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A New Approach to Measuring Consumer Acceptability of Beef

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SUMMARY AND CONCLUSIONS

Various techniques employed in obtaining consumer evaluation of selected product criteria impose conditions of experimental design which depart from usual home consumption environment. Considerable concern has been expressed by researchers on the possibilities of a "test situation" introducing bias in measurement of consumer reactions. A new approach which de-emphasized the "test environment" is reported.

A pilot panel of 40 faculty families purchased and evaluated quarters of beef. Twenty-four of these "quarters" were actually composites from 8 quarters (2 carcasses) in each of three grades (Choice, Good and Standard). Eight of the families received regular Good quarters (from four sides) and eight received regular Standard quarters (from four sides). Evaluations were made on a postcard schedule enclosed in each package of meat.

There appeared to be a close acceptability relationship of the various cuts within a carcass. There were 461 satisfied comments and only 33 dissatisfied comments. Round steaks were the source of 15 of the 33 dissatisfied comments. Seven carcasses had no complaint about round steaks; three of these seven had no other complaints; the other four carcasses had a total of only five complaints. In contrast, the seven carcasses with complaints about round steaks had a total of 13 complaints about other cuts. Standard carcass No. 60 had six complaints about round steak and seven about the other cuts. Perhaps round steaks are the most critical cut from the standpoint of consumer acceptability.

Loin and sirloin cuts were the most popular cuts. Short ribs received the least favorable mean rating of any cut and blade roasts were runner-up. The problem for both cuts—especially short ribs—appeared to be general dislike by several families rather than a large amount of inter-carcass variation in quality.

As indicated, one Standard carcass had 13 satisfactory cuts. Otherwise, the acceptability of cuts did not appear related to grade. These results agree with previous research which has shown that high proportions of all loins have been satisfactory and much alike but that small proportions of loins in the leaner grades have been unsatisfactory.

An amount of leaner grade beef as large as a quarter was readily consumed by families accustomed to fatter grades. In fact, several families were very enthusiastic about the leaner beef.

In general, the composite quarters were considered essentially homogeneous by families who had not been told about the compositing. However, most families did rate the cuts from different carcasses somewhat differently. When interviewed at the termination of the panel, most families reported some variation in quality of one, and sometimes of two, of the four retail cuts which they evaluated. No difference was mentioned in the short loins. Six of the 24 families receiving composites reported no variation in the quality of any cut while 13 of the 16 families receiving regular quarters reported some variation in quality of

one or more of the four retail cuts they evaluated.

Consumer ratings of the top round steaks by carcass were related fairly well to laboratory evaluations. The relationships of consumer and laboratory ratings of other cuts were very poor. However, a more adequate series of samples would be required to define these relationships with confidence.

The quarter-panel technique presents several problems in research, but it appears to merit further development as a research tool. The quarter-panel technique has the very important merit of testing experimental products in consumer homes in a nearly normal environment.

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A New Approach to Measuring Consumer Acceptability of Beef

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INTRODUCTION

Modern, large-scale retailing is insistent upon the supplying of uniformly good quality food. This insistence, seemingly a reflection of a general consumer desire, has resulted in the design of more acceptable manufactured food products and careful quality control in manufacture.

The sellers of beef must solve this same problem of supplying a uniformly good quality or qualities. A major step toward the solution of this problem is the determination of the amount of variation in the consumer acceptability of beef and the factors which can be used to predict effectively this acceptability. This is another report in a continuing series of research studies of the acceptability of beef.

Several studies of the eating acceptability of loin steaks have been published.[1,2,3,4]* The large variation in market prices of loins of the different grades is probably the primary reason for the study of their acceptability. This bulletin reports on a pilot study of the acceptability of eight beef cuts from 14 carcasses of three grades. The small size of the sample severely restricts inferences, of course. Since a new research technique was developed and tested, this report also has some methodological interest for preference researchers.

The study was designed to test six hypotheses:

(1) The acceptability of cuts as measured by ratings and number of complaints will not be related to grade;

(2) The acceptability of cuts will not be related to cooking methods;

(3) The acceptability of cuts will not be related to shear strength;

(4) An amount of leaner grade beef as large as a quarter of a carcass will be readily consumed by families accustomed to fatter grades;

(5) "Quarters" which are really composites of Choice, Good, and Standard grade cuts will be considered essentially homogeneous in eating quality by families not forewarned;

(6) There will be no relation between consumer ratings and laboratory panel ratings.

Implicit in these hypotheses were at least three ideas:

(1) The acceptability of all major beef cuts needs to be tested and related;

(2) The acceptability of various grades needs to be tested with a large amount of meat per family;

(3) A "single stimulus" test method[1] should be tried which simulates normal consumption as closely as possible.

*Numbers refer to list of references in the back.

EXPERIMENTAL PROCEDURES

Carcasses, or sides from carcasses, weighing 475 to 525 pounds were purchased from commercial packers. These carcasses and sides were graded by federal graders as being in the middle one-third of the grade. Purchases consisted of:

(1) Two Standard carcasses plus four sides;

(2) Two Good carcasses plus four sides;

(3) Two Choice carcasses.

The beef was aged 7 to 9 days at 38° F and was then fabricated into retail cuts.

Twelve loin, six sirloin, six top round, and six bottom round steaks were obtained for consumer panel evaluation from each hind-quarter. Two loin steaks of ¾-inch thickness were enclosed in each package. Sirloin steaks were packaged individually and were cut ¾-inch thick. Top and bottom round steaks were packaged individually and were ¾ and 1 inch thick, respectively.

Six ¾-inch rib steaks, three packages of short ribs, three 2-inch arm and three 2-inch blade roasts were obtained for consumer evaluation from each forequarter. All of these cuts were packaged individually.

In addition to the cuts fabricated for the consumer panel, a 1.5-inch thick steak from the anterior end of each short-loin was used for shear. These samples were frozen and were later sheared at one time. They were thawed 24 hours at 38° F and were broiled to 160° F internal temperature. Three cores of one-inch diameter were obtained from each steak, and three shear determinations were made per core on a Warner-Bratzler shear.

The four Standard and four Good sides were processed into eight regular forequarters and eight regular hindquarters with the numbers and types of cuts indicated above. Each regular quarter was sold to a cooperating family.

The 12 fore and 12 hind quarters from the six carcasses were handled differently. The cuts from these quarters were sorted into composite quarters. Each composite quarter was composed of equal numbers of cuts from three carcasses of the three grades (Table 1). To avoid the confounding of grade and position differ-

TABLE 1--ORIGIN OF AND NUMBER OF CUTS INCLUDED IN EACH COMPOSITE QUARTER

	Originating Carcass Grade and No.		
	Choice 01	Good 30	Standard 60
Hindquarter			
Loin	4	4	4
Sirloin	2	2	2
Top Round	2	2	2
Bottom Round	2	2	2
Forequarter			
Rib Steaks	2	2	2
Short Ribs	1 (pkg.)	1 (pkg.)	1 (pkg.)
Arm Roasts	1	1	1
Blade Roasts	1	1	1

TABLE 2--COMPOSITION OF HINDQUARTERS

Composite Carcass No.	Originating Carcass Grade and No.											
	Choice				Good				Standard			
	01L	01R	02L	02R	30L	30R	31L	31R	60L	60R	61L	61R
90LH, 91LH, 92LH	X				X				X			
90RH, 91RH, 92RH		X				X				X		
93LH, 94LH, 95LH			X				X				X	
93RH, 94RH, 95RH				X				X				X

ences within a composite quarter, cuts were from the same relative positions. For example, the three arm roasts of one composite fore were all from the first position of the three originating, left fores. Each of the 24 composite quarters was sold to a cooperating family.

