Pork Carcass evaluation assumes an important role in research, teaching, and extension activities. A number of evaluation procedures are available for use, and they vary widely with respect to ease of application, time and labor involved, equipment required, and technicality. Consideration of the objective and use of the evaluation is a major factor in selection of the procedure to employ.

The U.S.D.A. grade standards can be described as one of the practical tools for pork carcass evaluation. The need for a practical means of accurately reflecting consumer demand for pork at the livestock market prompted the development of the standards. Grading can be accomplished easily and quickly, in contrast to some of the other accepted evaluation procedures. The grade standards are thus adapted to widespread and frequent use as a contributing part of the evaluation. Other more technical and complicated steps may be required in specific cases due to the objectives in mind, but such methods are not as universally applicable as grades. Even though more detailed steps, such as cutting tests, are included in the evaluation plans, grades should be recorded to provide a familiar background for relating one evaluation to another and to everyday problems. Adding to the practicability of grades as a means of evaluation is the widespread and uniform interpretation of the results. U.S. grades are well-known and carry a definite meaning to a variety of interests. Some of the more technical aspects of evaluation are unfamiliar and forbidding to many who are interested in and can make good use of the comparison or evaluation. The use of practical terms encourages and simplifies the practical application of results.

The purpose for which a tool was designed is an important consideration affecting the suitability of the tool for a particular use. While we may at times successfully tighten a screw with a coin, we know that a more appropriately designed tool is available. The primary bases for the grades are differences in yields of cuts and in quality of pork. Therefore, we fully expect that the grade standards will most effectively aid evaluation through identification of differences in these and closely related factors.

The identification of differences in cutting yields probably represents the most important contribution of the grade standards to evaluation. Grading may provide as accurate and complete an analysis of cut-out as is required for a number of purposes. When it is not feasible to obtain actual cut-out data due to time, labor, space, or other limitations, the indication of cutting yields provided through grading will serve as a valuable aid to evaluation. Yields of the various cuts is an important aspect of pork carcass evaluation. Fatness, quality, grade, yields of cuts, and monetary value
are all closely related. Under present conditions, with increasing emphasis on lean pork and decreasing tolerance for fat, the use of fatness as one of the major grade determining factors makes the standards a particularly timely tool.

The close correlation between fatness and yields of cuts is the basis for estimates of yields by grade. Measurements of fatness are supplemented by consideration of subjective factors in grading to achieve more accurate indication of yields. The grades were developed primarily to aid marketing through identification of important differences in hogs. Practicality is an important feature of a grading system designed for use in marketing. For that reason, each grade represents a definite range in yields of the various cuts derived from a pork carcass. The requirement of a practical, workable system was given major consideration in determining the size of the range represented by each grade. Where the nature and purpose of an evaluation indicates a more refined analysis, the grades may be subdivided into halves or thirds in a manner similar to that frequently employed in using the Federal grades for beef. This refinement may be particularly desirable when the grades and associated yields are used for the determination of monetary values by extending yields with appropriate prices. The standards were developed on the basis of yields under a rather standard method of cutting. Appropriate adjustments may be made in yields for the accurate reflection of any other cutting method.

It is understood that quality of pork is one of the factors considered in determining grade, and the grade designations - Choice, Medium, and Cull - identify different degrees of quality. Differences in quality are usually considered to be less important in pork than in other meats. Pork consumers do not seem to exhibit very strong preferences for differences in quality, and trading practices reflect the same attitude in this respect. Among the explanations advanced for this condition are (1) a large part of our pork supply is derived from relatively young animals and (2) the processing to which a large proportion of the supply is subjected tends to minimize quality differences. According to the standards, Choice grade includes those carcasses which have indications of top quality characteristics in the pork. Lower degrees of quality are identified by the Medium and Cull grades. Identification of these quality differences normally considered important by consumers and in trading is accomplished through use of the standards in evaluating pork carcasses.

