EXPERIMENT STATION

OF THE

KANSAS STATE AGRICULTURAL COLLEGE,

MANHATTAN.

BULLETIN No. 118—MAY 1903.

ANIMAL HUSBANDRY DEPARTMENT.

D. H. OTIS, M. S . . . . . Animal Husbandman.*

FLESH AND FAT IN BEEF.

As the ultimate end of beef cattle is the block, it is important to associate as far as possible the outward appearance of the beef animal with the value of the carcass on the block. The butcher or packer buys a beef, not because of its beauty of form, but because he sees beneath the skin, and knows it will dress out a certain amount of edible meat, for which there is a ready sale.

The feeder's business is to supply the butcher or packer with the kind of animal needed to supply market demands. To do this successfully, the feeder must be able to distinguish inward quality by outward appearance. This ability to see below the skin and know what effect the feed is having upon the carcass can be acquired only by a study of beef animals, both alive and after they are slaughtered. Study of this kind enables the feeder to know how far he should go and when he should stop in order to produce the kind of animal demanded for the block.

This knowledge is a benefit to the feeder when selling, for he knows the worth of his stock, and can hold his own against unscrupulous buyers who may falsely claim that the feeder has not put his cattle in as high flesh as necessary to command top prices.

In order to study some of these problems connected with the pro-

* Mr. Geo. C. Wheeler, B. S., acting assistant, deserves credit for valuable assistance in the dressed-beef demonstration, and Mr. H. R. Thatcher, a senior student, for special pains taken in feeding and caring for the steers several weeks prior to their being slaughtered.

duction of first-class beef, the Kansas State Agricultural College and Experiment Station arranged with Mr. John Gosling, of Kansas City, for the selection of a large, fat steer, a prime butcher's animal, and a canner.

THE ANIMALS COMPARED ON FOOT.

The Fat Steer Donald The fat animal was a pure-bred Hereford steer, bred and raised by Gudgell & Simpson, of Independence, Mo. The steer took second prize as a fat steer both at the American Royal, at Kansas City last October, and at the International Live-stock Exposition, at Chicago last December. He was born January 15, 1900, being thirty eight months old at the time of the dressed-beef demonstration, March 24, 1903.

The pedigree of Donald on opposite page shows the concentration of the blood of the noted Anxiety 4th.

The following details are furnished by Gudgell & Simpson: "Donald was castrated because he was not deemed good enough for breeding purposes and because he was not quite up to the standard color markings. His mother was a poor milker (Donald being her first calf), and he had little chance for development until he was old enough to digest grain. He was fed on grass during the grazing season, and, at the same time was fed a liberal allowance of grain. His grain ration consisted mainly of corn chop, with some bran, and a little oil-cake. In the winter he was fed all the grain he would eat up clean. His roughness consisted mainly of prairie hay, with an occasional supply of clover and timothy. We knew he was being fed the last year at a loss. As Mr. Gosling told us, he was ready for the block the latter part of 1901." (See Fig. I.)

When Donald was judged alive before the class he was three years and one month old, and weighed 1846 pounds. In commenting upon him, Mr. Gosling brought out the following points: When a beef animal makes a gain of 600 pounds a year for three years he is doing well. Donald's neck is a little long and coarse. His top line is very good, although his tail head is a trifle high. He has a heavy hide and his handling qualities are good. He has good bone and stands up well under 1846 pounds weight. He is not quite evenly covered, and yet it is hard to tell where any more fat could be added to him. His flesh is not firm; the fat has taken possession of him; he is what we call a little overripe—too much fat to be profitable. He has a well-spring rib, which gives a rotundity of form, even under the immense amount of fat which covers the rib. When we come to examine his carcass next month, we will find at the point of the rib very little but fat. We must learn to distinguish between the words "fat" and "flesh." When men say an animal is very thickly fleshed or too

Name.—Donald.
Calved.—January 15, 1900.
Breeders.—Gudgell & Simpson.
Address.—Independence, Mo.

SIRE: Militant 71755.....
- Beau Brummel 51817.....
  - Don Carlos 33734 .. .... { Anxiety 4th 9904. / Dowager 6th 6932.
  - Belle 24629 ..... { North Pole 8946. / Beau Ideal 8th 9949.
- Miss Charming 8th 46850,
  - Don Carlos 33734..... { Anxiety 4th 9904. / Dowager 6th 6932.
  - Miss Charming 3d 33751. { Anxiety 4th 9904. / Miss Chance 4th 9858.

DAM: Donna Agnes 71705,
- Lamplighter 51834.....
  - Don Carlos 33734..... { Anxiety 4th 9904. / Dowager 6th 6932.
  - Lady Bird 3d 31101..... { North Pole 8946. / Lady Bertha 4th 9861.
- Donna Anna 2d 27407.....
  - Anxiety 4th 9904.. ..... { Anxiety 2238. / Gaylass 9905.
  - Downton Lady 17217.... { Downton Grand Duke 4182. / Downton Belle 9954.

thickly fleshed you can say: "Gentlemen, you are mistaken; you have the wrong name; you mean fat." There never was an animal with too much flesh.

The hips of Donald are not smoothly covered; they have too much covering. His rump is fairly long, wide and even, but too fat. There

SCORE-CARD FOR BEEF CATTLE.

Breed ,Hereford. *Sex* ,male.
Name ,Donald. *Age* ,three years one month.
Owner ,Kansas State Agricultural College. *Date* ,February 27, 1903.

