# *RELATIVE MERITS OF SUBJECTIVE AND OBJECTIVE METHODS OF CARCASS EVALUATION*

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In discussing the topic assigned to me an attempt will be made to keep repetition at a minimum. And since this discussion is to be followed by a procedures paper, some facts and theories concerning meat animal evaluation will be presented along with the relative merits of subjective and objective methods.

## Live animal and carcass grading

In a recent meeting one of our nationally know judges said, "Our measurements of live animals are subjective; measures in the carcass are also subjective." "Some judges will go down the line of carcasses and look at the eye of beef with a flashlight without paying much attention to the outside cover, conformation and meatiness of the carcass which we pay a lot of attention to on foot." Another prominent judge in comparing live animal grading with carcass grading stated, "I don't think the boys are any better off with carcass grading than we are in grading live animals." He went on to say that when carcass grades are put to the test as to eating quality, the carcasses do not always follow the categorized pattern of the upper grade eating better than the lower grade. In other words, the standards for carcass grading may do a rather exact job of grouping carcasses; however, these carcass standards are not necessarily doing any better job of sorting carcasses into groups according to eating quality than live grading. These statements are primarily aimed at beef. The same subjectiveness comes into play in pork and lamb judging and grading. I would hurriedly add that in pork evaluation the role of fat is more distinctly identified and, therefore, the final evaluation job is more satisfactorily done than with any other class of livestock.

In live and carcass grading, subjectiveness plays the major role with some objectiveness in pork carcass grading. The live grades and judges feel they can do a reasonably good job of finding animals with acceptable finish and heavy muscling. However, they are not able to score the animals on such carcass quality factors as color of lean, marbling and texture. On the other hand "meats people" are credited with paying too much attention to quality factors that do not always hold up in palatability tests.

## Weights and Dressing Percentage

Live weights vary according to "fill" conditions of the animal. If you were to analyze gains critically, you probably would find that the only time an animal gains in weight is while he is drinking a large quantity of water or gulping down a relatively large amount of food in a short period of time. This prompts some workers to attempt to adjust for fill

based on the theory that animals of the same class or breed have the same percentage of G. I. tract. Unfortunately this is not true and it is quite possible that as much or more error is introduced by adjusting for fill than if the difference in fill had been ignored.

When do you ever have the true dressing percentage of any animal? The packer derives a yield based on buying and selling weights - but the person involved in a carcass evaluation contest should be interested in dressing percentage. This matter of an equitable live weight is one of the greatest stumbling blocks to accurate monetary evaluation. We can not ignore dressing percentage just as we can not ignore eating quality and cutability!

## Cutting Yields

For years we have been taught that the thicker, meatier appearing animals (usually called "typier") have a higher percentage of the more demanded cuts and lower percentage of the less demanded cuts. The booklet "Ten Lessons on Meat" states that not only does fattening increase edible portion in meat, but there is a tendency for the more demanded cuts to increase and the less demanded cuts to decrease.

Table I--Yield of Standard Wholesale Cuts[1] of Beef in Percentage of Carcass, According to Commercial Grade[2]

| Cuts | Common | Medium | Good | Choice and Prime |
|---|---|---|---|---|
| | Per Cent | Per Cent | Per Cent | Per Cent |
| Fore quarter | 51.5 | 51.5 | 51.5 | 51.5 |
| Chuck and neck[3] | 27.7 | 26.4 | 25.4 | 23.6 |
| Trimmed chuck | 26.1 | 25.0 | 24.1 | 22.5 |
| Neck | 1.6 | 1.4 | 1.3 | 1.1 |
| Plate and brisket | 10.2 | 11.5 | 12.6 | 14.4 |
| Fore shank | 4.9 | 4.6 | 4.3 | 3.9 |
| Rib | 8.7 | 9.0 | 9.2 | 9.6 |
| Hind quarter | 48.5 | 48.5 | 48.5 | 48.5 |
| Whole round | 27.2 | 25.4 | 24.1 | 22.0 |
| Rump | 3.2 | 3.5 | 3.7 | 4.0 |
| Round | 20.1 | 18.4 | 17.1 | 15.2 |
| Hind shank | 3.9 | 3.5 | 3.3 | 2.8 |
| Whole loin | 18.5 | 19.6 | 20.5 | 21.7 |
| Loin--loin end and short loin | 17.2 | 17.4 | 17.7 | 18.0 |
| Kidney knob | 1.3 | 2.2 | 2.8 | 3.7 |
| Kidney | 0.4 | 0.4 | 0.3 | 0.3 |
| Kidney fat | 0.9 | 1.8 | 2.5 | 3.4 |
| Flank | 2.8 | 3.5 | 3.9 | 4.8 |

These figures prepared by the Bureau of Home Economics of the United States Department of Agriculture are based on data from the Missouri and Illinois Agricultural Experiment stations.