Another characteristic of the standards affecting their use in carcass evaluation is that Federal standards for grades of live animals correspond to the carcass grades. Live animal evaluation before slaughter is often a related part of activities utilizing carcass evaluation. The practical application of differences identified upon evaluation of carcasses usually depends upon interpretation of those differences in terms of live animals. Use of the grade standards provides the key to relate carcass characteristics to live animal characteristics.

Proper interpretation and application of the standards is essential to obtain maximum benefits in using grades as a tool for evaluation. The standards include measurements of average back fat thickness in relation to either carcass length or weight as guides in grading. There are provisions in the standards, however, that the grade of a carcass may be other than that
indicated by fatness by consideration of such other factors as conformation and carcass proportions, uniformity and balance, and evidences of quality. In some instances, there appears to be a tendency to rely too heavily on measurements and reluctance to give other factors sufficient weight in grading. Proper application of the standards and accurate grading depends upon consideration of all of the pertinent factors outlined in the standards.

In conclusion, the U.S.D.A. standards for grades represent one of the more practical tools to aid in pork carcass evaluation. The grades specify differences in two important items of evaluation - yields of cuts and quality of pork. These aspects have assumed greater importance during recent years due to changed consumer preferences and increasing price differences between fat and lean cuts. Varied methods for conducting evaluations and expressing pertinent comparisons have been developed. For instance, yields of several different combinations of cuts are used as measures of cutting performance - either on the basis of carcass weight or live weight. The use of different evaluation methods is beneficial to the extent that it offers promise of providing new or additional research information for attacking a problem. However, effective and practical application of evaluation results, in marketing and otherwise, depends upon the development and adoption of standardized terminology. Terms such as meat-type, premium, No. 1, select, and many others often have been used in referring to the correctly finished hog or carcass producing the pork cuts that consumers prefer. The role of providing standardized terminology can be fulfilled by application of Federal standards for grades of hogs and pork carcasses as an integral part of research, teaching, extension activities, and hog marketing.

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MR. KLINE: We have all been using these grades in some manner or other, whether we take backfat thickness measurements and length of carcass. Lyman Bratzler will lead the discussion on the grading work.

MR. BRATZLER: We should realize that we have one class of carcasses on which we have objective measurements for determining grades.

I thought I would bring out some points, from the "other side of the fence." We should bear in mind that the measurements, as Lowell indicated, do not give all the answers, for example, the regional study conducted, by the economists with some of us in meats, in which more than 3,000 carcasses were studied. Their correlation coefficients were, I believe, above .8, and even with that high a correlation, the average of these studies accounted for only 65.9 per cent of the variability, which leaves 34.1 per cent unaccounted for.

The range in the states -- Michigan, for example, accounted for 48 per cent of the variability by their regression or correlation coefficient, and Iowa was high with 72.4.

This regional study has been reported in this bulletin published by the University of Minnesota.

I know there has been some discussion as to the amount of fat required for the various grades.
I am going to list these fat requirements for the various grades, taking only the grade choice No. 1. I wrote to Carrol Plager who talked to us two or three years ago, to find out whether they had made any changes in their grades, and Hormel calls this particular group regular -- I don't know whether they mean regular run or not -- and their premium No. 1. I was very much interested in their figures.

Back fat thickness U.S. Choice No. 1:

U.S.D.A. 1.5 - 1.8" inches  
Regional 1.4 - 1.8 "  
Hormel (1.5 - 1.9) (regular)  
1.2 - 1.5 (premium)

I should like to emphasize what Lowell brought out, that in addition to the yardstick, we have to use some subjective measurements as a guide in grading carcasses. He emphasized the word "guide" because there can be a little overlapping of actual fatback measurements. In other words, a carcass from a 200 to 220 pound live hog normally does not get into the top grade unless it is very good in a number of other respects, particularly in ham development. In such cases, however, it is possible for a hog to measure 1.6 inches in backfat thickness and still make the grade. In other words, 1.5 isn't the deciding factor. If it has an excellent ham, according to Hormel, it may get into the premium grade. By the same token, a hog may be so deficient in ham development and faulty in conformation that it will be graded as a regular even though the backfat thickness measures 1.5.

