

## Practical Methods for Evaluating a Beef Carcass

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### Introduction

The ultimate objective of all beef cattle breeding, feeding, and management endeavors are culminated in the carcass as the marketable end product. In a great measure, the success of any beef production system is determined by the efficiency achieved in producing a quantity of beef that will meet consumer satisfaction. Most of us will agree that during recent decades much progress has been made in the improvement of both the efficiency of production and desirability of end product. Much of this progress has been made through selection practices based on the visual appraisal of breeding stock. In most cases selection has been within certain breeding groups, such as, *families* or *blood-lines*. However, more objective efforts must be forthcoming if further progress is to be made in the identification of breeding stock capable of efficiently producing high quality block beef. Consequently, practical methods for evaluating a carcass are of some concern at this time.

### Rate and Efficiency of Production

The rate and efficiency of gain by feeder cattle has been the subject of considerable research in recent years. The influence of ration, as well as inherited ability to "do well" under feed lot conditions, is of importance to both the breeder and feeder. If calves are fed to enable them to express their inherited production ability to a maximum, then differences in efficiency of feed conversion into meat becomes very important. Such factors as birth weight, weaning weight, post weaning feed lot gain, and the efficiency of feed lot gain have their place in a testing program. The producer, regardless of his position in the production line, will have these production data available to help him when confronted with selecting and/or culling decisions. Research has indicated that each of the above factors are influenced greatly by inheritance. Estimates of heritability have been placed at approximately 41 percent for birth weight; 30 for weaning weight; 45 for post weaning feed lot gain and 39 for efficiency of feed lot gain.

Thus, with reliable production data available, the beef cattle breeder can expect to make some progress in herd efficiency by more precisely identifying animals within the herd which have superior carcass traits. Such traits may be measured against a set of production goals.

Production goals have arbitrarily been set at 1.4 pounds of chilled carcass weight per day of age for steers and 1.3 pounds for heifers. It is felt by workers in the field that these values have merit in evaluating efficiency of production, as well as, quantity of production. Many cattle

in herds today can accomplish and surpass these minimum goals. The future requirements, of course, must be advanced from time to time as better animals are identified and their genetic potential utilized to the maximum.

### Carcass Desirability

In order to properly evaluate the end product (carcass), one must first be reconciled to the fact that it will be necessary to keep a set of records. Such records must by necessity reflect the *breed* and *blood line* to include the sire and dam. These data would then become valuable at the time the herd is culled and replacement selections made. Sex of each animal should also be recorded, since it is generally known that the carcass from a male will have less waste fat than one from the females. On the other hand, females are considered to mature more rapidly than males, thus reflecting a carcass which would likely have more outside fat and marbling at a given age. Sex is easily determined in the carcass by observing the udder or cod fat. Further positive identification may be obtained by observing the severed spermatic cord. This is commonly referred to by packing house personnel as the "pizzle". The "pizzle" or severed spermatic cord is located near the rear end of the pelvic bone. (Figures 1 and 2).

The birth date of each animal should be recorded. This would provide a basis for calculating the *age in months*. Accuracy in recording age should be considered important since it must be used in establishing the economics of production.

Cost of producing a pound of carcass meat may be calculated after the *live weight* and carcass weight have been established. These weights by themselves are of little value, but when combined with the age of the animal and the feed cost; it is possible to arrive at some production cost factor. *Cold carcass weight* should be recorded to the nearest one-half pound. Carcass weight by itself is also of little value since it only reflects the total number of pounds of lean, fat, and bone that have been produced. On the average, one may expect a choice carcass to contain approximately 55 percent lean, 32 percent fat, and 13 percent bone. This means that an animal weighing 1000 pounds would yield little more than 330 pounds of lean meat. Some variation in total lean will exist among carcasses and is visually appraised as conformation or carcass thickness. This is why the large retail chains have been selecting some carcasses from the rail in preference to others.

The difference in retail value between carcasses, in extreme cases, can be more than \$150. A difference of \$50 among carcasses is not unusual. Studies conducted by U.S.D.A. officials have shown that in the higher grading carcasses each one percent increase in the carcass yield of the preferred retail cuts increases the carcass value by approximately \$1.25 per hundred weight. This much difference can easily be visually differentiated. A common cut used to recognize these differences in value is the *loin muscle*. Differences are generally determined at the time the carcass is ribbed for shipment.