1 Standard Chicago Cuts.
2 Figures refer to typical animals from each grade.
3 Shoulder clod is included.

I show this table as evidence that we are looking at data with "rose-tinted" glasses as the table clearly shows the opposite is true. Almost without exception the research dealing with wholesale cuts of beef shows that longer carcasses with less fat produce a higher percentage of the more demanded cuts and a lower percentage of the less demanded cuts. I believe it is time we should stop trying to read into animals what we would like for them to produce in the way of edible portion rather than the actual yields. Why should we expect a long hog and a compact, blocky beef carcass to cut the same high yield? Even though the thicker beef carcass has eye appeal, the fact remains that the edible portion is usually not as great in this so-called "typier" carcass than one that is angular and has more length. Why? I believe this question could usually be answered with a simple 3-letter word - FAT! If the thicker, beefier carcass were covered with a thin rind of fat, the yield of primal cuts would excel the more angular, rangy-type carcass.

In my opinion fat has a more definite role in determining edible portion, the percent of demanded cuts or less demanded cuts, the percent separable lean, the percent protein and practically any cutability factor that might be mentioned than does type, breed or conformation. Therefore, I am submitting for your perusal the U.S.D.A. proposed schedule for determining yield grades of beef carcasses.

SCHEDULE FOR DETERMINING YIELD GRADE OF BEEF CARCASSES

I. Preliminary Yield Grade: Determine from following table:

| Preliminary Yield Grade* | Adjusted Fat Thickness | Preliminary Yield Grade | Adjusted Fat Thickness |
|---|---|---|---|
| 1 | --- | 6 | 1.6-1.99 |
| 2 | .0-.39 | 7 | 2.0-2.39 |
| 3 | .4-.79 | 8 | 2.4-2.79 |
| 4 | .8-1.19 | 9 | 2.8-3.19 |
| 5 | 1.2-1.59 | 10 | 3.2- |

*For 600 pound carcasses with 10 square inches of rib eye.

II. Final Yield Grade: Adjust the preliminary yield grade as follows:
Weight: For each 100 lbs over 600 lbs, lower yield 40% of grade.
For each 100 lbs under 600 lbs, raise yield 40% of grade.
Area Rib Eye: For each sq. in. more than 10, raise yield 30% of grade.
For each sq. in. less than 10, lower yield 30% of grade.
Kidney Fat: Lower yield 20% of grade for each percent of kidney fat.

This schedule has been criticized for being too complicated and making grading too costly and time consuming. This should not be a serious handicap in a carcass evaluation contest.

Marbling

Some meats personnel have been accused of using marbling as the sole quality factor in evaluating carcasses. A high relationship seems to exist between outside fat thickness and marbling - but not necessarily

so. On the other hand the relationship between marbling and palatability traits, particularly tenderness, although positive and statistically significant, is quite low and accounts usually for less than 20% of the variation in tenderness. This leaves some doubt as to how much emphasis marbling should receive in the overall appraisal of carcass desirability. Marbling probably should be considered along with other characteristics which are also subjective in nature such as color and texture. The influence of heredity and environment on these factors is not clear as of now.

Size of "EYE" Muscle

The size of the loin or rib eye has long been associated with the total lean in a particular carcass. In a recent article published in the Journal of Animal Science it was shown that only about 18% of the variation in total separable carcass lean could be associated with the area of the longissimus dorsi muscle. Correlation coefficients between total separable carcass lean and the lean of wholesale cuts were .95 with round, .93 with chuck and .81 with foreshank. The high relationship of the lean content of these beef cuts, especially the round, to the total lean in the carcass is indicative of their usefulness in predicting total muscling. It must be understood, however, that fat covering and total separable fat were completely ignored. With these facts and theories in mind it might be well to suggest a resolution which could read as follows:

Whereas research has shown that excessive fat has a depressing effect on yield of the more demanded cuts, the yield of total separable lean, the percentage of "true" edible portion and the percentage of protein

And whereas the positive relationship between the amount of finish, (fat thickness, marbling, chemical estimates of finish, or specific gravity) and consumer preference and palatability is small although highly significant in some instances.

Be it resolved that "an all-out war" be declared on excessive finish. That through patient, clear sighted, cooperative research, a meat animal will be produced that yields a high percentage of edible meat with outstanding eating quality. This will also be the ideal animal for the producer, packer, and consumer.

In summary it appears that we have no single or combination of objective or subjective methods that will produce an entirely satisfactory carcass evaluation. There has been no mathematical concoction proposed to date that will adequately do the job. To me it simply means that we should use all the subjective and objective methods available, recognizing their limitations, and combining them with some good, ordinary "horse sense" to arrive at the best final decision.

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CHAIRMAN BRAY: Is there any question on how Bill stands? Very good, Bill. We enjoyed your paper and I am sure it will be

a stimulant for discussion. However, we are going to delay this discussion that we had scheduled here because of the absence of Mr. VanStavern. But we will certainly come to a discussion of this paper following the next presentation, and that is going to be by Dr. Walters of Oklahoma State University on the subject of "Can Procedures for Carcass Contests Be Standardized?" I think at this point that is quite a subject.

MR. WALTERS: Mr. Chairman and members of the Conference, I would be the first to agree this is quite a subject, but I believe you assigned this, didn't you?

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