	Possible score.	Judge's score.
GENERAL APPEARANCE:		
Weight, score according to age	10	10
Form, straight top line and underline; deep, broad, low set, and stylish	10	9
Quality, firm handling; hair fine; pliable skin; dense bone; evenly fleshed	10	9 ½
Condition, deep, even covering of firm flesh, especially in regions of valuable cuts	10	7 ¾
HEAD AND NECK:		
Muzzle broad; mouth large; jaw wide; nostrils large	1	1
Eyes large, clear, placid	1	7/8
Face short, quiet expression	1	7/8
Forehead broad, full	1	1
Ears, medium size, fine texture	1	1
Horns, fine texture, oval, medium size	1	1
Neck short, thick; chest clean	1	7/8
FORE QUARTERS:		
Shoulder-vein full	2	1 7/8
Shoulder, covered with flesh	2	2
Brisket advanced, breast wide	1	1
Dewlap, skin not too loose, drooping	1	1
Legs straight, short; arm full; shank fine	2	1 7/8
BODY:		
Chest full, deep, wide; girth large; crops full	4	4
Ribs long, arched, thickly fleshed	8	6½
Back broad, straight, smooth, even	10	8½
Loin thick, broad	8	7
Flank full, even with underline	2	1¾
HIND QUARTERS:		
Hips smoothly covered; distance apart in proportion to other parts	2	1¾
Rump long, wide, even; tail head smooth, not patchy	2	1¾
Rump bones, not too far apart	1	1
Thighs full, deep, and wide.	2	1½
Twist full, plump	2	2
Purse full, indicating ripeness	2	2
Legs straight, short; flanks full, smooth	2	1 7/8
Total	100	90¼

are two and one-half inches of fat on that rump. His thighs are not as full as we would like.

In order to show where and to what extent Donald appeared deficient as a model beef animal, Mr. Gosling's score is given herewith. This score-card can best be studied in connection with the above

SCORE-CARD FOR BEEF CATTLE.

Breed, Hereford-Shorthorn. *Sex*, male.
Name, John. *Age*, one year eleven months.
Owner, Kansas State Agricultural College. *Date*, February 27, 1903.

	Possible score.	Judge's score.
GENERAL APPEARANCE:		
Weight, score according to age	10	10
Form, straight top line and underline; deep, broad, low set, and stylish	10	9
Quality, firm handling; hair fine; pliable skin; dense bone; evenly fleshed	10	9
Condition, deep, even covering of firm flesh, especially in the regions of the valuable cuts	10	9
HEAD AND NECK:		
Muzzle broad; mouth large; jaw wide; nostrils large	1	1
Eyes large, clear, placid	1	1
Face short, quiet expression	1	1
Forehead broad, full	1	1
Ears, medium size, fine texture	1	1
Horns, fine texture, oval, medium size	1	1
Neck short, thick ; chest clean	1	1
FORE QUARTERS:		
Shoulder-vein full	2	2
Shoulder, covered with flesh	2	2
Brisket advanced, breast wide	1	1
Dewlap, skin not too loose and drooping	1	1
Legs straight, short; arm full; shank fine and smooth	2	1 7/8
BODY:		
Chest full, deep, wide; girth large; crops full	4	4
Ribs long, arched, thickly fleshed	8	8
Back broad, straight, smooth, even	10	8½
Loin thick, broad	8	6½
Flank full, even with underline	2	2
HIND QUARTERS:		
Hips smoothly covered; distance apart in proportion to other parts	2	1½
Rump long, wide, even; tail head smooth, not patchy	2	1½
Rump bones, not too far apart	1	1
Thighs full, deep, wide	2	1½
Twist full, plump	2	1 7/8
Purse full, indicating ripeness	2	2
Legs straight, short; shank full, smooth	2	1½
Total	100	91¾

comments. A study of Fig. I will also be an aid, although it falls far short of a study of the live animal.

The Prime Steer John: To compare with the fat steer, a cross-bred Shorthorn-Hereford steer from registered parents was purchased.

The latter was a prime twenty-four-months-old steer, raised by Alex. Moffit & Sons, of Mechanicsville, Iowa. In giving the history of the steer, Messrs. Moffit say: "The steer was dropped on the 15th of March, 1901, ran with the cow until the 1st of May, and then we put him in with the other calves, arid he had about all the corn and corn-meal he could eat twice daily until he was weaned, October 15; then we turned him with a load of steers and he had all the ear corn he could eat until May 15, 1902; then turned on blue-grass, without grain, until the 15th of November; then taken to the feed-lot and fed on ear corn, but not on full feed until a week or so before you purchased him." (See Fig. II.)

The steer John was one year and eleven months old and weighed 1268 pounds when he was studied by the students in stock judging. The following are taken from Mr. Gosling's comments at the time:

The weight is all we can expect; the top line is very good, although there is one marked deficiency back of the hips; the latter are a little too prominent. His chine of beef is splendid and the flesh is evenly distributed. His handling is not as fine as it might have been; for this soft handling we deduct one point. (See score-card of John.)

There is a fineness of muzzle that he takes from his sire. His head is fine, indicating good breeding; his eyes and forehead are both good; his neck is beautiful.

The shoulder vein is all that could be asked; it protrudes a little beyond the shoulder point. The shoulder is beautifully covered; the brisket protrudes a little, but not enough to be objectionable; dewlap is neat.

Fore legs are fairly straight, but might be a little farther outside of the body; chest is full, deep, and wide. The ribs are long and well arched; hips are well covered, but not as smoothly covered as we would like to see. His tail, head and rump bones are all right; thighs not quite wide or deep enough, causing a lack of beef. His twist is not full, and his hind legs could be a little straighter.

A canner (a poor, thin cow) and a baby beef were purchased and their carcasses compared with each other and with the steers, in order to show the framework and the distribution of the fat and lean portions of meat in animals of various ages and various degrees of condition. (See Fig. III.)

Mr. Gosling, when speaking of the canner, remarked that if one is going into the beef business it is as important that he should know the knuckles, joints and other features of the anatomy of a cow as it is for an engineer to know all the different parts of an engine. This cow, properly dissected, will show all these parts.

In the case of the steers we talked about full thighs. In this re-

spect the cow is very deficient. There is no twist and the hip-bones are not covered with fat. In this canner you see mere skin, some flesh, and bones; there is no fat. It is possible that by feeding this cow slop for ninety days she could be put in fair shape for low-grade beef.

The baby-beef heifer was purchased a few days before the demonstration test and was not scored on foot, as were the steers. Her live weight was 775 pounds. She was not as fat as desired, but was the best we could find; she could have been fed two months longer to advantage. (See Fig. IV.)

In order to study more fully the character of the carcasses, a matured grade Hereford bull, that was in comparatively poor condition, was procured. This bull shows the natural flesh on the animal, but no fat. (See Fig. V.)