A "casual" evaluation schedule was included with each package of the regular quarters and with the 12 composite quarters derived from the left sides of the carcasses. This type of evaluation schedule was used in order to measure satisfaction in a very unobtrusive manner (Figure 1.)

A nine-point acceptability scale was included in a second type of evaluation schedule (Figure 2). This schedule was included with each package of the 12 composite quarters derived from the right sides of the carcasses. Both schedules were on the backs of self-addressed postcards which were sealed in polyethelene bags and enclosed in the meat packages.

Date Eaten_____

Please Circle or Fill In answers that apply:

Meal: Breakfast, Lunch, Dinner

Number of family members eating meat _____

How cooked? _____Lid: Yes No

Defrosted before cooking? Yes No

Doneness? Well (no pink meat) Rare (Some pink meat)
Was it satisfactory? Yes No
Comments:

Name_____

Fig. 1—Evaluation schedule packaged with all regular and 12 composite quarters.


Date Eaten_____
Please circle or fill in answers that apply:
Meal: Breakfast, Lunch, Dinner
Number in family eating meat____

How cooked:_____
Lid: Yes No
Defrosted before cooking? Yes No
Doneness? ___Well (no pink meat)
___Rare (some pink Meat)
Please check your family's opinion of this cut:
_____Like Extremely
_____Like Very Much
_____Like Moderately
_____Like Slightly
_____Neither Like nor Dislike
_____Dislike Slightly
_____Dislike Moderately
_____Dislike Very Much
_____Dislike Extremely

Comments:

Name:_____

Fig. 2—Acceptability scale. Cards with these scales were packaged with 12 composite quarters.

At first, plans were to obtain no ratings on ground beef. However, it was decided that the homogeneity of ground beef provided an opportunity for studying family variation in ratings. Therefore, 28 families received ground beef packages containing evaluation cards. The ground beef was prepared at one time and was presumed to be fairly homogeneous. It was packaged as patties in one-pound packages and each family received 10 to 15 of them.

The panel was recruited from a random sample of the University Faculty Directory. This Directory included certain administrative and secretarial people as well as faculty. The sample did not include unmarried people; nor members of the Departments of Agricultural Economics, Animal Husbandry, or Home Economics; nor families who had had no experience with frozen meats, nor fami-

lies with members who had special experience or training with meats.

The recruitment interviewer, after establishing eligibility of the family, offered the quarter slightly below its wholesale cost. The low price was justified as a reward for complete cooperation.

The importance of the data on method of cooking and doneness was stressed as strongly as the evaluation data. Prompt and honest evaluations were asked for. The grade of the beef was not identified even in the few cases where it was asked. No hint was given that some quarters were actually composites. A replacement was promised for any unsatisfactory cut.

The frozen, packaged beef was delivered to the cooperator's home freezer or locker. Returned cards were checked closely and omissions were checked by telephone. Cards from all but a very few packages were returned within five months.

ACCEPTABILITY OF CUTS

Evaluation of Cuts in General

Short loin and sirloin steaks from all 14 carcasses were very acceptable. Ratings were assigned numerical values ranging from 1 for "Like Extremely" to 9 for "Dislike Extremely." Both cuts had high mean ratings and each had only two complaints of unsatisfactory (Table 3). The short ribs were rated poorest in the composite forequarters. Although the short ribs elicited only four complaints,

TABLE 3--RATINGS OF CUTS OF ALL COMPOSITE CARCASSES

Composite Carcasses	Mean Ratings	Ratio: Satisfactory / Unsatisfactory
Loin	1.65	56:2
Sirloin	1.83	66:2
Top Round	2.37	52:9
Bottom Round	2.38	56:5
Rib Steak	2.06	68:3
Arm Roast	2.12	32:2
Blade Roast	2.84	34:2
Short Ribs	3.18	26:4

a few families refused to consume more than one or two of the three packages, so the complaints were actually underestimated. The number of complaints was greatest for the top round steaks. There was evidence that these steaks were cut too thick for many people.

The mean ratings by cuts probably reflect imperfectly the relative popularity of the cuts. People showed some tendency to rate a particular round steak as 1 (Like Extremely) or 2 (Like Very Much) if it were "a very good round steak" even if they liked loin steaks much better than round steaks. However, the short ribs were an unfamiliar and generally unpopular cut and were occasionally rated very poor.

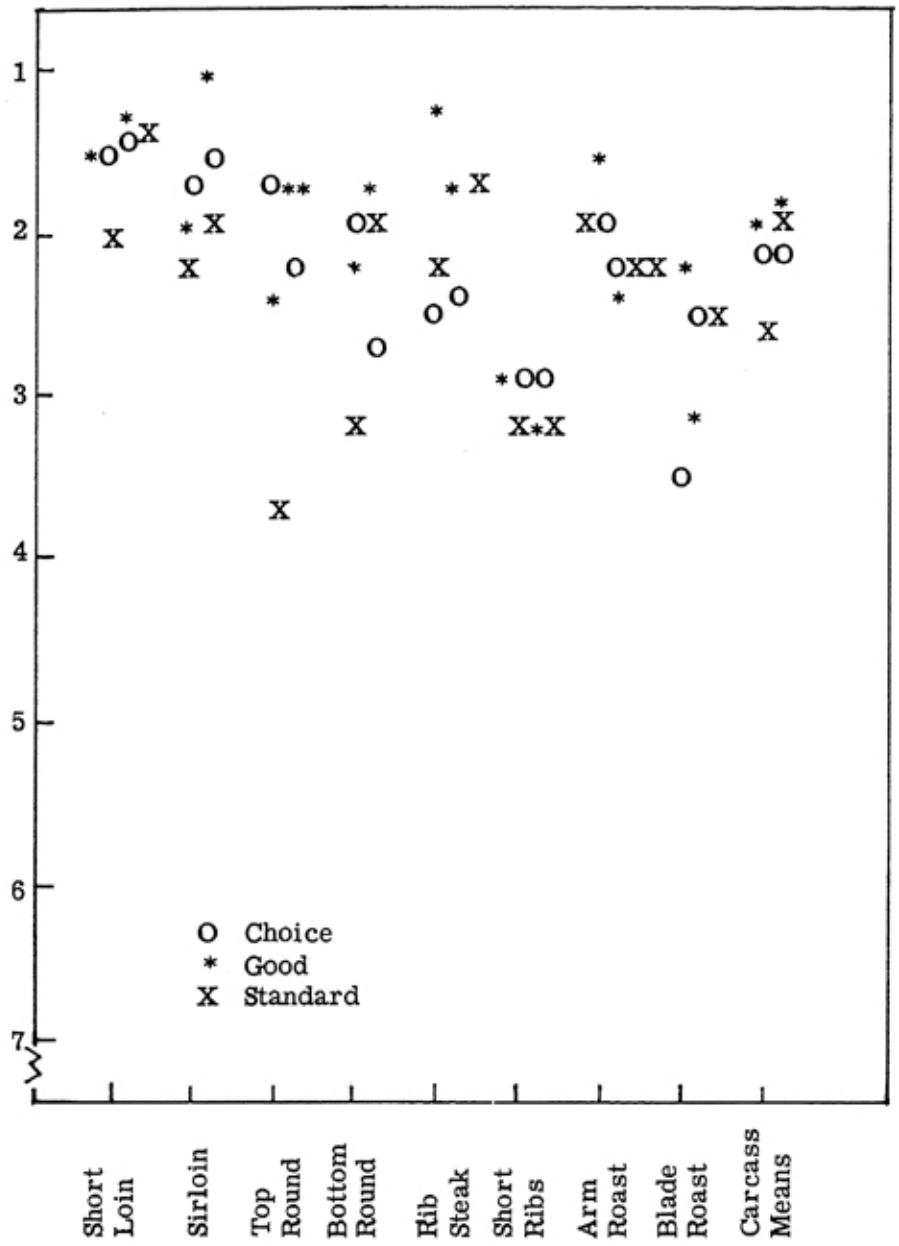


Fig. 3—Acceptability ratings of cuts.

