AREAS FOR MEAT RESEARCH COORDINATION

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New and spectacular developments are competing constantly for the space in our scientific publications. Antibiotics and hormones give hope for increasing the efficiency of conversion of feedstuffs to meat, and prolonging the domination of meat in our diet in spite of the mushrooming human population. Atomic age irradiation may someday make refrigeration obsolete. Perhaps any degree of marbling will be attainable, and fat may be pumped into the muscles of carcasses and cuts to suit the fancy of the most exacting shopper. Perhaps, like cheese, beefsteaks will be displayed in self-service counters and labeled "sharp", "medium sharp", or "mild", depending on the fat used to pump the old cow carcass. The tenderness problem may become a thing of the past with enzymatic tenderizers being used with the regularity of salt. In our time production of cured ham has kept pace with the hustle and bustle. Use of nitrites in the curing mix allowed rapid color formation, and the old sixty day cure was cut in half, then trimmed to a week, then to three days, and now at least one manufacturer of curing materials advises only a two hour cure after artery pumping before handing in the smokehouse. The smoke, of course, can be applied electrostatically in a few minutes. Vacuum packaging can help to maintain the maximum in flavor and appearance.

Research on any one of those could be accomplished more easily and with more expectation of rewarding results than for the problem to be suggested.

Meat quality, that respected but elusive attribute, judged with confidence by the old pros, seems to defy the efforts of experimental workers who seem to reduce it to a statistic. Frequent efforts have been made, much has been published, but still the predictability is alarmingly low using traditional observations.

What is quality? It might be defined as those factors contributing to the tenderness, flavor, juiciness, aroma, and palatability of meat. Our meat judging manual lists marbling, firmness of fat and lean, texture of lean, color of lean, and color and density of bone as evidence of quality in the beef carcass.

Not one of the quality factors is easily measured. Close correlations should not be expected between factors measured without precision.

To be specific, consider the relationship of marbling and tenderness. Each can be estimated objectively with respectable repeatability, but published correlation coefficients have been low, and in some cases non-significant. The relationship of marbling to juiciness, however, has been found experimentally to be greater, but the statistics have bred doubt in my mind concerning the importance of marbling where earlier instruction and training had left no room for doubt.

Even the importance of conformation has come in for its share of doubt. Livestock judges speak glibly of "higher percentages of high priced cuts" when comparing slaughter animals. The upstanding, long-bodied, flat-

rounded, somewhat narrow steer may, however, do surprisingly well when compared to "shorty" of the same weight using the ruler, the knife, the saw, and the scales. This should not be taken as a condemnation of beef conformation. The method of comparison is imperfect. Thin cuts may be just as high, percentage-wise, in thin sides as thick cuts in thick sides. The percentage comparison is not even certain to show differences between dairy bred steers and beef steers of superior conformation when standard cutting procedures are applied. In my opinion a better basis of comparison is sorely needed.

Many experts and authorities of high standing have expressed similar doubts and have emphasized the need for better methods and more complete information.

Dean Longwell of Missouri, and a committee of well recognized animal husbandry authorities in the north central states prepared a report on the "Present Status and Needs for Research in Nutritive Value and Quality of Meat" in 1950. They observed that "no known characteristic in the living animal is a sure indication of color or firmness of the lean or fat, tenderness, or vitamin A value of the meat". They stated that research relating to the quality and palatability factors showed considerably less progress than that related to economic and nutritive value factors. This was said to be due primarily to the fact that in most cases satisfactory research methods were lacking. A proposed regional project titled "Characteristics of Beef Which Relate to Consumer Acceptance" was prepared. I have a copy, and the research suggested still seems quite important. I don't know who wrote the project, for no names are mentioned, but probably all the meats men in the experiment stations of that region were involved.

The project noted that the study of beef of known breeding, feeding, and management history was of especial importance. That the colleges hold a virtual monopoly on cattle of that description was recognized.

The American Meat Institute Foundation has completed a study of the carcasses of about 150 cattle graded by Federal graders into Prime and Good for steer and heifer, and Commercial for cow carcasses. Results indicate that the present grading system gives a fair evaluation of meat quality characteristics, according to Dr. D. M. Doty. Disturbing, however, was Dr. Doty's observation that commercial cow carcasses tended to be somewhat better than would be expected from the grade assigned, and that some prime carcasses were of poorer meat quality than expected.

As I understand it, some of the carcasses for this study were simply selected in the cooler. Cattle of known feeding history were planned, but about 30% of the cattle could not be obtained fitting this specification. Not only feeding history, but also breeding history is important. If the unusually good quality carcasses came from cattle of similar heredity or environment, production tests could be conducted aimed at producing more satisfying meat.

I believe that heredity influences meat quality. The progeny of one bull in our college herd seem to fatten very uniformly and to produce meat with exceptional marbling with a minimum of outside finish. Rather high heritability of the "meat quality" characteristics seems fully as logical to me as high heritability for rate of gain, or for conformation factors.

United States artillerymen scoffed at the effectiveness of enemy artillery which dropped a round here and a round there. Now and then their results were better than we wanted to admit, but the American answer was the T. O. T. This called for training all guns within range on important targets and firing everyone of them at the time required to deliver fire on the target at the same time. This gave a coordinated mass effort and the effectiveness was excellent.

Evaluation of carcass quality in meat animals is a worthwhile target. If we use all our guns perhaps we can capture this strong point which seems to have been bypassed in the search for new horizons. If we could agree on attacking this problem, I'm sure each institution could make an annual contribution. Even if some schools made rather complete analysis on only one or two carcasses, the total contribution would still be important.

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MR. KASTELIC: Thank you, Mr. Butler.

I would be pleased if you would curtail discussion until we have heard from Mr. Doty, who is to speak on another aspect of the general problem of how we might institute cooperative investigations. Mr. Doty.

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