In speaking of this bull, Mr. Gosling explained that he shows practically all the flesh and certainly all the bone he will ever have. In the fattening process this flesh is not materially increased but expanded by the infusion of the many fat veins current in all carcasses. You can "melt the tallow from a candle and still have the wick left." This is exemplified in the Hereford bull and the canner.

THE DRESSED CARCASSES.

The two steers were slaughtered by Armour & Co., Kansas City, to whom we are indebted for the very excellent manner in which the carcasses were handled preparatory to the demonstration. The canner and baby beef were killed and very creditably handled by the local butchers.

The following table gives the weight and value of each animal alive and the weight and percentage of dressed carcass:

	Live weight, lbs.	Value per 100 lbs. on foot.	Dressed weight, lbs.	Percentage of dressed wt.
Steer Donald	1,790	$5 00	1,191	66.5
Steer John	1,240	5 25	810	65.3
Canner	975	1 50	400	41.0
Baby beef	775	3 25	409	52.7

Account was kept of the tallow from the steers, with results as follows:

	Weight of tallow, lbs.	Per cent. of tallow.
Donald	121	6.7
John	69	5.5

Mr. T. Phillips, expert cutter from Armour & Co., Kansas City, laid bare the various cuts with a skilful hand, and made the cutting one of the important educational features of the demonstration.

The cuts showing the striking peculiarities of each animal were photographed after which they were exhibited to the class in stock judging. All the photographs from which the illustrations for this

bulletin were made were taken by Dr. S. C. Orr, of Manhattan, and any points of excellence from a photographic point of view are due to his tireless energy and patience.

When the carcasses of Donald, John, the baby beef, the canner, and a carcass of veal, which was purchased prior to the demonstration, were placed side by side, Mr. Gosling called attention to the spongy nature of the bone of the vertebrae of the veal calf and the amount of blood it contained, as indicated by the color. Comparing the condition and color of these various specimens, it was noticed that the bone became less spongy, and especially less colored, as one passes from the veal to the baby beef, the twenty-four-months-old steer, the thirty-eight-months-old steer, and the canner. As the color begins to wane the bone begins to solidify, until in the canner it is brittle and solid as a piece of limestone. The appearance of the bone helps one to tell the age of the animal when slaughtered.

SIMILAR CUTS COMPARED.

The illustrations of the cuts of beef show the appearance of the same cuts from different animals slaughtered. (See Fig. VI.)

The dotted lines in figure VI show the outline of the various cuts of beef and the solid line shows where the exposure was made for the camera. The accompanying explanations are condensed from Mr. Gosling's remarks at the demonstration.

The Rounds.—The appearance of cross-sections of the rounds varies considerably with the point where the knife is inserted. This is shown in figures VII and VIII.

In figure VII the cross-section is made at the point of the rump joint; this cut shows more lean and less fat than the cut in figure VIII, the latter being made one and one-half inches further up the round. These illustrations also show considerable difference in the amount of fat in the three animals, Donald showing the most, John considerably less, the baby beef comparatively little.

The expansion of lean by means of fat is well shown in figure IX.

It will be noticed that in the center of these rounds there is one large fat vein and a large number of smaller veins. During the process of fattening these veins expand and enlarge between the fibers of meat. Fat also increases the outer portions of the round. As the fattening process is continued the fat covering enlarges, and may be made to form a considerable portion of the round, as is shown in the Donald exposure. It will also be noticed that the fat increases very much more rapidly than the lean, the increased appearance of the latter being due almost entirely to the increase of the small fat veins between the muscular fibers.

The Long Loins: The following illustrations are from the different loin cuts of Donald, John, and the baby beef. (See Figs. X, XI, XII.)

As mentioned above, the steer Donald was a prize-winner, both at the American Royal, in Kansas City, and at the International, at Chicago. At both shows he competed with a steer named Conge. At Kansas City the judge was a breeder, feeder, and butcher—a happy combination of knowledge for a judge of fat stock—who placed Conge ahead of Donald. At Chicago a breeder was judge and placed Donald ahead of Conge. Donald was bought at auction for $7.50 per hundred pounds; his rival sold at private sale for $12.50 per hundred pounds, the latter having more flesh and edible portions and a smaller per cent. of outside fat. The difference is due to a shorter feeding period, thus satisfying producer, purveyor or caterer, and consumer.

By examining the illustrations, we will plainly see the wasteful quantity of fat on the steer Donald, much less on the steer John, and practically none on the baby beef. By examining closely figures X and XI, it will be seen that the amount of flesh represented varies with the same animal in the two figures. This is due to one-half inch difference in the point of cutting the loin, which is parted at the rump joint, and shows how it is possible, in close competition on the block, to turn the tide of events in favor of a less worthy animal.

These illustrations also show that an even distribution of excessive fat in the live animal is misleading. Some breeders, and especially fitters of show cattle, ignorantly lead us to suppose that a plump and full loin edge represents flesh, or extra quality of edible meat. These illustrations say not, but on the contrary show how this extreme fat is made at the expense of the natural amount of lean, for as you augment the per cent. of fat you as surely lower the per cent. of lean.

These comments should not be interpreted as meaning a condemnation of fat, for the latter is essential to prime beef; it is the standard for beef, pork, and lamb; and yet it is possible to render these largely inedible by excessive fat. There is less danger of this with young animals, since here the natural flesh is not so readily swamped with excessive fat.

When the steer John was alive we predicted he would show one-half-inch of fat on the top of the back-bone, as contrasted with an inch and one-half in the case of Donald. The fulfillment of this prediction is readily seen in the loin cuts. The steer John was really too fat to be a profitable cutter even at the age of twenty-four months. If he had been slaughtered sixty days sooner he would have been just right, and at so much less for cost of production.

The steers, Donald and John, demonstrate the fact that the pure-bred animals have more aptness to fatten than grades. It is this fattening element, this quick-train movement, that makes our pure-bred cattle so much more valuable as feeders and impregnators, factors so necessary for the improvement of our low grades of cattle.

The fat on both of these steers is of fine quality, as was indicated by the touch, pliable skin, and fine quality of the hair. Poor handlers invariably furnish tallow cakes instead of choice quality of fat, and the lean is coarser in the grain.