Variation in Evaluation of Cuts by Carcasses

Of greater interest is the variation from carcass to carcass in the ratings of particular cuts. This variation in ratings should be interpreted cautiously since variation by carcasses and variation among households are intermingled. Each cut mean is the average of ratings by three households. However, previous evidence suggests that carcass variation is ordinarily the larger.[1] Variation in cut ratings was very limited for several cuts (Figure 3). The greatest range was 1.80 to

3.83 for top round steaks. There was virtually no variation in mean ratings of short ribs.

The ratio of satisfactory to unsatisfactory packages of a cut per carcass ranged from 6:0 to 2:4 for top rounds; 6:0 to 4:2 for bottom rounds, 3:0 to 0:2 for short ribs, and 3:0 to 1:2 for blade roasts (Table 4). Almost half of all complaints came from one carcass.

TABLE 4--NUMBER OF PACKAGES SATISFACTORY OR UNSATISFACTORY BY CUTS FOR 14 SIDES[a]

Grade and Carcass No.	Loin	Sirloin	Top Round	Bottom Round	Rib Steak	Short Ribs	Arm Roast	Blade Roast	Carcass
Good									
No. 30	4:0	5:1	3:3	5:1	6:0	3:0	3:0	3:0	32:5
No. 31	6:0	6:0	6:0	6:0	6:0	3:0	3:0	3:0	39:0
No. 35	4:0	6:0	6:0	5:0	6:0	0:2	3:0	3:0	33:2
No. 33	1:0	5:0	3:1	1:0	6:0	3:0	2:1	3:0	24:2
No. 32	6:0	6:0	6:0	6:0	6:0	3:0	3:0	3:0	39:0
No. 34	6:0	6:0	6:0	6:0	5:1	1:0	3:0	3:0	36:1
Totals	27:0	34:1	30:4	29:1	35:1	13:2	17:1	18:0	203:10
Standard									
No. 60	5:1	5:1	2:4	4:2	5:1	2:1	2:1	1:2	26:13
No. 61	5:0	6:0	5:0	5:1	6:0	2:0	2:0	3:0	34:1
No. 65	4:1	3:0	2:1	5:0	6:0	0:1	3:0	3:0	26:3
No. 62	6:0	6:0	6:0	5:1	6:0	1:0	3:0	3:0	36:1
No. 64	5:0	6:0	5:0	6:0	6:0	3:0	3:0	3:0	37:0
No. 63	4:0	6:0	4:0	2:0	4:1	3:0	3:0	3:0	29:1
Totals	29:2	32:1	24:5	27:4	33:2	11:2	16:1	16:2	188:19
Choice									
No. 01	6:0	6:0	5:1	5:0	6:0	2:1	2:1	3:0	35:3
No. 02	6:0	4:0	6:0	6:0	4:1	3:0	3:0	3:0	35:1
Totals	12:0	10:0	11:1	11:0	10:1	5:1	5:1	6:0	70:4
Grand Totals	68:2	76:2	63:10	66:5	78:5	31:5	37:3	40:2	461:33

[a] Does not include cuts of the 6 sides composited and evaluated by nine-point scale.

Variation in Evaluation of Cuts by Grade

How effective were grades in classifying these cuts into groups of differing acceptability? Obviously, numbers are so small that any answers to this question must be interpreted very cautiously. The best rating was given a Good carcass for seven of the eight cuts (Table 5 and Figure 3). These best cuts came from Good carcass No. 31 for the hindquarter and Good carcass No. 30 for the forequarter. The only statistically significant difference among grades was for rib steaks. Grades in order of liking of rib steaks were Good, Standard, and Choice. However, as indicated all ratings were generally very close. The poorest grade mean for each cut was either Standard or Choice.

While the evidence from the mean grade ratings suggests no differences in acceptability between grades, the number of dissatisfactions indicates that accepta-

TABLE 5--RATINGS OF CUTS BY GRADES

	Choice			Good			Standard		
	Mean	No. 01	No. 02	Mean	No. 30	No. 31	Mean	No. 60	No. 61
Loin	1.58	1.67	1.50	1.54	1.67	1.43 a/	1.83 b/	2.17 c/	1.50
Sirloin	1.73	1.83	1.60	1.58	2.00	1.17 b/	2.17 b/	2.33 c/	2.00 a/
Top Round	2.08 b/	1.83	2.33	2.17	2.50	1.83 a/	2.91 b/	3.83 c/	1.80 a/
Bottom Round	2.36 b/	2.00 c/	2.80	2.09	2.33 a/	1.80 a/	1.83	3.33 c/	2.00
Rib Steak	2.60 b/	2.67 c/	2.50 a/	1.55	1.33 a/	1.80 c/	2.09 b/	2.33 c/	1.80 c/
Short Ribs	3.00 b/	3.00 a/	3.00 a/	3.20	3.00 a/	3.33 c/	3.33 b/	3.33 c/	3.33 c/
Arm Roast	2.17 b/	2.00 c/	2.33	2.00	1.67 a/	2.50 c/	2.17 b/	2.00 a/	2.33
Blade Roast	3.17 b/	3.67 c/	2.67	2.86	2.33 a/	3.25	2.50	2.33 a/	2.67
Carcass Means		2.21	2.26		2.03	1.95		2.74	2.05

a/ The best cut mean of each row.
b/ The poorest grade mean of each row.
c/ The poorest cut mean of each row.

bility was slightly related to grade. The number of unsatisfactory cuts of the composited carcasses was four for Choice, five for Good, and 14 for Standard (Table 6). Standard carcass No. 60 was the chief source of unsatisfactory samples (a total of 13) and accounts for the difference by grade (Table 4).

TABLE 6--RATIO OF SATISFACTION TO DISSATISFACTION BY CUTS AND GRADE

	Composite Carcasses			Regular		Total		
	Choice	Good	Standard	Good	Standard	Choice	Good	Standard
Loins	12:0	10:0	10:1	17:0	19:1	12:0	27:0	29:2
Sirloins	10:0	11:1	11:1	23:0	21:0	10:0	34:1	32:1
Top Round	11:1	9:3	7:4	21:1	17:1	11:1	30:4	24:5
Bottom Round	11:0	11:1	9:3	18:0	18:1	11:0	29:1	27:4
Rib Steak	10:1	12:0	11:1	23:1	22:1	10:1	35:1	33:2
Short Ribs	5:1	6:0	4:1	7:2	7:1	5:1	13:2	11:2
Arm Roast	5:1	6:0	4:1	11:1	12:0	5:1	17:1	16:1
Blade Roast	6:0	6:0	4:2	12:0	12:0	6:0	18:0	16:2
Totals	70:4	71:5	60:14	132:5	128:5	70:4	203:10	188:19

Variation in Evaluation of Cuts by Shear

Mean shear values of the short loins by grade were Standard, 15.95; Good, 17.27; and Choice, 17.07 pounds. The 6 Standard loin shears ranged from 14.47 to 18.08; the 6 Good loin shears ranged from 10.53 to 28.86; and the two Choice loin shears were 17.03 and 17.11.

In this small experiment with a very limited range in both shear and acceptability values, the shear values were of virtually no assistance in predicting acceptability. Previous work suggests that loins with shear values over 20 pounds are much more likely to be unsatisfactory than loins with shear values under 20 pounds.[1] Good No. 33 was the only carcass with a loin shear in excess of 20 pounds and it appeared to be quite satisfactory to consumers. The only really unsatisfactory carcass was Standard No. 60 which had a shear of 17.83 pounds.