Another point I think we should consider is that the weight ranges for the carcasses under the U.S.D.A. may be a little large. Hormel uses, I think a 10-pound difference in carcass weight on setting up their standards. The regional bulletin gives 20 pounds, which may narrow it down a little and make it a little more exact, but I personally feel that unless we know we are going to have big differences, I don't think there is any substitute for at least a partial cut out on these carcasses.

I summarized some work that we did in scoring hogs. I was not one of the scorers. The three judges scored for length on live hogs -- they scored 434 hogs, I believe, and these are the R values for length and finish, and cutout. They are the highest R values that any of the three had. Square those and you can see that they still have a lot of variance there that was not explained by their variation coefficient.

Correlations (r values) for each weight group of three graders' scores of live hogs and as they cut out:

Length .66  
Finish .52  
Cutout .35

MR. HANKINS: Are those correlations among the three graders?

MR. BRATZLER: Those R values were figured for each weight group individually. There were about 15 of them. I picked the highest ones from the three men. One may have been one man's, the next another
man's, and the other may have been the third man's. I just picked out
the highest ones of the 15 or 20 that we got by the different weight
averages. That is on the live weight basis by scoring the live hogs.
They are correlations among grades.

MR. BUTLER: Has any commercial organization applied the
U.S.D.A. standards?

MR. STRONG: In varying degrees, yes. Maybe not the whole hog.
Maybe they are picking out the choice No. 1 grade, for instance. They
haven't started to de-emphasize the wrong kind too much yet.

MR. BUTLER: What about a rail weight and grade basis as a
substitute for this and as assistance for the country that is raising
hogs?

MR. STRONG: Well, of course, you can find an attempt or two
around the country to get into that. However, our position has been all
along that if you look at the live grading method versus the carcass
grading method for payment you run into too many problems of practica-
bility, the practicability of rail grading for the way we market hogs in
this country. I think you will find in everything we have ever done on
paper expression of that feeling. That seems to be the general feeling
among most people engaged in this marketing program, that there are too
many complications associated with the identification of them when we
ship them a thousand miles before we kill them, that may detract much
from that system for it to be practical and to be here next week.

MR. BRATZLER: As I understand it, when Hormel pays premium it
is on a rail and weight basis.

MR. MACKINTOSH: They have sufficient confidence in the greater
cutout yield of their super grade that if you allow them to sort the hogs
out to meet those specifications they will pay 40 cents a hundred more,
I believe. Carroll Plager told me that they feel they could even pay
more if their buyers were only good enough at picking the hogs.

MR. ENGLAND: I am from the Hormel Institute. I am not exactly
familiar with all the ramifications of the sorting of live hogs. I do
know that when you sell them on a yield and grade basis at the plant at
Austin the pig is judged in the carcass according to two things; that is,
the yield or dressing percentage and the amount of backfat and carcass
quality along with the yield. Either of those factors can result in a
premium price for your pig. The dressing percentage, of course, varies
quite a bit, but I would suspect that the difference in the backfat is a
much more predominant factor than the yield in determining the premiums
that those people receive for their hogs. We consistently at the Insti-
tute sell our pigs on the graded yield basis and average something like
75 cents per hundred-weight over the market price.

MR. BRAY: Lowell, do you have any figures on how good a job
you can do in selecting these hogs alive according to what their carcass
grades will be?
Mr. Strong: In some of our demonstration work, we have been running 75 to 80 per cent in grade on hogs graded alive and graded in carcass. Some packers tell us if they cannot get 85 per cent they are ready to go home. You get a range all the way from 70 to 85, from those who have worked with it.

Mr. Bray: How good a job can you do in sight grading the carcasses rather than taking your ruler for each one of them?

Mr. Strong: That is the practical way to do it and it is the way most people will do it after a little experience. When they do take the ruler out they find it is borderline just as they thought it was.

Mr. Cole: The weakness I have always found with the U.S.D.A. standards was that if you put Hormel's premium hog on the standards it would probably grade medium. When we put on carcass demonstrations in our state and use the choice 1, 2 and 3 as high quality hogs we are leaving a false impression that the 2 and 3 are better hogs than the medium, and the medium hogs beat either the 2 or 3 and in some cases will beat 1.