It will be noticed that in the baby-beef loin there is not an ounce of waste fat. It is all edible. It is not as juicy and may lack the flavor of the other two, but it is undoubtedly tender, and tender beef always has more friends than adverse critics. This class of beef is used in the suburban districts of our large cities. The cuts are relatively small and suited for small families; children eat it without complaining of too much fat. Every portion of the baby-beef carcass can be used.

The Short Loins In order to show what is meant by a fat hip, the short loins are shown. (See Fig. XIII.)

In securing figure XIII, it was necessary to cut the long loin at the point of the hip-bone. The steer Donald shows a depth of over two inches of fat on the point of the hip, the amount increasing as the cut approaches the flank end.

The short loin of the steer John also has too much fat on the hips. The short loin of the baby beef is a mass of tender flesh at this point.

A century ago our forefathers who engaged in the beef breeding and feeding business produced specimens of the various beef breeds that had a large amount of fat, and they would take pride in exhibiting specimens that to-day would be considered hideous animals. They had hips as big as peck measures, briskets like fifty-pound sacks of flour protruding between their fore legs, the shoulder-side, the back, ribs, and the rump bulging and rolling with fat. The celebrated "White Heifer that Traveled" is a good illustration. (See Fig. XIV.)

In speaking of this heifer, Mr. Alvin H. Sanders, in his book on Shorthorn cattle, says: "About the year 1806 Robert Coiling reared a purely bred heifer, afterward called 'The White Heifer that Traveled,' which he sent out through the principal agricultural counties for exhibition. The date of her birth is not given in the first volume of the English Herd-book, where her pedigree is recorded. She was got by Favorite 252 from a dam called 'Favorite Cow,' bred by R. Colling. The name of' Favorite Cow's' sire is not given. Her granddam, 'Yellow Cow,' was by Punch 531, and her great-granddam was

by Anthony Reed's Bull 538, and bred by Mr. Best, of Manfield. The 'White Heifer' being twinned with a bull, and herself not breeding, she was fed up to her greatest flesh-taking (we would now say fat-taking) capacity and extensively exhibited. Her age when slaughtered is not given, but the account states that her live weight could not have been less than 2300 pounds, and her dead weight was estimated at 1820 pounds." (If these figures are correct she dressed 79.13 per cent.)

By more judicious mating and line breeding of those that nature had given more smoothness of outside fat, we have progressed until we have smoothly covered beeves like Donald, and many more evenly covered than he. Too frequently our fat-stock-show animals are simply attractive models of bovinity, regardless of utility. This lack of utility applies to overfed breeding stock to an alarming extent. Putting breeding animals in show condition may seriously injure their usefulness as breeders.

The Ribs: These represent the only high-priced cuts from the fore quarters. (See Figs. XV and XVI.)

The steer Donald shows almost two inches of spine fat. When alive this was indicated by the touch. The steer John shows less fat, but displays nearly as much edible lean. The baby-beef rib, like its long loin, is nearly all fine-texture lean.

By comparing cuts (Figs. XII and XVI), it will be noticed that there is a considerable difference in the amount of lean meat presented. This is due to a slight variation in the place of cutting. In figure XII the knife was directed half way between the ribs, while figure XVI shows a cut made close to the rib. Outside of this slight variation these two figures show corresponding cuts.

The Plates: Loading the high-priced cuts with excessive fat causes an extra deposit of fat on the less valuable cuts. This waste is shown in figure XVII.

The plates of the two steers show about twenty-five per cent of lean in proportion to the fat. In the baby beef there is not any waste except the bone.

With the exception of the round, illustrated above, no photographs of the canner were taken. The uses to which the canner is put are so different from the steers or baby beef, very little comparison can be drawn.

The meat from the canner round furnishes a commodity known as dried beef. The boneless butt is cut between the point of the hip and the rump-bone. The loin strip is cut from the upper side of the

short ribs, the tenderloin from the lower side, and the regular or Spencer roll is taken from the back rib and counting to the eighth, when the feather of the shoulder-blade is reached. The last four cuts are placed in freezers by the packer, mostly in the autumn, and resurrected in the early summer months and shipped to Eastern markets. Being quite lean and boneless, they meet with a ready sale. The flesh from the plate and brisket, chuck, shoulder, etc., are either made up into bologna sausage or canned; hence the name canner.

Color of the Flesh and Fat The ideal color of lean beef is a faint red. The color of the lean in the steer Donald was perfect. The color of his fat was whiter than most steers of his age, but hardly so white as that of John. A mild or pale red color of flesh and a delicate ivory-white fat are two essentials for good-flavored and especially tender beef.

The color of the lean meat in the steer John was also perfect. It had a fine texture, was nicely marbled, showing what aristocratic breeding does in the bovine race. When blended with common blood, which has coarser grain, coarser muscle, and coarser bone, the happy medium is struck, and not infrequently grades have justly won carcass premiums at fat-stock shows.

The color of the meat of the baby beef was somewhat lighter than that of the steers, and that of the veal calf was still lighter. The color of the canner meat was very dark red.

THE COOKING TEST.

A sample of the loin steak, the rib roast and a boiling-piece from the shoulder clod were taken from each of the steers and from the baby beef and submitted to the domestic science department for a cooking test. Each class of meat was treated to its required temperature. Small samples of each were given to twenty invited guests, who were each provided with a card on which they were to write their judgment as to the character of the meat. Each piece of meat was designated with a numbered paper flag, the guests having no knowledge as to what animal the number represented. Nothing was served with the meat. The following is a copy of the card on which the guests expressed their judgment.

It was explained to the guests that they would be served with three samples each of steak, roast and a boiling-piece from a very fat animal, a butcher's animal, and a baby beef. They were asked to pass judgment as to which animal each sample of meat came from and to write their judgment in the column headed "animal." The superfluous fat was removed from the samples before serving. The quality of fiber and the flavor were to be described in the terms indicated at

BEEF TEST.

DESCRIPTIVE TERMS: { Animal: Fat, butcher's, and baby beef.
Quality of fiber: Tender, medium, tough.
Flavor: Rich, medium, poor.
Rank: First, second, third.