The size of loin muscle is important and does tend to reflect the quantity of lean in the various other portions of the carcass. The *shape of the loin muscle* should also be considered since a plump oval steak is desired. Consequently, a plump oval loin eye is preferred to a long

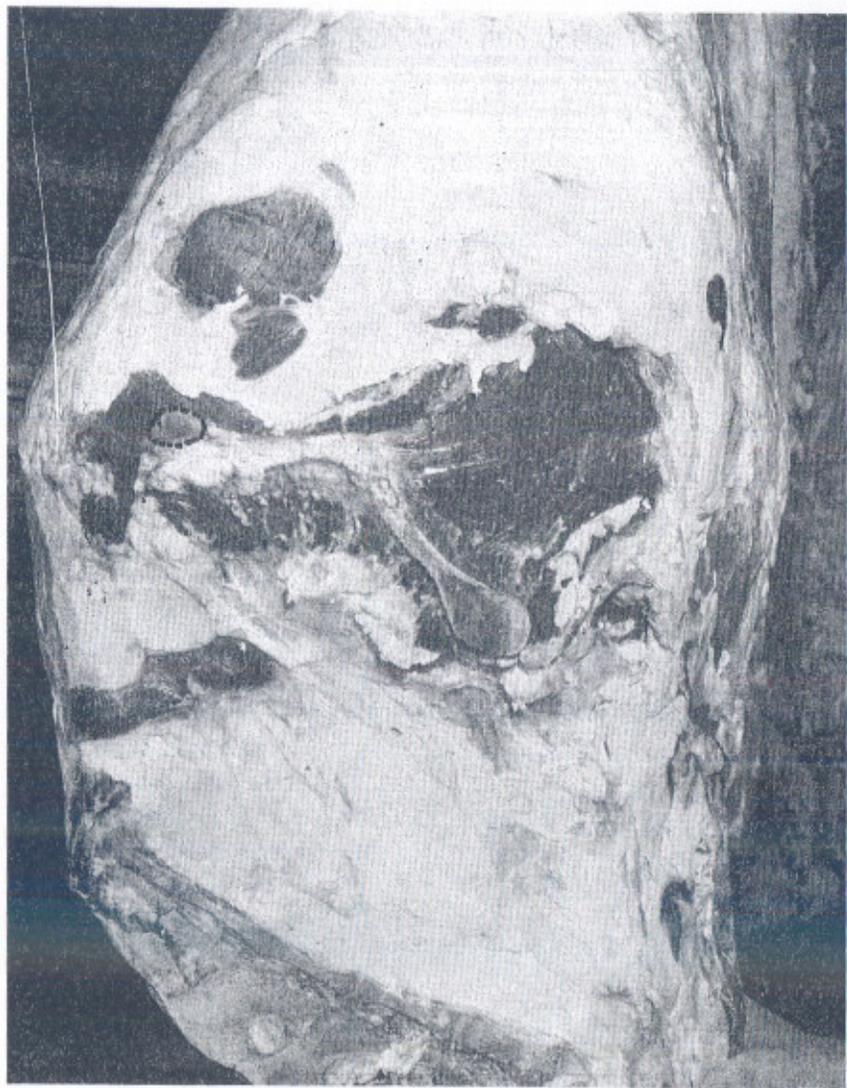


Figure 1.—Characteristics identifying the steer carcass include generally prominent cod fat, the half-closed face of the gracilis muscle, and the spermatic cord at the upper end of the aitch bone.

flat loin eye. The size and shape of the loin muscle may be recorded for future study and measurement by the following methods.

Place a piece of 6 x 9 transparent tracing paper over the ribbed area and trace the outline of the muscle. A number two lead pencil should be used since it will be soft enough to avoid puncturing the

