Pork carcass evaluation has long been a subject of interest to many in this group. You will find that items concerning it have been included in the program of almost every Reciprocal Meat Conference. Such emphasis is not too difficult to justify. Swine production is one of our major livestock enterprises and pork represents a substantial share of our meat diet.

At this conference we are considering evaluation methods primarily in relation to research work. As you know, many of us in the Consumer and Marketing Service of the U.S. Department of Agriculture are involved in consumer protection activities or in providing services to aid in more efficient marketing. You are particularly familiar with such functions as meat grading, market reporting, meat inspection, and regulatory programs under the Packers and Stockyards Act. In my own area of work in developing grade standards for livestock and meat, we are directly interested in evaluation techniques. Our job is to apply them to the problem of providing a practical system of market identification. In this connection, research is of great importance to us, since it provides valuable information needed for improving standards.

Increasing use of more detailed pork carcass evaluation techniques is apparent in connection with most research on swine and pork. The era of measuring the results of our efforts to improve swine production methods in terms of pounds of live hogs produced has passed, and rightly so. Expanded facilities, improved techniques, and additional personnel now permit us to appraise more thoroughly the pork which results from our production efforts. In any expanding program it is wise to pause long enough to see where we are, where we want to go, and the best way to get there. It has been said that the longer we have been doing something routinely, the greater the need to take such a look at it, as there is a good possibility that it should be changed.

In appraising pork carcass evaluation criteria, we must consider the objectives of our evaluation work. We are interested in obtaining meaningful measures of the degree of excellence with respect to two general characteristics—quantity and quality. In simple terms, it is just a matter of "how much" and "what kind" of pork the carcass contains.

In evaluating quantitative differences in pork carcasses, we are interested in the relative amounts of lean, fat, and bone and in the relative proportions of the carcass in the preferred and less preferred parts. This aspect of evaluation certainly has received a great deal of attention during the past 20 years. Obvious consumer interest in lean
rather than fat has been the reason for greater attention to this characteristic. Perhaps the fact that all of us include some measure of quantitative differences in our evaluation work has created our problem—confusion. It certainly would be unusual for one person alone to create the confusion that exists. The problem is in the variety of ways we have devised, and regularly use, to measure differences in quantity. A quick review of the reports of research results will reveal several methods for measuring quantitative differences. Add some of the special techniques used in our evaluations in connection with such activities as carcass contests, certification programs, and testing stations and you should be convinced of the problem.

One of the most detailed procedures available for evaluating quantitative differences in pork carcasses is to make a complete physical separation of lean, fat, and bone. Analysis of the chemical composition of the carcass represents a similar procedure. Of course, these techniques are too time-consuming, expensive, and tedious to have widespread use. The results also are rather difficult to interpret in a practical way. For example, I know of no way to express the results in terms of differences in monetary value, which is of interest to many. While these detailed methods have a place in some studies, it does not seem appropriate to consider them as standard, uniform procedures for all to use. Perhaps we should further investigate the possibility that such determinations for a sample portion of the carcass could be made rather easily and would accurately reflect the composition of the entire carcass.

Obtaining complete cutting yields for a carcass is widely accepted as an excellent evaluation technique. It requires more time and effort than some simpler procedures. Cutting and trimming methods must be uniform from one time to another and from place to place to obtain meaningful and comparable results. Rather general use of the recommended cutting procedures adopted by the Reciprocal Meat Conference has materially reduced this problem. Complete cutting data also permit the use of another evaluation method—the determination of value differences. As you know, this seems to be the only language which some can understand. It is necessary to use caution in interpreting information on value differences. Price levels change almost constantly and the relative prices of various cuts also change over longer periods of time. Therefore, in computing value differences it appears that we should use average prices for a period of time, probably for a year or more.

Data on cutting yields for a portion of the carcass represent another evaluation technique. A common one, of course, is the yield of the four major lean cuts—the hams, loins, picnic cuts, and Boston butts. It is easier to obtain yields for these cuts than total cutting yields, but the same requirement for uniformity of cutting and trimming methods applies. Since the major, high value lean cuts are included in this figure, it rather accurately reflects differences in carcass value. Widespread use of this technique has made it a familiar tool which is easy to interpret and meaningful in comparing results. Information on the yield of the four lean cuts must be considered an important step in pork carcass evaluation.

The yield of primal cuts—or the four lean cuts and the belly—also is used in evaluation work. This approach recognizes that the belly is one of the major cuts of the carcass and contributes substantially to
total carcass value. On the other hand, fatness has an important effect on the yields of the various parts of the carcass. A point to consider is that the belly "acts like a fat cut," in that belly yields increase with added fatness while lean yields decrease. This leads to the idea that yield of lean cuts rather than primal cuts is a more realistic measure to use in view of our goal of increasing lean yields.

In recent years we have seen increased use of yield of ham and loin, or of either cut singly, in pork carcass evaluation work. An obvious advantage is that such data are easier to obtain than more complete cutting yields. Another point is that emphasis is placed on the two largest lean cuts which are in greatest demand, and consequently of greatest value. Yield of ham and loin has been shown to provide a rather good measure of total yields and value of the carcass and has a place as a practical evaluation method.