Article, beef.	Animal.	Judgment.		
		Quality of fiber.	Flavor.	Rank.
1. Steak.....				
2. Steak.....				
3. Steak.....				
4. Roast.....				
5. Roast.....				
6. Roast.....				
7. Boil, r.....				
Boil, s.....				
8. Boil, r.....				
Boil, s.....				
9. Boil, r.....				
Boil, s.....				

the head of the card. They were asked to rank the steaks, roasts and boiling-pieces separately. Two treatments were given to the boiling-pieces, one *(r)* rapid or vigorous boil, and the other *(s)* simmer,

Judgment as to Animal and Quality of Fiber The following table gives a summary of the votes as to the animal and quality of fiber. A few of the guests failed to vote on some of the points.

No of sample served.....	Animal from which sample was taken.	Votes of guests as to what animal they thought the sample belonged.			Votes of guests as to quality of fiber.			
		Fat steer (Donald)..	Butcher's steer (John).....	Baby beef.....	Vigorous boil, or simmer....	Tender.....	Medium.....	Tough.....
1	Baby beef.....	2	12	3	.....	1	3	15
2	Fat steer (Donald).....	15	2	1	.....	14	3	1
3	Butcher's steer (John)..	1	3	13	.....	8	10	1
4	Baby beef.....	4	13	0	.....	0	4	15
5	Fat steer (Donald).....	13	4	1	.....	14	5	0
6	Butcher's steer (John)..	0	2	15	.....	14	5	0
7	Baby beef	3	9	5	r...	3	4	8
					s...	7, 10	4, 8	4, 12
8	Fat steer (Donald).....	8	6	3	r...	4	9	2
					s...	5, 9	10, 19	0, 2
9	Butcher's steer (John)..	6	2	10	r...	7	6	2
					s...	7, 14	9, 15	1, 3

From the above table, it will be plainly seen that the guests were fairly successful in deciding what meat came from the fat steer, but many confused the butcher's animal with the baby beef.

Strange as it may seem, the baby beef was pronounced tough in the broil and roast. This may be partially accounted for by the fact that the baby-beef animal was comparatively poor, and the fat had not been deposited between the muscular fibers to make it tender.

In the boiling-piece, the baby beef was considered tender. In boiling this meat it is possible that the connective tissue gave way quicker than the boiling-piece of the fat steer, Donald, or the butcher's animal, John. The fat steer (Donald) received the largest number of votes for being tender in the broil and roast, but stood lowest in the boil. The butcher's steer (John) was considered as tender as Donald in the roast. Donald and John received very few votes for being tough.

The "simmering" boil received more votes for being tender, especially in the baby beef, than the vigorous boil, although in several instances there was very little difference.

No. of sample served.....	Animal from which sample was taken.	Votes of guests as to flavor and rank.							
		Vigorous boil, or simmer..	Flavor.			Rank.			Average..
			Rich.	Medium.	Poor.	1st.	2d.	3d.	
1	Baby beef.....	....	1	12	6	1	3	15	3d.
2	Fat steer (Donald).....	....	16	3	0	14	4	0	1st.
3	Butcher's steer (John)..	....	6	11	1	8	10	5	2d.
4	Baby beef.....	....	0	5	13	0	1	17	3d.
5	Fat steer (Donald).....	....	13	6	0	11	8	0	1st.
6	Butcher's steer (John)..	....	4	10	4	6	11	1	2d.
7	Baby beef.....	r..	8	2	4	7	4	4	1st.
		s..	8, 16	3, 5	1, 5	4, 11	4, 8	2, 6	
8	Fat steer (Donald).....	r..	4	6	4	2	9	4	3d.
		s..	1, 5	4, 10	6, 10	2, 4	5, 14	5, 9	
9	Butcher's steer (John)..	r..	3	9	1	6	4	5	2d.
		s..	3, 6	8, 17	2, 3	5, 11	2, 6	5, 10	

In flavor, the fat steer (Donald) stands first in the broil and roast. John second, and the baby beef third. The larger number of votes on John and the baby beef classes them as medium in flavor. In the boiling-pieces, the baby beef ranked first, John second, and Donald last; the latter receiving ten votes for being medium in flavor and ten votes as being poor. Very little difference is noted in flavor between the vigorous boil and simmer, except in the fat steer (Donald), where the vigorous boil gets the largest number of votes.

The rank varies with the flavor, and very closely with the quality of fiber. The fat steer (Donald) unquestionably ranks first in the

broil and the roast, but falls behind in the boil. Butchers claim that the best-flavored meat comes from the lean of fat animals.

In passing judgment upon the various qualities of meat, it will be noticed by the votes that there was more or less difference of opinion; this was especially true in regard to the boiling-pieces, as there the individuality in flavor seemed to be much less marked than in either the broil or roast. However, each sample, if served upon the home table, would be classed as excellent.

Loss of Weight in Roasting The roasts of the three animals were weighed before and after cooking. The following figures give the results of the test:

Animal.	Weight before roasting.	Weight after roasting.	Loss in weight.	Percentage of loss.
Donald	8 lbs.	4 lbs. 8 oz.	3 lbs. 8 oz.	43.7
John	6 lbs. 10 oz.	3 lbs. 2 oz.	3 lbs. 8 oz.	52.8
Baby beef	4 lbs. 4 oz.	2 lbs. 4 oz.	2 lbs.	47.0

Weights were also taken of the boilling-pieces

Animal.	Weight before boiling.	Weight after boiling.	Gain in weight.	Percentage of gain.
Donald	3 lbs. 2 oz.	3 lbs. 4 oz.	2 oz.	4.0
John	2 lbs. 12 oz.	2 lbs.	—12 oz.	—27.27
Baby beef	1 lbs. 10 oz.	1 lb. 10 oz.	0	0

While the losses and gains sustained are interesting, no particular conclusions can be drawn from this one test.

The cooking and serving of these various samples of meats was under the direction of Prof. Edith A. McIntyre, who was ably assisted by Misses Elizabeth J. Agnew and Olivia Staatz. Much credit is due the domestic science department for the excellent manner in which the meats were cooked and served.

RELATION OF BREEDER, FEEDER, BUTCHER, AND CONSUMER.