Inter-Relationships

The sample of carcasses is too small to appraise accurately the various inter-relationships. One important question is the following: Are unsatisfactory samples of one cut likely to be associated with unsatisfactory samples of all other cuts from that same carcass? The evidence of unsatisfactory samples from Standard No. 60 and from all other carcasses except Good No. 30 suggests an affirmative answer (Table 4). However, three cuts of the hindquarter of Good No. 30 produced complaints but the forequarter was entirely satisfactory. The evidence from the ratings concerning this question is also indecisive. The poorest carcass overall—Standard No. 60—was poorest of the six carcasses for all four hindquarter cuts but was not poorest for the forequarter cuts (Table 5). Good No. 30 and 31 were the best carcasses overall and No. 30 was best for all four forequarter cuts while No. 31 was best for three of the hindquarter cuts. The same relative superiority of the Good No. 30 forequarter over the hindquarter is shown by ratings as by relative number of complaints.

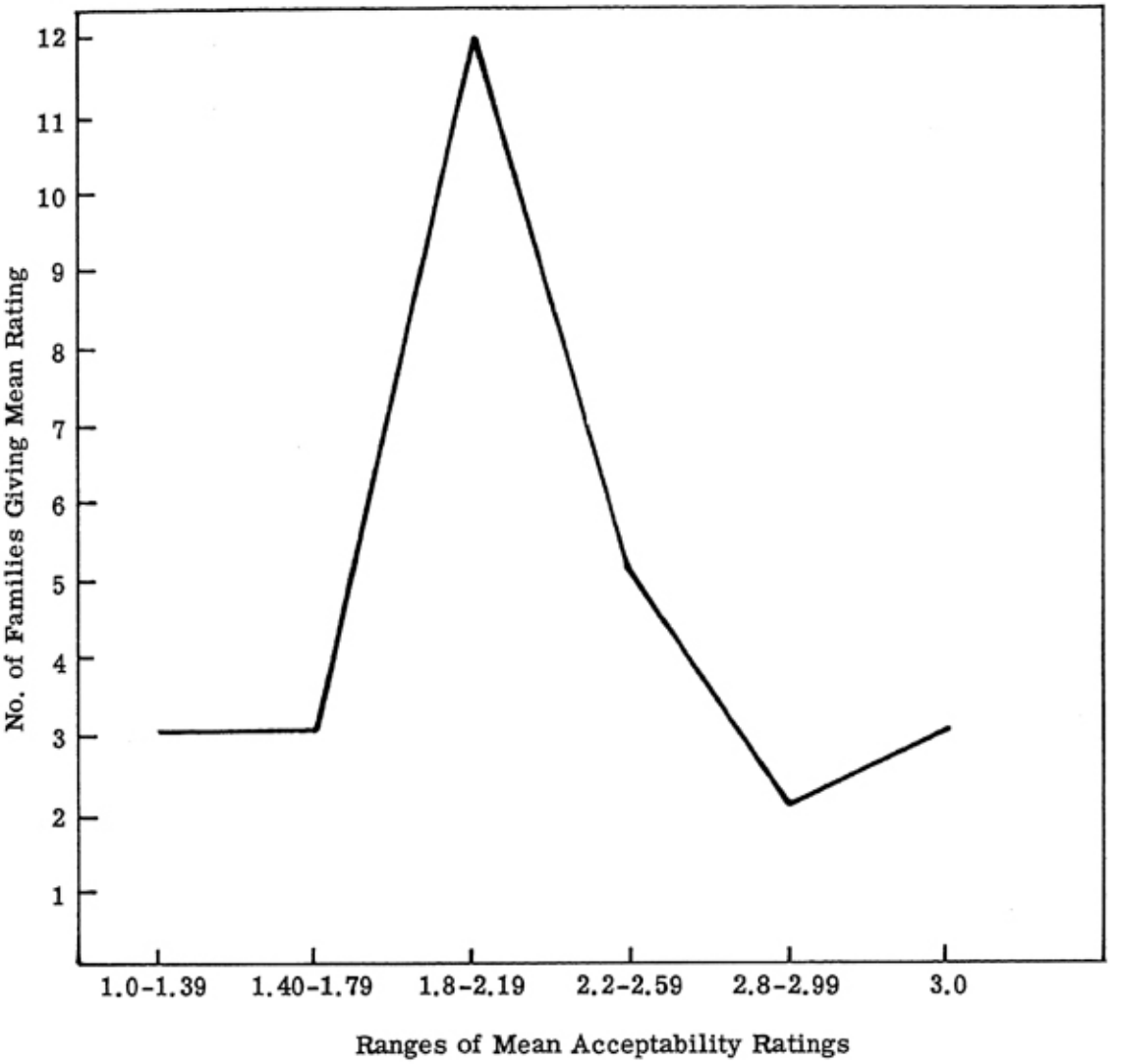
What was the degree of association between the ratings of the cuts from one side of a carcass and the number of unsatisfactory samples of the cuts from the other side of that same carcass? Each cut was evaluated by three families. Thus, the left loin from Choice No. 01 was evaluated by a different card-schedule and by different families than evaluated the right loin from Choice No. 01. The data suggest a fairly substantial association, although they are insufficient for generalization. A comparison of results in Tables 4 and 5 indicates that carcass No. 30 with the best mean rating had no unsatisfactory samples and that carcass No. 60 with the poorest mean rating had the most unsatisfactory samples. Likewise the best rated cut means (Table 5) were associated with no complaints for those cuts with the exception of No. 60 blade roasts (Table 4). The poorest cut means of the hindquarter were all associated with complaints, but this association was not present in the forequarter.

The analysis of meat acceptability is greatly hindered by the lack of large quantities of a cut known to be homogeneous in quality. Gound beef ratings are of particular methodological interest because a large quantity of beef can be obtained which, if well mixed, can be assumed to be fairly homogeneous. Four to 15 packages of ground beef were evaluated by each of 28 families. Twelve of the 28 mean ratings by families fell within the range 1.80 to 2.19 and the extreme range was 1.10 to 3.00 (Figure 4). The difference among family means was highly significant. Assuming that this ground beef was quite homogeneous, these results indicate that consumers differed significantly in their ratings of ground beef. While it is interesting that the mode was 2.0 and the lowest rating was 3.0, it should be remembered that a fatter or leaner mix might have had different limits.

Comments on Evaluation Cards

Certain interesting comparisons of cuts can be made from the many com-

Fig. 4—Frequency distribution of mean ratings of ground beef by 28 families.



ments on the reaction cards. The loin and sirloin led in favorable comments (Table 7). The bottom round and rib steak drew several comments of toughness. Blade roast had a much smaller proportion of favorable comments about flavor than the other cuts. Comments for the other cuts were not tabulated.

Standard grade received lower proportions of comments of good flavor and of general approval, and a higher proportion of comments of tough than the other two grades (Table 8). There were eight Standard sides tested including the two carcasses. Seven of the nine comments of poor or no flavor and 17 of the 25 comments of tough in the Standard grade were associated with the two sides of Carcass No. 60. Of the 12 families evaluating some part of that carcass, five made unfavorable comments about flavor and 10 about lack of tenderness. The comments on the other Standard sides compared favorably with the other grades.

One family made no comments on their postcards; a few families made only one or two comments; one family made 38 comments.

TABLE 7--NUMBER OF COMMENTS VOLUNTEERED BY PANEL MEMBERS ON CARDS BY CUTS

Comments[a]	Cuts				
	Loin	Sirloin	Bottom Round	Rib Steak	Blade Roast
Good flavor	21	13	19	17	3
Poor or no flavor	2	4	2	1	1
Tender	20	15	13	9	2
Not very tender	5	5	8	8	1
Tough	1	3	7	4	2
Not too fat	1	0	0	2	1
Too fat	1	0	0	4	0
General approval	20	29	10	13	4
General disapproval	0	1	0	0	1
Used tenderizer	0	4	2	4	3
Misc. (thickness, bone, etc.)	6	5	8	4	7
Total	77	79	69	66	25

[a] Summary terms.