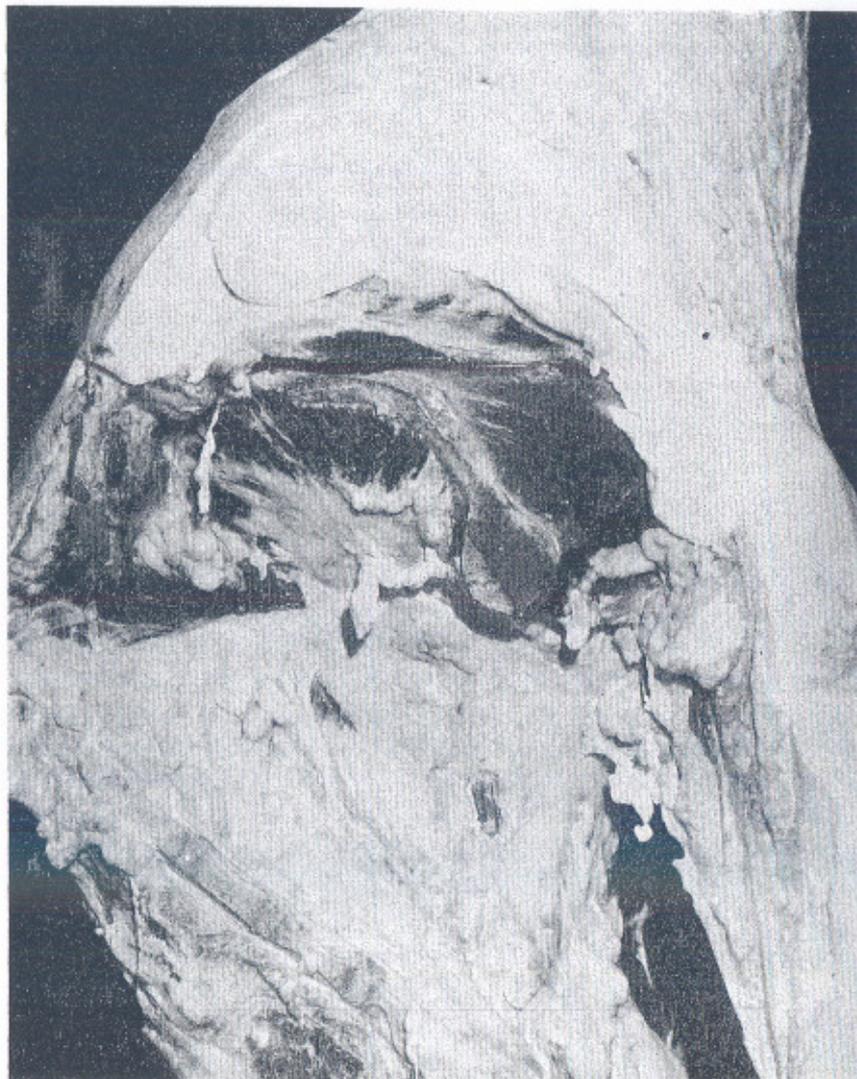


Figure 2.—Identifying heifer carcass characteristics include the presence of the udder and the exposed face of the gracilis muscle above the aitch bone.

tracing paper and will make a line dense enough so that the tracing can be observed. Care should be taken to avoid including adjacent muscles in the loin eye area. An example of the true muscle area may be observed in Figure 3.