The Breeder: As improved cattle take the place of our common stock, the problem of feeding for lean meat will become more and more important. To have high-grade or pure-bred cattle show excessive fat on the block does not always inspire the man who raises cattle for the feed-lots to improve his stock by purchasing pure-bred cattle.

One of our best judges of beef cattle, both alive and on the block, is quoted as saying: "Our improved breeds of beef cattle were getting to contain so large a per cent. of fat that they were not as profitable from the butcher's standpoint as a plainer-bred steer, and so far as quality is concerned, a plainer-bred steer's carcass would have sufficient quality if the steer has been properly fed and ripened."

It would undoubtedly be a better advertisement to a pure breed to have its slaughtered animals show as nearly the ideal condition as

possible on the block. Unfortunately fat in excess is frequently upheld as the standard of excellence. In the public sales of to-day it is the fat animal that brings the highest price, even though there is by its side a better-framed animal that is in far better breeding condition. Fat and fecundity are more or less antagonistic, as is shown by the fact that barrenness is more common with fat animals than with those of lean or moderate flesh. For breeding purposes fat is a hindrance rather than a help. Breeding stock fitted for the show ring must have its fat reduced after the show season is over. It taxes the skill of the feeder to the utmost to reduce this fat, as a mistake at this time may ruin an animal for future usefulness as a breeder.

The farmer or amatuer breeder visits the fairs and stock shows and sees stock in plump, fat condition, and as this condition is pleasing to the eye he holds up these animals as his standard and demands animals in fat condition when he buys. As long as the demand is for fat animals the breeder will supply this demand, even though it is a detriment and useless expense both to the seller and buyer. When we are able to recognize merit without its being padded with fat, it will mean a saving of thousands of dollars to breeders of live stock. Utility, not excessive fat, should be our standard of excellence.

Fat, or the fat tendency, that would be condemned by the butchers may have its place in bulls that are to be crossed upon scrub or common cows that are deficient in the fat element, but all such crosses should be made intelligently by the breeder.

The Feeder The average feeder may not be guilty of getting his cattle too fat. For this reason it is sometimes suggested that he be encouraged to get his cattle as fat as possible, in order not to fall below the market requirements. While it is doubtless true that many feeders fail to get the proper finish to their cattle, this is no reason why they should remain in ignorance of what constitutes a proper finish. The feeder should be taught as to what is meant by an ideal beef, and encouraged to reach that ideal whenever it is possible, and to be able to recognize it when it is reached. Such knowledge will inspire a feeder to do better feeding and will undoubtedly result in the marketing of better cattle.

Another class of feeders may market their cattle in a finished condition, but, not being able to recognize this condition, may be led by unscrupulous buyers to imagine their cattle are not fat enough, and sell them accordingly. Feeders need to know what they have and what their cattle will show upon the block. The more knowledge feeders have along these lines the more certain they are to be respected and to get their just dues.

The Butcher: The butcher buys a beef animal for the amount of lean meat he is able to cut from it, and especially for the amount of lean in the high-priced cuts. He wants just as little waste as possible. It is his business to cater to the desires of the consumer, and whatever the consumer demands he tries to secure in the purchase of a beef animal.

The Consumer: The consumer dictates to the butcher, the butcher to the feeder, and the feeder to the breeder; in other words, the consumer is the supreme judge as to what constitutes good beef, and all the others must bow to his judgment. There is no question but that the consumer is demanding more lean and less fat. As indicated in the cooking tests, there must be enough fat distributed among the fibers of the lean to make the meat tender and well flavored, but the heavy layers of fat are now relegated to the tallow box, and not served on the meat platter. If this be true, it behooves both the breeder and feeder to produce beef animals that will furnish the largest amount of well-marbled meat in the highest-priced cuts with the least amount of extraneous fat.

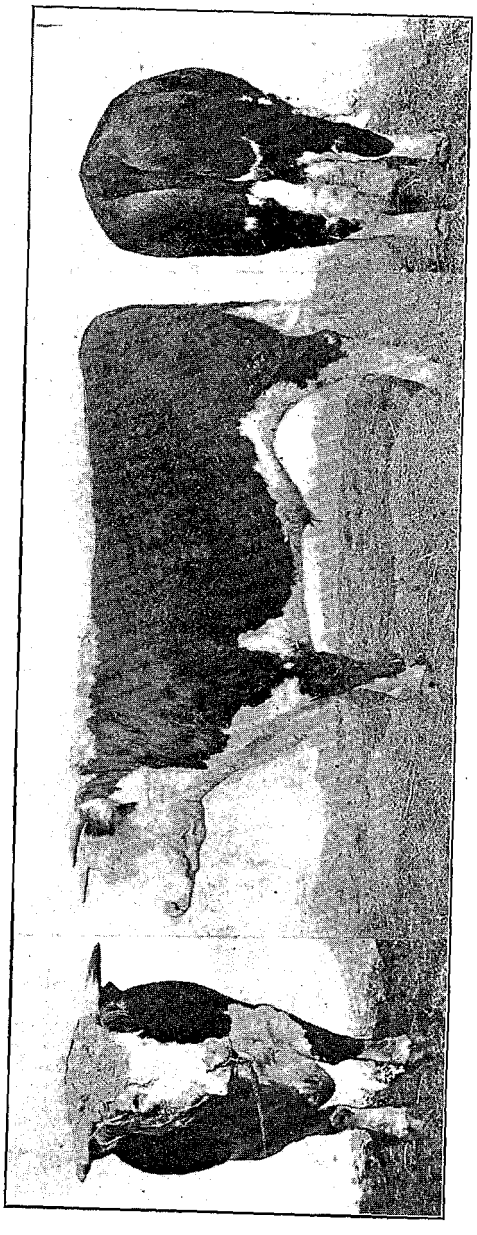


FIG. I.—The Fat Steer, DONALD.