TABLE 8--PERCENTAGES OF COMMENTS BY GRADE

Comments[a]	Choice	Good	Standard
Good flavor	27.1%	22.9	16.9
Poor or no flavor	4.2	1.8	5.1
Tender	17.7	15.3	16.9
Not very tender	12.5	4.1	11.2
Tough	6.2	7.1	14.0
Not too fat	1.0	---	1.7
Too fat	2.1	2.4	1.1
General approval	25.0	27.5	16.9
General disapproval	---	0.6	1.1
Misc. (thickness, bone, etc.)	4.2	11.8	12.3
Used tenderizer	---	6.5	2.8
Totals	100.0	100.0	100.0

[a] Summary terms.

GENERAL CONSUMER REACTIONS TO THE QUARTERS

In the spring of 1957 the present study was completed by a final interview of the participating families. For one family no final interview was obtained. A copy of the final schedule may be found in the appendix.

General Satisfaction.

Thirty-one families in the study were pleased with the meat, although they considered some cuts inferior to others. Seven other families reported they were greatly pleased, while only one family reported dissatisfaction with the entire quarter. It is interesting that this particular quarter was a composite, that the

consumer gave it a quality ranking of "2," that the ratio of satisfactory cuts to unsatisfactory cuts reported by the household was 16 to 7, and that carcass No. 60 was included in the composite.

All seven of the families showing great satisfaction and 16 of the 31 merely pleased families ranked their beef "1". Only 2 families ranked their quarters as low as "3" or "4". Table 9 shows degree of general satisfaction and quality ranking in relation to the quarter received.

TABLE 9--SATISFACTION WITH MEAT ACCORDING TO QUARTER CONSUMED

Quarter or Quarter Portions Consumed	House-hold No.	Rank of Quarter by Household	General** Satisfaction	Mean Rating Composite Quarter	Ratio of Satisfactory to Unsatisfactory Packages
01LH, 30LH, 60LH	08	2	D	---	16:7
01LH, 30LH, 60LH	09	1	P	---	16:7
01LH, 30LH, 60LH	33	-	--	---	23:0
01RH, 30RH, 60RH	06	2	P	2.25	---
01RH, 30RH, 60RH	07	1	P	2.79	---
01RH, 30RH, 60RH	10	1	P	1.83	---
02LH, 31LH, 61LH	01	1	P	---	24:0
02LH, 31LH, 61LH	25	2	P	---	19:1
02LH, 31LH, 61LH	31	1	VP	---	24:0
02RH, 31RH, 61RH	02	1	P	1.87	---
02RH, 31RH, 61RH	28	1	VP	1.46	---
02RH, 31RH, 61RH	30	2	P	2.09	---
01LF, 30LF, 60LF	21	2	P	---	10:2*
01LF, 30LF, 60LF	40	1 or 2	P	---	9:1*
01LF, 30LF, 60LF	38	3	P	---	10:2*
01RF, 30RF, 60RF	22	1	P	1.75	--- *
01RF, 30RF, 60RF	23	2	P	2.75	--- *
01RF, 30RF, 60RF	39	2	P	2.17	--- *
02LF, 31LF, 61LF	13	1	P	---	12:0*
02LF, 31LF, 61LF	16	2	P	---	12:0*
02LF, 31LF, 61LF	18	2	P	---	10:1*
02RF, 31RF, 61RF	14	1	P	2.75	--- *
02RF, 31RF, 61RF	17	1	P	2.17	--- *
02RF, 31RF, 61RF	34	1	VP	1.75	--- *
32RH	27	1	VP	---	24:0
33RH	26	2	P	---	10:1
34RH	29	1	VP	---	24:0
35RH	03	1	VP	---	21:0
32RF	36	1	VP	---	12:0*
33RF	37	4	P	---	11:1*
34RF	35	1 or 2	P	---	11:1*
35RF	19	1	P	---	12:0*
62RH	05	1	P	---	23:1
63RH	32	1	P	---	16:0
64RH	24	1	P	---	22:0
65RH	04	1	P	---	14:2
62RF	11	2	P	---	12:0*
63RF	20	1	P	---	10:1*
64RF	15	2	P	---	12:0*
65RF	12	1	P	---	12:0*

* Answers concerning short ribs omitted, because of their frequent, extreme unpopularity.

** D = Dissatisfied
P = Pleased
VP = Very Pleased

Relation to Mean Quarter Score

Mean quarter scores given composite quarters by 12 households were not consistent in every case with quality rankings given the same quarters. For example, two quarters ranked as "1" were given mean quarter scores of 2.75 and 2.79, the lowest scores recorded. Mean scores of the eight quarters ranked "1" ranged from 1.46 to 2.79 and averaged 2.05 while the scores of the four quarters ranked "2" ranged from 2.09 to 2.75 and averaged 2.32.

Variation in Meat Detected by Panelists

Composite beef quarters were received by 24 families, and final interviews were obtained from 23 of these families. A primary purpose of the final interview was to determine the degree of quality variation observed in the composite quarters. Therefore, repeated efforts were made to obtain mention of the slightest dissatisfaction with any cut. It was obvious from the context of the interview and the general rankings given the quarter that many of these "complaints" were very minor, indeed. All except 6 of these 23 families reported differences in quality among the various parts of their quarters. However, only 3 of the 16 families receiving regular beef quarters reported all their meat the same quality.

One or more round steaks from about one-half of all the hindquarters (both regular and composite) were thought tough and/or tasteless. Greater proportions of sirloins from the regular hindquarters than from the composite hindquarters were considered tough. One or more rib steaks and arm and blade roasts from one-half of the composite quarters were tough and/or tasteless, whereas the same cuts from one-half to more than three-fourths of the regular forequarters were considered inferior in the same way. See Table 10.

TABLE 10--QUALITY OF QUARTERS AS JUDGED BY PANELISTS

Type of Quarter	Total No. Households	Number Panelists Finding: Inferior* Round Steaks	Inferior* Sirloin Steaks	Inferior* Rib Steak	Inferior* Forequarter Roasts	All Same Quality
Composite Hindquarter	11	6	4	--	--	4
Regular Hindquarter	8	4	4	--	--	3
All Hindquarters	19	10	8	--	--	7
Composite Forequarters	12	--	-	6	6	2
Regular Forequarters	8	--	-	4	7	0
All Forequarters	20	--	-	10	13	2

* "Inferior" means one or more packages of a cut less desirable than other packages of that cut.

Did the 23 panelists detect the compositing of their quarters? Only one of them explicitly suggested that her round steaks did not all come from the same animal; moreover, she did not appear to extend that idea to the other hindquarter cuts. As indicated, most families, when pressed, recalled a steak or a

roast or two that was not quite as good. The fact that this type of recollection occurred as frequently with regular quarters as with composites suggests that these consumers did not detect quality variations in the composites much greater than those occurring from cut to cut within a quarter.

Nature of Complaints by Cut

When housewives were questioned concerning their satisfaction with the individual cuts, more complaints were made about round and rib steaks than about other cuts. Most of the persons dissatisfied with one or more rib steaks (10 of 20 families) said they were not tender, while the general problem reported by the eleven dissatisfied with rounds (11 of 19 families) was one of thickness and toughness. However, not all of these complaints were serious since only three said they would not have purchased the rib steaks and four would not have bought the round steaks at the store.

Sirloin and T-bone steaks proved more satisfactory. Only four of 19 households complained about sirloins, saying one was too fat and the others tough. Only two housewives mentioned dissatisfaction with T-bone, both saying they were cut too thin.

Although nine out of 20 persons found fault with forequarter roasts, none said they would not have purchased them. Therefore, their various complaints of toughness, no flavor, gristle, too much fat, and dryness apparently did not indicate serious dissatisfaction.