We say that the choice 1, 2 and 3 are the quality hogs, the medium lack quality, and the cull, of course, we know is inferior. It bothers me to have a choice 2 and 3 tag on a hog that in my way of thinking is inferior to a medium hog.

Mr. Beck: I should like to say a few words about some work we have been doing in northwest Arkansas, in the FFA marketing of barrows in spring projects. They had a show last year and they have had two shows already this year to market the pigs they had in the project. Last year they judged the hogs and then slaughtered them. I acted as official judge since I am the coach of the University of Arkansas team, and do the meats work. They did not tell me but they slaughtered these pigs and checked to see whether or not I had actually selected the best pig in the group. They told me later than I had and I felt pretty good, but I didn't like the situation too well because you certainly stick your neck out when you go out and judge a show with as many as 200 or 300 pigs in the contest and you pick the grand champion. You judge many breeds and then you bring in the first and second place of each breed and tie a ribbon on the grand champion.

This spring they called me again to judge the show, and they said they were going to slaughter the pigs and have a carcass contest, too, but this time they notified me in advance that they were going to test me to see whether I could select a pig that was a better pig than the second place and reserve champion. I went out to the University and I prepared for it. I slaughtered pigs in our meats laboratory and checked them pretty closely.

I am not the best man by any manner of means, but I was lucky in this event. Again I picked the pig and they ran it through the local slaughter, and the local packer there gave more emphasis to it than I thought he should. He let it be known all over the area there that the pig I selected was worth $1.25 a hundred pounds more than the reserve champion and the second place pig.
That goes with your point that they can pay 75 cents a hundred more for top pigs and they are still making 50 cents from the farmers. They may lose that amount on the next pig. But if the champion weighs 200 pounds and the reserve champion 225 pounds, for the meat they get from the 200 pound they get $2.50 more than they do for the meat from the pig that weighs 220 to 225 pounds.

MR. STRONG: On this matter of quality, don't just take the standards and clip out the little measurements and try to use them all by themselves. Some of the hogs that are in the 1.2 to 1.5 group when you are using the standards, you can find justification for putting in the choice grade, even though they measure up to the standards normally indicated for the medium grade.

MR. COLE: I presume everyone knows that you can go down and make a choice 1 out of a middle medium 1. I didn't know until about a year or so ago that you can go down as far as the middle medium grade. You still do not have a choice label on that type of hog and you do have a choice label on an extremely fat hog that is probably much less in value, with fat at 1/8th of a cent a pound, than the medium hog.

MR. FARWELL: How do you think these feeder grades as written correspond with these block gold models that you can buy from the National Provisioner. It seems to me that the cull hog you get would be a good medium in most people's estimation of live hogs, and certainly most of them give you an optical illusion of smoothness and quality that you probably don't have in cull hogs. You don't have the range that probably you should have in those models. We use them in our class work and I think the range is not great enough.

MR. STRONG: I suppose a lot of our cull hogs are the kind that never should have been let live that long. Your remark about the model is probably justified. We have not shown that in the model. That cull may look a little better than the live hog. However, I think you can use the models to help you interpret some of the adjectives in these standards for grades of live hogs.

MR. FARWELL: Do you think the medium reflects the medium or might that medium look like a pretty good choice 1?

MR. STRONG: I don't think he looks fat enough for a choice 1 in his shoulders and there is too much loin sticking out.

MR. FARWELL: Too much sharpness over his back, too. You don't see the backbone sticking up on the No. 1 as you do on the medium.

MR. BRAY: I would not argue over those grades. I would argue about the No. 3 on those models. I think he looks just as wide in his under line as on his top line. He should roll out more on the top line. He looks like a good, smooth heavy hog.

MR. STRONG: He looks fat enough for choice No. 3.

MR. BRAY: He weighs 200 pounds and he looks like he weighs 300 pounds, and he would make a choice No. 1 with that weight. They don't look like the same weight load.
MR. STRONG: They are not meant to.

