAT.
4th MONTH	TEST FOR BUTTER FAT.
5th MONTH	TEST FOR BUTTER FAT.
6th MONTH	TEST FOR BUTTER FAT.
7th MONTH	TEST FOR BUTTER FAT.
8th MONTH	TEST FOR BUTTER FAT.
9th MONTH	TEST FOR BUTTER FAT.
10th MONTH	TEST FOR BUTTER FAT.
11th MONTH	DRY COW OFF TO GIVE HER AT LEAST 8 WEEKS REST. FEED 2 LBS. PER DAY CONCENTRATES TO BUILD BODY FAT.
12th MONTH	PROVIDE CLEAN DRY QUARTERS FOR COW TO HAVE CALF.

This publication was prepared by Glenn Goble, Farm Advisor, Sacramento County, and a committee including Glenn Marders, Assistant State Leader; C. L. Pelissier, Extension Dairyman; Jack E. Herr, 4-H Club Specialist; and Farm Advisors S. D. Nelson, Siskiyou County, and Walt Fieg, Humboldt County.

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