Short ribs were an obviously unpopular cut. Thirteen persons said they would not have purchased them at the store.

Meaning of Quality to Consumer

Using the numbers 1 through 4, the panelists ranked the labels "Quality Meats," "High Grade," "Choice," and "Economy" in order of quality according to their own interpretation. A majority chose "Choice" as meaning top quality and "Economy" as lowest quality. There was no clear-cut indication as to which of the remaining two ranked second and third. (See Table 11).

TABLE 11--CONSUMER INTERPRETATION OF TERMS USED TO DESCRIBE QUALITY OF MEAT

Term	Ranks			
	1*	2	3	4
	No. Consumer			
Choice	30	5	2	2
Quality Meat	7	14	17	1
High Grade	2	17	20	0
Economy	0	3	1	35

* 1 = top quality; 4 = lowest quality.

Consumers were then asked to define each of the terms they chose as indicating top and lowest quality. Of the resulting 31 definitions for "Choice" 12

said it meant the very best meat, two said it meant next best, and 1 didn't know. Eight defined it as flavorful and tender, and an additional eight were thinking in terms of fat—"fat enough but not too fat."

The 36 definitions given for "Economy" revealed interesting and perhaps somewhat surprising ideas held by consumers. To only a few did the term mean good meat at a low price, as the following quoted definitions show:

"This meat would be economy because saved so much money and got such good quality."

"Good nutritious meat, not high price; stew meat and hamburger."

"Lower priced; can be cooked to where the same food value as higher grades at a lower price."

"Would use if you lived on a close budget. Good meat but would need special cooking. It has all the food value of better meat but wouldn't serve it to company."

About the same number, on the other hand, thought of it as referring to meat which was completely undesirable:

"Meat during the war called utility meat—awful."

"Tougher meat; gristly; no flavor."

"Would never buy: poor grade; no marbling; no flavor."

"Poor; to be avoided."

To one housewife "Economy" meant merely a "grade of meat (look for label on meat)."

A majority of housewives indicated that, to them, "Economy" meats meant less desirable meats than those labelled otherwise. Some merely pointed to low quality or offered suggestions as to the reason for such quality:

"Less desirable quality."

"Weren't the best cuts; saving."

"The cheaper grades, economically priced: hamburger, etc."

"Slick meat; no fat or yellow fat; light yellowish red, not the dull red of good beef."

"A lower price and a lower grade of merchandise."

"Dry, stringy meat."

"From grade stock; poor quality animal."

"Smaller animal, not aged properly. May have been an animal that didn't have a good appearance."

"Lowest; baby beef; not fed right; low quality beef when butchered."

"They (the butchers) think it's tough because no marbling—possibly how much exercise the animal got has something to do with it."

"Grass-fed animals; not a good animal to start with."

"Good for stews; not too much flavor or too tender."

"Just about lowest; poor, old, poorly fed cows; have to be specially prepared."

Others, after pointing to low quality, suggested proper cooking methods as a means to greater palatability:

"Low grade; should be cooked a long time at low temperature. Lower price."

"Type of cut that can be doctored up to taste well and look good."

"Not as tender; fat; not well flavored; have to be cooked properly—use tenderizer."
"Cuts that would have to be braised, broiled, or stewed."
"Lower grade animal; just as nutritious but requires special cooking."
"Would have to be treated (tenderized) before cooking; would have to be cooked until well done; would expect it not to be tender. Pot roast meat, etc."
"Nutritious but lacking superior quality of texture. Would take longer to cook; slow moist heat."
"Meat which depends on the cook for goodness."
"Good if cooked for a long time in water and would use tenderizer. Not too fat and a lot of connective tissue."
"Toughness—would have to be stewed or braised—the extra parts: heart, liver, etc."
"Soup bones, stew meat and short ribs—economy cuts; need special cooking."
"Cheap meat; would cook differently."
"Lowest price (not bad, but has to be fixed in same imaginative way)."
"Cheaper cuts; tough; just as flavorful as better cuts if you cook them properly."

"High Grade" was interpreted by 3 people as "doesn't mean anything to me", "Prime—the very best", and "the best you can get."

A total of 9 definitions for "Quality Meat" was received. To some consumers, this label meant the best, as these definitions indicate:

"Best beef available; tender; flavorful; as good as beef gets."
"Very best (fixed anyway)."
"Good Choice meat; well selected meat is what it should mean but doesn't always."
"Better meats; tenderness; less waste."

Other definitions involved flavor and tenderness:

"Juicy; tender; thickness of steaks (1 inch)."
"Flavor; low percentage of shrinkage; tenderness."
"Flavor and tenderness."

To one person the term meant nothing.

LABORATORY PANEL EVALUATIONS

A laboratory panel of six judges evaluated one loin steak, one top round steak, and one blade roast from each of the 20 sides in the experiment. At each tasting three judges evaluated tenderness and juiciness and the other three evaluated flavor.** These few observations have a limited usefulness as a rough check upon consumer evaluations, but are obviously too few to be anything but suggestive.

The laboratory evaluation of individual cuts was fairly well related to consumer evaluations for top round only (Table 12). The relationship for loin steaks and blade roasts was very poor. Likewise, the laboratory evaluations of tenderness were much better related to the number of dissatisfactions for the top round cut than for the loin or blade cuts.

**See Appendix for description of experimental procedure.

TABLE 12--COMPARISON OF CONSUMER AND LABORATORY RATINGS

Loin Steaks				Top Round Steaks			
Side No.	Consumer Rating	Overall Laboratory Rating	Tenderness Laboratory Rating	Side No.	Consumer Rating	Overall Laboratory Rating	Tenderness Laboratory Rating
02	1.50	3.56	3.67	61	1.80	3.22	3.00
31	1.50	2.33	2.00	01	1.83	3.22	3.67
61	1.50	3.33	3.33	31	1.83	3.00	2.67
01	1.67	3.44	3.33	02	2.33	3.67	4.00
30	1.67	3.00	4.00	30	2.50	3.67	3.67
60	2.17	3.44	3.67	60	3.83	5.50	7.00

While all cuts of carcass No. 60 were rated rather low, the laboratory ratings of neither the loin nor blade lead one to expect the very low rating of the top round.

Consumer mean ratings generally varied less than laboratory panel means. For example, the laboratory ratings of No. 60 top round were much more critical than consumer reactions. Possibly, differences in cooking methods and in the "mental set" of the participants explain some of the difference in consumer and laboratory reactions.

The mean ratings of the grades were much alike for flavor, tenderness, and juiciness (Table 13). The only significant difference between ratings of grades was the flavor of the blade roasts. The Standard grade mean of the flavor of blade roasts was more than 1.2 points poorer on a 9-point scale than either of the other two grades.

TABLE 13--MEAN RATINGS OF GRADES BY LABORATORY PANEL

	Tenderness	Juiciness	Flavor	Unweighted Mean
Loin				
Choice	3.34	2.58	3.59	3.17
Good	3.08	2.67	3.00	2.92
Standard	2.83	3.08	3.46	3.12
Top Round				
Choice	3.42	3.58	3.42	3.47
Good	3.81	3.56	3.38	3.56
Standard	4.25	3.46	4.13	3.95
Blade				
Choice	3.58	3.08	3.17	3.28
Good	3.08	3.25	3.08	3.14
Standard	3.29	3.23	4.38	3.63

COOKING METHODS BY CUTS

The quarter-panel members prepared more beef cuts by dry-heat than by moist-heat cooking methods.† Of all beef cuts tested, 671 were cooked by dry heat while only 366 were cooked by moist heat. Broiling, the most popular dry-heat method, was used in the preparation of 86 percent of these 671 cuts (Table 14). Fifty-eight percent of the cuts cooked by moist heat were fried (with lid)

TABLE 14--NUMBER CUTS PREPARED BY DRY-HEAT METHODS

Cut	Charcoal Broiled	Broiled or Fried (no lid)	Baked (no lid)	All
Loin Steak	10	87	0	97
Sirloin Steak	5	82	0	87
Top Round Steak	1	46	1	48
Bottom Round Steak	2	36	2	40
Rib Steak	1	96	1	98
Short Ribs	0	2	6	8
Arm Roast	1	1	17	19
Blade Roast	0	4	11	15
Ground Beef	8	224	27	259
All	28	578	65	671

or braised, while 12 percent were either boiled, pressured, or made into soup (Table 15). Sixty-eight percent of the ground beef was broiled, while 11 percent was prepared by other dry-heat methods.