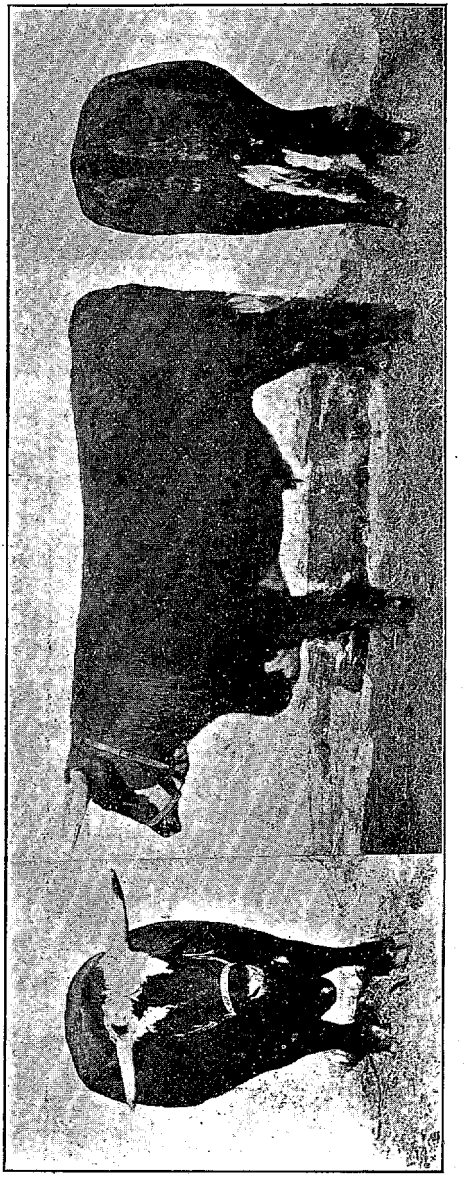


FIG. II.—The Prime Steer, JOHN.

FIG. III.—The Canner.

FIG. IV.—The Baby Beef.

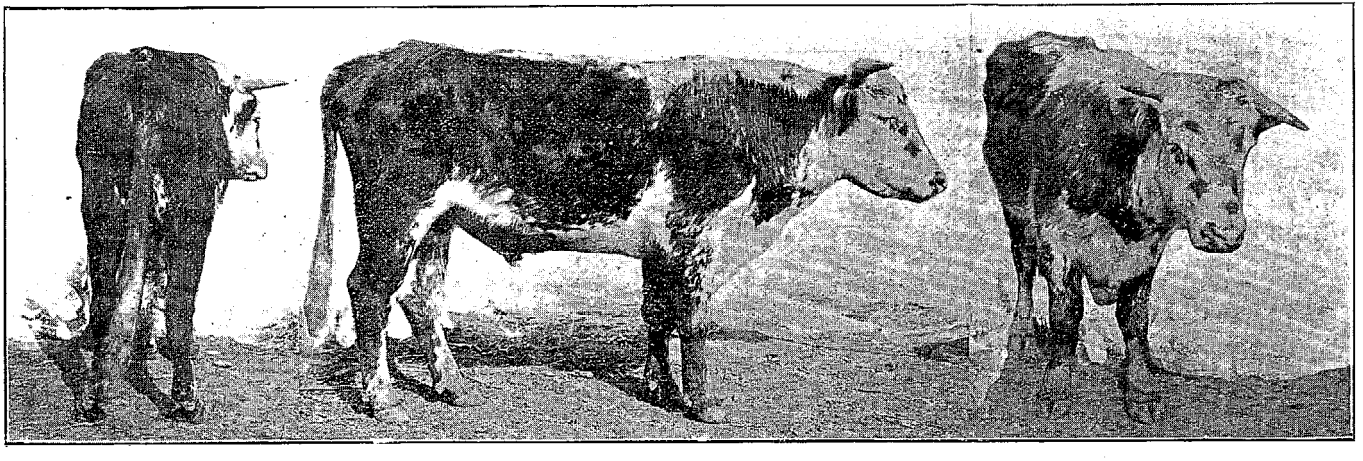


FIG. V.—The Grade Hereford Bull, showing Natural Flesh.

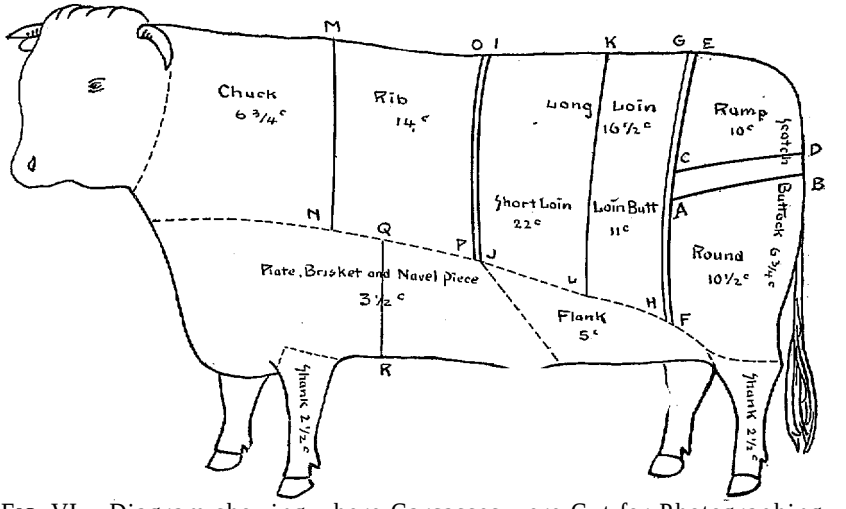
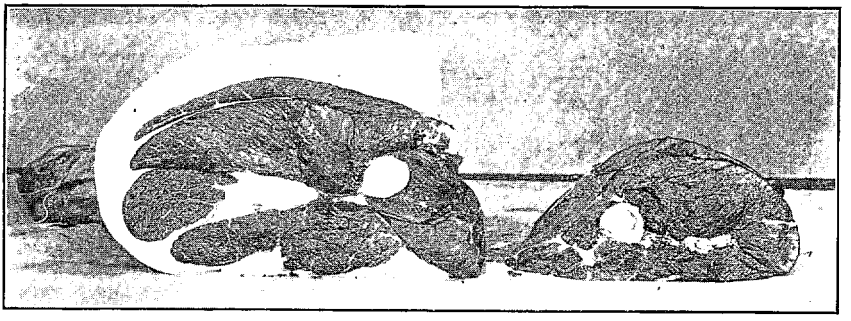


FIG. VI.—Diagram showing where Carcasses were Cut for Photographing.