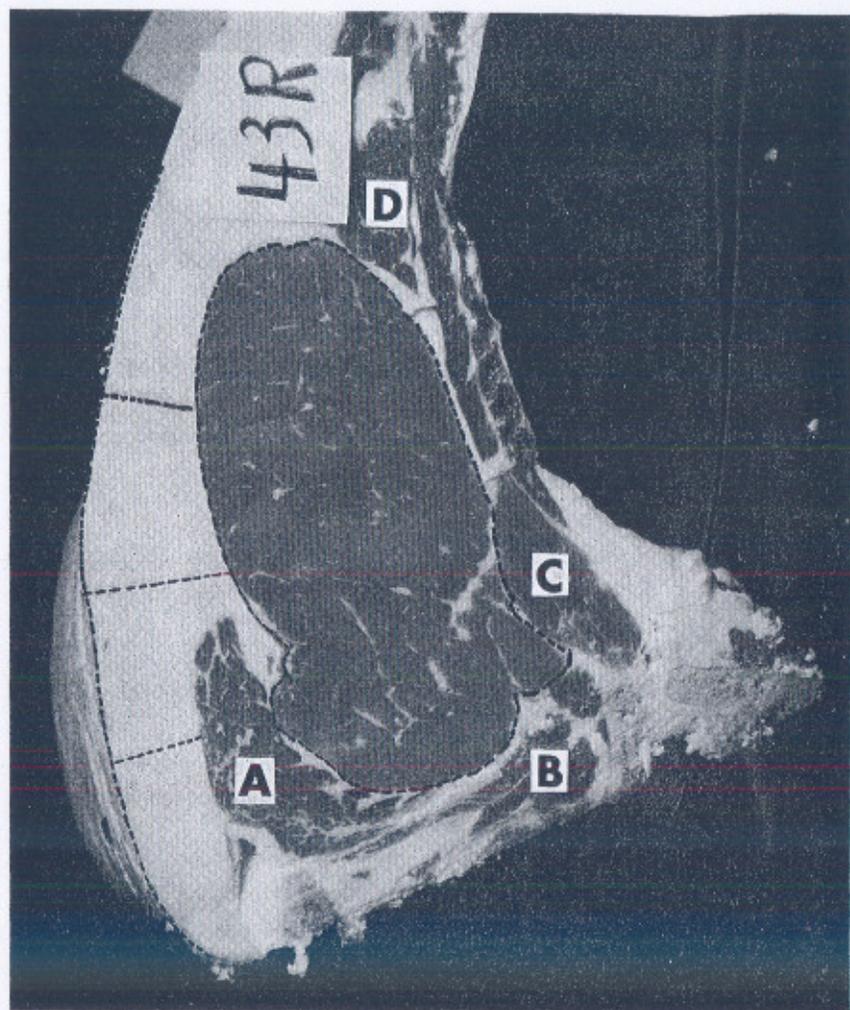


Figure 3.—In some carcasses the loin muscle is clearly separated from all surrounding muscles. Other carcasses have some apparent overlapping of muscles. Such adjoining muscle areas should not be included in making loin muscle tracings. The loin muscle in this photograph is enclosed by a dotted line. Fat thickness is determined by taking an average of the three measurements shown. Muscle structures labeled as A, B, C, and D should not be included in the loin muscle tracing.

A tracing of the *fat cover* may also be made before the transparent paper is removed from the ribbed area. Thickness of fat over the loin muscle along with the amount of kidney and pelvic fat are good indicators of carcass wastiness. This fat should be held to the very minimum since it is a part of the non-edible portions of the carcass.

The loin muscle area and fat cover may be visually appraised for their approximate quantities of each or they may be measured. If the objective approach is chosen the area may be determined with the aid of a polar planimeter. The planimeter reading will be directly in square inches. The area then should be expressed on a hundred pound basis. Two square inches of loin muscle per 100 pounds of carcass weight would be a good goal for cattle averaging 12 to 15 months old at the time of slaughter. Fat thickness should be determined by taking an average of three separate points over the loin muscle. Make sure the lines are drawn at right angles to the fat surface. One measurement should be at the center of the long axis of the loin muscle and the others one-fourth of the distance from each end. A typical measurement may be observed in Figure 3. The average of the three measurements should be recorded in tenths of an inch of fat thickness. One-tenth of an inch of fat for each 100 pounds of carcass would be adequate. Amounts in excess of this should be basis for discounting a carcass.

A visual appraisal of the muscle should be made for marbling. The quantity may be established by a federal grader or an individual may wish to compare the marbling with a standard set of photographs. Shown in Figure 4 are four degrees of marbling representative of the official United States Standards for grades of carcass beef. The amount of marbling generally desired in the lean ranges from a modest to a moderate amount. This amount of intramuscular fat has been found to provide adequate liquid during cookery and mastication. Since additional marbling has not been shown to improve the tenderness, a *modest* amount is considered sufficient to enhance the lean meat flavor and provide eating pleasure.

### Summary

Some improvement in beef type cattle will be made through a recognition of the carcass traits. These traits when combined with the production traits become valuable tools in determining production efficiency and product desirability.

Beef type cattle may be considered to have the following characteristics:

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| 1. Chilled carcass weight/day of age.      | Steers 1.4 lbs or more<br>Heifers 1.3 lbs or more |
| 2. Rib eye area/cwt carcass                | Two square inches or more                         |
| 3. Fat cover/cwt carcass (at the 12th rib) | 0.1 inches or less                                |
| 4. Quantity of marbling                    | Modest to moderate                                |
| 5. Conformation                            | Thick and meaty                                   |
| 6. Kidney fat and pelvic fat               | Small amount                                      |



A



B



C



D

Figure 4. Representative degrees of marbling determined by official United States Standards for grades of carcass beef. Examples shown here include marbling degrees classified as (A) slightly abundant, (B) moderate, (C) modest, and (D) small.