TABLE 15--NUMBER CUTS PREPARED BY MOIST-HEAT METHODS

Cut	Barbecued	With Vegetables	Braised or Fried (with lid)	Baked (with lid)	Boiled, Pressured, or as Soup	All
Loin Steak	3	0	6	0	2	11
Sirloin Steak	9	0	12	6	0	27
Top Round Steak	1	0	48	6	3	58
Bottom Round Steak	2	2	50	6	5	65
Rib Steak	0	1	9	2	2	14
Short Ribs	3	5	11	4	18	41
Arm Roast	0	0	10	22	5	37
Blade Roast	0	1	7	27	8	43
Groud Beef	4	5	58	3	0	70
All	22	14	211	76	43	366

Loin steaks, sirloin steaks, and rib steaks also followed this general pattern of dominant use of dry-heat cooking methods. Eighty-one percent of loin, 72 percent of sirloin, and 86 percent of rib steaks were broiled. Moist-heat methods were used in the preparation of only 10, 24, and 12 percent of the three cuts, respectively.

†Dry-heat methods used were charcoal broiling, broiling or frying (no lid), and baking (no lid). Moist-heat methods were barbecuing; cooking with vegetables; braising or frying (with lid); baking (with lid); and boiling, pressuring, or using for soup. A very small percentage of the families ground the meat.

In the preparation of top round steaks, broiling and braising were equally popular cooking methods. Together they accounted for 87 percent of the preparations. However, when all methods used are considered, slightly more of these steaks were cooked by moist heat (54%) than by dry heat (44%). A little less than 2% of these steaks were ground by the consumers (Table 16).

TABLE 16--METHOD OF PREPARATION

	Moist-Heat	Dry-Heat	All
	%	%	No.
Loin Steak	10	90	108
Sirloin Steak	24	76	114
Top Round Steak	54	44[a/]	106
Bottom Round	61	38	105
Rib Steak	12	88	112
Short Ribs	84	16	49
Arm Roast	66	34	56
Blade Roast	73	25	58
Ground Beef	21	79	329
All	35	64	1037

[a/] Percentages do not add to 100 wherever a few cuts were ground.

Cooking methods for bottom round steaks varied even more from the general pattern than did those for the top rounds. Forty-seven percent of the bottom rounds were cooked by the braising method, while 34 percent were broiled. Of the remaining steaks in this group, 14 percent were cooked by a variety of other moist-heat methods and less than 4 percent were prepared by other dry-heat methods.

Moist-heat methods were mostly used, also, in preparing short ribs and arm and blade roasts. Eighty-four percent of the short ribs were cooked by moist heat, mostly by pressuring or braising. Sixty-six percent of arm roasts and 73 percent of blade roasts were cooked by moist heat; baking (with a lid) was the most popular method for both.

RELATION OF COOKING METHOD TO OTHER PRACTICES

Cooking vs. Doneness

Ninety-five percent of meats cooked by moist-heat methods were commonly cooked well done. With dry-heat methods, 58 percent of the cuts were cooked well done and 40 percent were cooked rare (Table 17).

Over three-fourths of the meat that was charcoal broiled was cooked rare. The degree of doneness for broiled meat was more evenly divided between well-done and rare—56 percent to 41 percent, respectively. Few roasts were cooked rare.

TABLE 17--COOKING METHOD BY DEGREE OF DONENESS

	Well		Rare		Both		All
	No.	%	No.	%	No.	%	No.
Dry-Heat Methods							
Charcoal Broiled	6	21	22	79	0		28
Broiled or Fried (no lid)	324	56	238	41	12	2	578[a]
Baked (no lid)	57	88	7	11	1	1	65
All	387	58	267	40	13	2	671
Moist-Heat Methods							
Barbecued	17	77	4	18	1	5	22
With Vegetables	13	93	1	7	0		14
Braised or Fried (with lid)	203	96	7	3	0		211[b]
Baked (with lid)	73	96	2	3	0		76[b]
Boiled, Pressured, or as Soup	42	98	0		0		43[b]
All	348	95	14	4	1	*	366

*Less than 1%.

[a] 4 respondents gave no answers.

[b] 1 respondent gave no answer.

Cooking Method vs. Thawing

From 64 percent to 96 percent of the meat cuts were thawed before being cooked, but there was no noticeable difference in practice between users of dry-heat and moist-heat methods. Roasts were less often thawed than other cuts, while steaks for barbecuing and charcoal broiling were thawed most often.

Relation of Cooking Method to Socio-Economic Factors

There seems to be little definite relation between size of family and method of cooking. Half of the meat that was charcoal broiled was for families of two; half that was barbecued and half that was cooked with vegetables (moist heat) was for families of three.

A special study was made of 4 cuts—loin steaks, bottom round steaks, rib steaks, and short ribs—to ascertain whether there was any relation between income and cooking method. It was found that in general the higher-income group tended more to dry-heat methods. Families in this group did more charcoal broiling and less braising or frying of loin steaks than lower-income families. In preparing bottom round steaks, the former did much more broiling or pan-frying (no lid) than the other group, and no moist baking. Although broiling rib steaks was slightly more popular with the higher than the lower-income group, there were 3 cases of baking for the first-named group. For the short ribs, baking was used more often by the higher-income group than the other (Table 18).

TABLE 18--RELATIONSHIPS OF COOKING METHOD AND INCOME FOR FOUR CUTS

Cooking Method	Loin Steak		Bottom Round		Rib Steak		Short Ribs	
	Low-income Group %	High-income Group %	Low-income Group %	High-income Group %	Low-income Group %	High-income Group %	Low-income Group %	High-income Group %
Dry-Heat Methods								
Charcoal Broiled	5	13	2	2	1	0	0	0
Broiled or Fried (no lid)	80	81	23	47	83	90	7	0
Baked (no lid)	0	0	2	2	0	3	0	32
All	N = 48	N = 49	N = 15	N = 25	N = 61	N = 37	N = 2	N = 6
Moist-Heat Methods								
Barbecued	5	0	4	0	0	0	10	0
With Vegetables	0	0	4	0	1	0	10	10
Braised or Fried (with lid)	9	2	51	43	10	2	23	21
Baked (with lid)	0	0	10	0	0	5	3	16
Boiled, Pressured, or as Soup	0	4	4	6	4	0	47	21
All	N = 8	N = 3	N = 41	N = 24	N = 11	N = 3	N = 28	N = 13
Total All Methods	N = 56 100%[a]	N = 52 100%	N = 56*100%	N = 49 100%	N = 72 100%	N = 40 100%	N = 30 100%	N = 19 100%

*1 other respondent ground the meat.

[a] Percentages sometimes fail to add to 100 because of rounding.

OTHER FACTORS CONSIDERED

Except for ground beef,†† 85 percent to 94 percent of all cuts were consumed at the evening meal. None were eaten at breakfast.

Ground beef was used for hamburgers twice as often as it was prepared as hamburg steak. Together both methods of serving accounted for 72 percent of ground beef preparations.

About the same proportion of meat cuts was cooked well done regardless of whether they were thawed prior to cooking.