MR. ZIEGLER: What bothers me is the way you use the word "quality." You are not talking the same language when you say quality in pork and quality in beef, not the way you are using the term. Is there anyone here who would agree with the statement that Cole made that he has no time for the No. 2 and No. 3?

Everybody here knows that the higher the finish the more quality you are going to get in pork. Do you want to eat a pork loin that does not have a bit of fat in it? Do you get more satisfaction from that than from a chop that is nicely marbled?

Remember the economic conditions that we are laboring under at the present time. If the chemists come up with a use for fat that jumps lard to 20 cents a pound you would go under the table. We want a type of hog that will produce the quality of pork we are looking for in the shortest time at the least cost. When we look at it from the packer's standpoint, at the present time he does not want lard or any more of it than he gets. But keep that word "quality" out of it, because there is no quality in a medium hog.

MR. BRATZLER: Along that line, Missouri conducted a consumers survey on chops and cured ham slices from medium hogs and No. 1 hogs. I believe there were some 290 housewives in the survey. They didn't give the housewives enough to fill them but they had samples. I had felt, as you do, Tom, that we can go too lean on these hogs, and I was surprised by these housewives. Fifty-five per cent were for the medium; 35 per cent for the choice No. 1 pork, and 10 per cent had no preference -- in that order. Had they looked at the meat before they cooked it, they might have picked the medium because of its leanness, when it was cooked, it even increased their preference for the medium pork.

MR. ENGLAND: As an animal breeder, I would have to disagree with what Mr. Ziegler says, because I think he is perhaps basing his points on breeds of hogs that were originally developed and used as fat hogs. Today we don't have to be satisfied with that kind of pig because we do have within and between our breeds of swine today the possibilities for developing pigs which contain the amount of fat that we want on top of the lean and within the lean.

MR. PIERCE: Iyman, we seem to be getting a little confused in what our objective is on a grade. A grade is no more useful than the extent to which it is used. In the Missouri study, you stated their results. I also recall that they found good grade beef to be preferred over choice or prime.

We who are working on grades have a moral obligation, to base these grades on real basic factors that we know have something to do with the eating quality of pork and with factors that can be measured. We will never be able to tie them to monetary values. We can never have the top hog at all times bring in the most money. We have to have a system that can be used to reflect differences in monetary value. We are not
embarrassed when we find our medium hog bringing more money than a No.
3. If that is the preference of some particular group or of some packer
let them go ahead and buy them that way.

Basically we started to reflect two things: Differences in
yields of lean and fat cuts and differences in quality. Quality is what
we are talking about now. We need more information on the critical line
as to the minimum quality that we should have in a choice No. 1. We have
also said that with choice 1, 2 and 3 properly trimmed the cuts are inter-
changeable. They are selling that way today. I am not sure that is
right either. You can get some of these cuts of pork too fat. A grade
standard is not a real precision tool. It is a rough measurement because
it measures a range, and is merely a start.

MR. HILLIER: To get a real differential on hogs you have to
have a real differential in the prices of the cuts, the way they whole-
sale and retail. The differentials you have been talking about are due
to differences in yields of cuts with no premiums on cuts. Lowell, what
efforts are being made to carry these grades on through to the retailer,
trying to get a differential in the prices of the cuts?

MR. STRONG: We know of one place where it has been tried.
There has been a little work on seeing how much extra money some of
these guaranteed lean cuts will command. I don't know the status of
this work. There is interest in that field in a lot of other quarters
and I think that we will begin to see something in the very near future.
That, will add to the value differences from one end to the other,
whereas now it is entirely on the weight.

MR. KLINE: I am glad to see this active participation in
these discussions because, after all, on that is going to depend whether
our program is a success or a failure today. So use your pencils and note
pads if you need to. I do to jot down questions as the speakers are
talking.

I think we have kind of built the groundwork for the next
paper as far as quality is concerned. I am sure that at least I have
looked forward to this paper. We are going to ask George Wilson, of the
University of Wisconsin, to present his paper, "How Important Is Quality?"