In establishing the current status of pork quality, it is first essential to state a definition of the term. The production-marketing segment of the swine industry seem generally to consider quality to consist of those traits which influence price at the market prior to slaughter. This concept of quality includes live weight, anticipated dressing percentage, evidences of muscling or absence of fatness, and general appearance. The packer frequently considers the same characteristics to be of prime importance as quality factors. Generally, however, the packer broadens the term to include weight of cuts produced, firmness, and color of the meat. The retailer is primarily concerned about the leanness as a quality characteristic and, to a lesser extent, the firmness of the product. It is generally agreed that consumers consider the amount of fat either subcutaneous, or intermuscular as paramount quality considerations. The consumer appears to consistently reject pork that has any appreciable amount of either. Undoubtedly, the presence of free moisture in the package is considered important and a basis for rejection.

Most segments of the industry agree that pork suffered a serious decline in consumer status for many years. Improvement programs implemented by producers have been active for several years. No one appears to question the tremendous strides made toward improvement, even though progress has not been as rapid as one would desire. Complex problems of recognition of merit in live animals, in fresh wholesale cuts, in cured products, processed meats, in retail product, and in eating qualities, continue to plague the industry.

It has been necessary in the preparation of this paper to greatly restrict the definition of quality. This has been done with no intent to minimize the far-reaching economic implications or the validity of the other considerations.

Those engaged in meat technology research seem to have traditionally defined "quality" specifically as "that combination of characteristics which specifically contribute to consumer satisfaction". The visual characteristics which have most often been assumed to be associated with consumer satisfaction include marbling, color of lean, firmness of lean, and freedom from moist exudates. Additional impetus has been given to research in this area in recent years as a result of the emphasis on the part of producers, packers, retailers, and consumers to increase the leanness of pork offered for sale. Considerable apprehension has existed in almost all segments of the pork industry as to the possible deleterious effects such emphasis might have on pork quality as defined above. It behooves those who have a vital interest in the maintenance of the preeminent role of pork, as well as other meats in the American diet, to be cognizant of the potential effects of any such possible interrelationship.

It was not felt that literature review for this paper necessarily required a review of all that has been published on this subject. Rather, this literature review covers only recent years.
It was, for many years assumed that consumer acceptability of pork was highly associated with total carcass fat content. Nonetheless, carcass backfat apparently had little influence on marbling or quality characteristics of fresh pork cuts from the ham, loin, and shoulder (Batcher, et. al. 1962). (Murphy and Carlin 1961) report that marbling increased slightly as carcass backfat increased from 1.0 inches to 2.3 inches. The amount of backfat did not have a significant effect on taste panel tenderness, juiciness, or flavor of braised pork chops. Shear force measurements on the raw Longissimus dorsi muscle indicated a slight increase in tenderness as the backfat increased. Total cooking losses of braised \( \frac{3}{4} \) inch chops were not associated with backfat. (Saffle and Bratzler 1959) found, however, that taste panel scores for loin chops improved as carcass backfat increased. (Batcher and Dawson 1960) stated that degree of marbling showed promise as a means of predicting tenderness and juiciness of cooked loin and ham cuts of pork, but that greater variations in fat content were noted among muscles from some carcasses than from others. It was suggested, therefore, that more than one muscle be used to evaluate the quality of the cut. (Batcher et. al. 1962) report that, generally muscles from carcasses with high marbling scores had more intramuscular fat than those with low marbling scores. In only a few cases were tenderness and juiciness related to either marbling score or intramuscular fat content and the relation varied with the muscle. (Murphy and Carlin 1961) report however, that marbling had a significant positive effect on both tenderness and juiciness of braised pork chops. (Carpenter, et. al. 1961) state that marbling in the Longissimus dorsi muscle and chronological age were the most important factors associated with palatability, and that fresh pork loins were generally acceptable if they contained approximately 20% fat on a dry basis. Palatability of commercially cured hams was not affected by intramuscular fat content or chronological age, but an increase in tenderness of bacon was associated with an increase in intramuscular fat content of the Longissimus dorsi muscle. Flavor and juiciness were not affected in intramuscular fat content of the Longissimus dorsi muscle or chronological age.