Some other considerations should be mentioned in connection with the use of yields in evaluation. One of these is the question of using only one side or the entire carcass in determining yields. The fact that we cannot always achieve a perfect split into equal sides leads to the suggestion that yield data should be obtained from both sides. Another factor to consider is the weight upon which yields are based. Both live and carcass weights are used; each has its advocates. Those who favor computing yields of cuts as a percentage of live weight point to the ease of relating this information to other familiar measures. Most of our marketing procedures and our measures of production efficiency are expressed in terms of live weight. However, such items as rate of gain and feed conversion could just as well be expressed in terms of carcass weight with equal meaning once we became familiar with the figures. Yield of cuts as a percentage of carcass weight emphasizes the end product--pork. It also provides a more accurate picture of the kind of carcass or hog produced with respect to our basic objective of identifying differences in lean and fat content. It is not affected by some rather easily changed variables such as amount of fill. Two hogs may have the same yield of lean cuts on a live basis but differ substantially in leanness. For example, hogs differing by 2 percent in yield of lean cuts on a carcass basis appear equal on a live basis if the fatter hog has a 3 percent higher dressing percentage. Separate consideration of yields of cuts based on carcass weight and dressing percentage permits a more analytical expression of comparative merit.

Another approach to the evaluation of quantitative characteristics of pork carcasses is the use of measurements. Their usefulness is the result of established relationships of measurements and yields of cuts. They are familiar and meaningful to all of us and rather easily obtained. The objective nature of measurements of such factors as average backfat thickness, carcass length, and area of loin eye lend uniformity to our evaluations. Such information must be considered useful in pork carcass evaluation work.

In evaluating quality differences in pork carcasses, we are interested primarily in traits which indicate the eating quality of the meat. Increased attention has been given to this aspect of evaluation in recent years, but considerably less than to quantitative factors. With new information available in this field, it now should be possible to make progress toward the adoption of uniform evaluation procedures for quality differences. We must admit that some improvement in our methods should be possible. Our
problems in appraisal of quality may be about as great as those in appraising quantity, except that in this case we are not confused by too many ideas, but too few.

The major factors considered in appraising quality in pork are color, firmness, and marbling. Together these factors have been shown to have value in predicting palatability. The degree of dryness or wateriness also has been shown to be associated with palatability and with other economic aspects of desirability such as processing and cooking losses and attractiveness of the cuts. Maturity also affects palatability, particularly when a wide range in maturity is involved. However, since such a large proportion of our pork is produced from relatively young animals within a rather narrow range in maturity, seldom is this an important factor in our evaluations. Other characteristics such as texture of lean, connective tissue, and character of marbling seem worthy of further investigation to define more clearly their effects on palatability. Under present knowledge, the more important factors of color, firmness, marbling, and dryness certainly have merit for use in our evaluation of pork quality.

Objective methods are available for measuring most of the pork quality characteristics of interest to us. However, for the most part these are rather detailed, complicated procedures which often cannot be accomplished as a part of the evaluation. Subjective methods which are easier to apply offer greater opportunity to improve pork quality evaluation work and make it more uniform. In this connection, the quality standards developed and illustrated by the University of Wisconsin are welcome aids. Widespread use of these standards should contribute to the objective of improved, uniform evaluations of pork quality.

One of the problems encountered in some pork carcass evaluation work is the need for devising a single, overall measure of merit, such as an index or scoring system. This involves combining information obtained in separate evaluations of several dissimilar characteristics, such as cutting yields, measurements, and quality traits. It must be recognized that it is virtually impossible to find a common denominator which will permit equitable combining of unlike factors of this nature. A satisfactory score or index may be developed for a specific purpose by arbitrarily assigning a value or weight to each of the characteristics considered in the evaluation. However, that particular system may be entirely unsuitable for another purpose. Therefore, we must conclude that reporting the results of separate evaluations of the several different factors considered provides the most meaningful information on pork carcass evaluation work.

In conclusion, there is ample evidence that we are not all of the same mind with respect to pork carcass evaluation methods. The body of information developed in this field in recent years should permit improving our techniques and making them more uniform. In this connection, it is suggested that this group should review its recommended evaluation procedures and adopt improvements if possible. Then all of us should make a determined effort to follow those recommendations. This is not to suggest maintaining the status quo and discouraging a continued search for new approaches and further improvements. Rather it is an attempt to establish a common thread for use in achieving greater uniformity and comparability in our individual efforts. In short, the challenge is whether we can agree, or must we continue to go our several ways.
V. R. CAHILL: Well, Lowell, that is a challenge. I wonder what we shall do with it.

If you have been reading your program you may be wondering what comes next. In recent months, and possibly years, folks in many segments of our industry have been wondering about the feasibility of pork grades. As you well know some of them have attempted in one way or another to establish a system based on grades. The committee was thinking about this addition to the program and the name Robert Rust came to mind. We learned last night he says only yes to challenges and accepted the challenge to do something about pork grading in the State of Iowa and also to accept the challenge of putting this in form of a paper relating some of the attempts throughout the country. At the time the program was confirmed he still felt that the lamb carcass show in which he was involved during this conference would work out all right so far as schedule is concerned. You know, as well as I do, that he had to return to Iowa to work on lamb carcasses and so his associate, and our good friend Ed Kline is here to share with us these ideas on the Feasibility of Grades for Wholesale Pork Cuts. Ed, we appreciate your stepping in.

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