Donald. Canner.

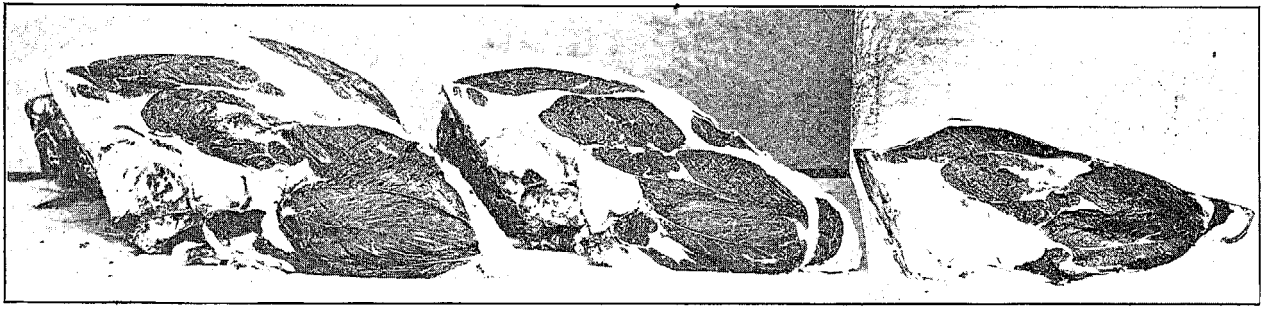
FIG. IX.—Rounds, showing Expansive Power of Fat.

Donald. John. Baby Beef.

FIG. VII.—Rounds, enriching Rump (see A–B, fig. VI).

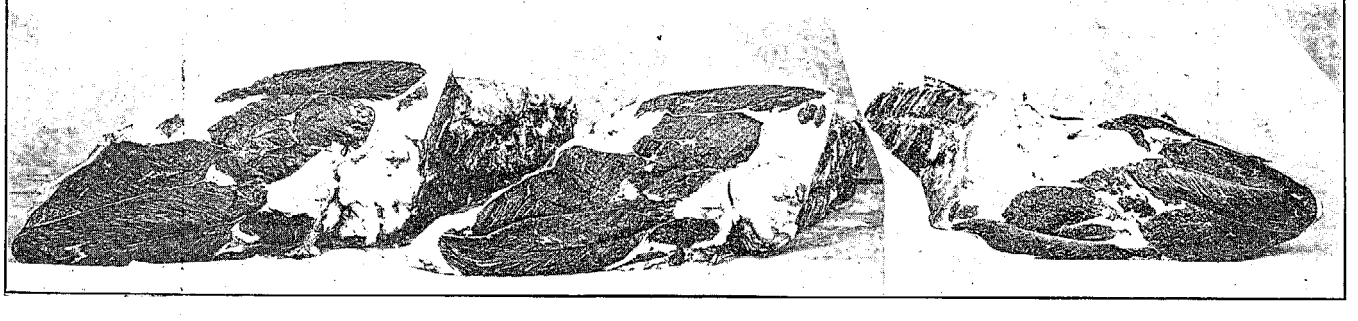
Donald. John. Baby Beef.

FIG. VIII.—Rounds, impoverishing Rump (see C–D, fig. VI).



Donald. John. Baby Beef.

FIG. X.—Butt End of Loin (see E–F, fig. VI).



Donald. John. Baby Beef.

FIG. XI.—Butt End of Loin, differently Cut (see G–H, fig. VI).

Donald. John. Baby Beef.

FIG. XII.—Rib End of Loin (see I–J, fig. VI).

Donald. John. Baby Beef.

FIG. XIII.—Short Loins parted at Point of Hip (see K–L, fig. VI).

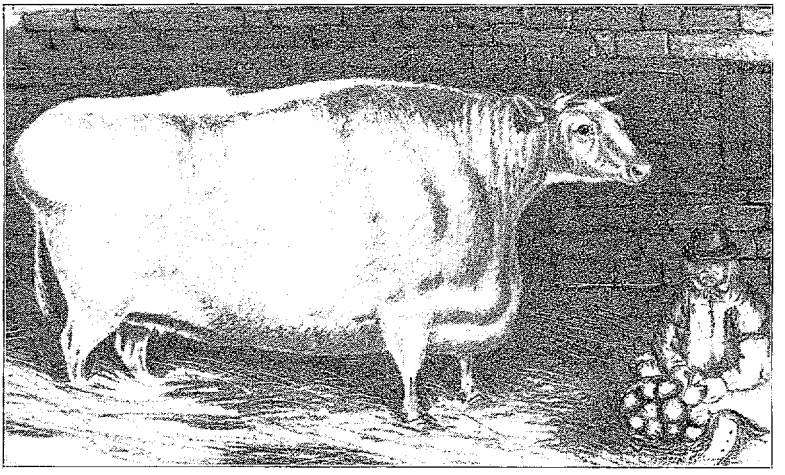


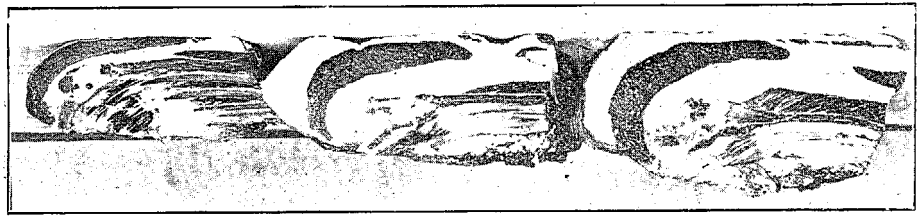
FIG. XIV.— Robert Colling's Celebrated White Heifer that Traveled.

Donald. John.

FIG. XV.—Thick End of Rib, showing Feather Edge of Shoulder-blade (see M–N, fig. VI).

Donald. John. Baby Beef.

FIG. XVI.—Rear End of Rib (see O–P, fig. VI).



Baby Beef. John. Donald.

FIG. XVII.—The Plates (see Q–R, fig. VI).