(Kauffman, et. al. 1961) found that consumers generally preferred marbled chops for their eating qualities, but do not convey this philosophy at the point of purchase.

(Carpenter, et. al. 1961) also reported that darker, drier, and firmer muscle tissues shrank less during curing and cooking processes and were more tender and juicy when compared to lighter-colored, softer tissues. (Meyer, et. al. 1963) reported that pale, soft, watery muscle showed greater exudate formation, more expressible juice, and higher cooking loss than was true for dark, firm, dry muscle. Also, while niacin content of the pale, soft, watery muscle was about twice as high, vitamins lost during cooking were higher than for dark, firm, dry muscle. Fresh dark, firm, dry muscles had slightly higher riboflavin and thiamin content.

(Judge, et. al. 1959) found that hogs raised and slaughtered during cool months had darker, more highly marbled loins than those raised and slaughtered during warm months and that breed effect on muscle types was highly significant. (Kropf, et. al. 1959) reported that both dietary level of protein and the quality of the protein exerted an effect on the intramuscular fat content of the Longissimus dorsi muscle. (Zessin, et. al. 1961)
reported that severe pre-slaughter dietary stress reduced marbling score and intramuscular fat content of the Longissimus dorsi muscle with a corresponding reduction in taste panel scores for tenderness, juiciness, odor, and flavor of pork cooked either as roasts or chops. (Sayre, et. al. 1961) showed that a rapid change in environmental temperature for various periods of time preceding slaughter decreased the lactic acid concentration and increased the color intensity of the chilled muscle. (Lewis, et. al. 1961) demonstrated that intermittent electrical shocks administered for a period of $5\frac{1}{2}$ hours prior to slaughter had no detrimental effects on eating characteristics or on curing and smoking losses. (J. Wismer-Pederson and E.J. Briskey 1961) reported that soft, exudative tissue resulted when pH was decreased to about 5.4 (lactic acid approximately 1%) while tissue temperature remained above 25°C. Rapid chilling of tissues prevented the extreme pH variations and muscle structure alterations with a resultant material improvement of color intensity and water-binding capacity in fresh tissue as well as reduced gelatin formation in the canned product.

Method of cooking may have significant implications as to the acceptability of the finished product. (Weir, et. al. 1962) found that broiling thick chops to an internal temperature of 185°F resulted in higher cooking losses and lower juiciness scores whereas broiled thin chops were more tender and juicier, but had less flavor than when braised. Extending the braising time beyond that required to reach an internal temperature of 185°F had no beneficial effect on any of the palatability characteristics.

While there are some conflicting reports regarding interrelationships among some of the criteria included in the meat technologist's definition of "quality", there appears to be general substantiation of the usefulness of the characteristics employed. Very few people with whom the author has corresponded would rank "quality" as defined in this discussion as a very highly important factor in the industry today. Most will agree, however, that it is essential that pork be improved in its acceptability if it is to maintain or improve its competitive position among meats and meat substitutes. It behooves those engaged in research to be relatively more concerned about the somewhat distant future than with the present. We should bear in mind that the situation which exists today was greatly influenced by research conducted and experience gained in the past.

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DR. VARNEY: Thank you very much, Burdette.

You will note from the program that there will be a discussion period after the second paper. This was so arranged in order to take advantage of comments from others who are in the audience and not on the program as such, so if you will, please, be thinking of those questions that you would like to have answered or of any comments that you would like to contribute to this program and we shall consider them after the next paper.

For the next paper, Dr. S. E. Zobrisky of the University of Missouri has done a laborious job in compiling a list of references which I think will be of very much interest to you on the subject of the "Current Status of Pork Carcass Evaluation".

DR. STEVE E. ZOBRISKY (University of Missouri): Mr. Chairman, and Members of the Conference.

A copy of this paper is available at the back door, and as you read it I hope you will bear with me. There are a lot of mistakes, typographical errors principally, but I think you can make it out. I might add that this is really nothing more than paraphrasing of the literature; some very old and some recent. Some of it is nothing more than the paraphrasing of letters that I have received.