Little relation was found between degree of doneness and income. However, there was a surprising amount of rare loins, rib steaks, and especially bottom rounds. Approximate percentages cooked rare were as follows: loin, 46; top round, 23; and rib steak, 48.

EVALUATION OF QUARTER-PANEL TECHNIQUE

The technique of supplying consumers a quarter of beef was tried in order to obtain consumer evaluation of several cuts and grades in as normal an environment as possible. The reduction of researchers' travel as compared to a weekly delivery type of panel was also perceived as a minor advantage. This technique was tested in this small panel to ascertain the nature of the problems associated with it.

Physical Problems

The preparation of many carcasses under experimental conditions is an extremely heavy task. Likewise the recruitment of a panel and the delivery of quarters is very time-consuming. This technique should not be utilized without very adequate planning and staff.

Sampling Problems

The refusal rate was much higher than with household surveys or with a panel provided free samples for a few weeks. Many families did not have adequate freezer space for 70 to 90 pounds of beef and did not consider space at a locker plant sufficiently convenient. Other families may have had the space but were unwilling to buy the meat.

Data Problems

About two percent of the cards were not returned. While this is a satisfactory rate of return, the fact that two of the 40 families failed to return several cards considerably reduced the usefulness of the data from two quarters. It appears from the results of this panel and others now in progress that a satisfactory

††Only 63 percent of ground beef was eaten at the evening meal.

rate of return can be maintained. This rate of return was somewhat slow as five months were required to consume the quarters.

How accurate were the data? Incoming cards were edited and cooperators were called about incomplete cards. The importance of honest answers was emphasized during the recruitment interview. The researchers have only indirect evidence of the care with which these schedule cards were filled out. Most families evidenced considerable interest in the panel, and most of them took the trouble to write comments occasionally on the postcards. Results from different families consuming cuts from the same carcass and from families consuming ground beef appeared satisfactorily comparable.

It was observed that two or more packages were sometimes consumed at the same time by one family. This on occasion may have led to a loss of identity and a confusion in reporting.

Experimental Problem

For obvious reasons, the selling to cooperators of large amounts of products with a high probability of being very unsatisfactory would not be advisable with this technique. It seems likely that this extreme level of unsatisfactoriness rarely occurs in beef. The sale of composite rather than regular quarters further reduces the probability of any family receiving a large amount of even moderately unsatisfactory meat.

Since there was some variation among families in the level of ratings, the means, which were means of 6 families per cut, should have more reliability than means of regular quarters. The regular quarters did serve as a useful control in evaluating the degree to which compositing was noted. The small number of samples per carcass for the roast cuts increases the probability that variation attributed to carcasses actually included important consumer preference variation because of the reduced "averaging" of opinions.

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APPENDIX
Taste Panel Procedure

Loin Steaks

In a three-day period six panel members, who had previously been through a training period, tasted 24 steaks for tenderness, toughness, juiciness, dryness and flavor. These tests utilized one reference steak from the pre-judging period and one control steak unknown to the panelists.

Each panel member was placed in an isolated, light-controlled booth and was provided a scaled record sheet on which to rate taste samples. Ratings were made on structured scales similar to those used by Quartermaster Food and Container Institute researchers with 5 points for juiciness, 8 for tenderness, and 9 for flavor. Panelists 1, 2, and 3 judged the first bite for toughness/tenderness and for dryness/juiciness while panelists 4, 5, and 6 judged the first bite for flavor. This procedure was reversed for the second bite, with such alternating being continuous throughout all the tasting. In an effort to aid better taste perception each panelist was given water and cubes of dry bread for consumption after each taste of meat. Steaks were cooked a total of 17 minutes (turned at the end of 7 minutes) on a commercial grill which had been preheated for 30 minutes to a temperature of 300° F. Six bites were cut from each steak and placed on numbered plates. The first three bites were served to judges 1, 2, and 3. For the next taste they were given 4, 5, and 6 so that the part of the steak being judged for flavor was always the same. This consistency of method was true also for toughness/tenderness and for dryness/juiciness.

Chuck (Blade) Roasts

After a two-day training period, a panel of six members judged five roasts per day, for four days, for the same characteristics as in the steak tests.

Roasts of the same thickness but not the same size were first seared for two minutes on each side on a commercial grill preheated to 350° F. After all thermostats had been co-ordinated,* the roasts were braised** for two hours in electric fry pans, equipped with heavy glass lids. Six bites of meat were cut from the eye muscle, placed on numbered plates, and given to the panelists for judging as before.

*Thermostats on fry pans were co-ordinated by putting water in all pans and testing the temperature of the water with a thermometer. All thermostats were recorded where the setting produced a temperature of 205° F to 206° F.

**Roasts were put on trivets and a cup of water was added. Braising time was computed from the time the steam began to escape around the edges of the lid.

Top Round Steaks

A training period of three days preceded these tests. The actual tests were completed on 24 steaks in four days, one of the steaks each day being a control steak unknown to the panelists.

Although the thickness of the various steaks was supposed to be the same, there appeared to be sufficient difference to cause uneven thawing. This difference would also be expected to cause some variance under the standardized cooking method. The most marked difference in thickness appeared to be between the control steaks and the other steaks.

Steaks were first seared for one minute on each side on a commercial grill preheated to 350° F. Then they were braised† for forty-three minutes in electric fry pans, with thermostats set at 200° F.

Six bites of steak were cut from the same muscle. These were again numbered and judged in the same manner as previously described.

†One-third cup of water was added. Steaks were put on trivets.

Date _____
Interviewer_____

BEEF PREFERENCE STUDY

Columbia, Spring, 1957
Quarter Panel --- 40 Families

I. General Information:
A. Name:

B. Number in Family:

C. Did you have a hindquarter or a forequarter?_____

D. When did you finish your Quarter?

II. Were all packages of meat equally satisfactory?

If NO to II A. What cuts were less satisfactory?

If YES to II A^1 Were there any cuts which were less satisfactory?

(If NO or NO Answer to A or A^1 omit B)
B. How did you tell they were unsatisfactory?

1. Flavor

2. Tenderness

3. Visual:_____

_____

When noticed?
a) Before cooking.

b) After cooking.

IV. Were there any packages that you would not have purchased at the store? Yes____No_____

If YES, ask A. B, & C.

A. Which ones?

B. Why not?

1. Family doesn't like the cuts. (Specify cut)_____

_____

2. Poor quality, (Specify cut & other details)_____

_____

- 2 -

C. If you did buy these in the store, what characteristics would you look for in the cuts?_____

_____

If not already discussed, ask:

D. How would you go about buying a T-Bone steak at the store?

V. A. Were there any differences in quality between the different packages?

B. What do you mean by quality?

VI. Do you think you would continue to buy your meat in quarters? Why or why not?

VII. Rank these four labels: Quality meats_____
High grades_____
Choice_____
Economy_____

VIII. How would you classify your quarter using the above labels?

IX. Would you rank all the quarter that way or just parts of its?

X. What does (use first and last label) mean to you?

Comments

(Obtain general practices.)

	Doneness (color)	Cooking time	Cooking temp.	Utensil	Additives	Salt	Tenderize it? pounding? tenderizer?
Steaks (T-Bone & Rib)							
Round Steaks							
Short Ribs							
Chuck Roast							
How do you cook these cuts?							
Rib Roast							
Rolled Roasts							

Yes_____

Do you use a meat thermometer?

No_____

Were these packages the right size for your family?_____

Check lists for interviewer reference only:

Utensils

Pressure saucepan
Deepwell cooker
Roaster (W or W/O lid)
Dutch Oven
Skillet
Oven Broiler
Other (Specify)

Additives

Seasonings (salt and spices)
Ketch-up-Steak Sauce- Mustard-Garlic
Dip and roll (batters, bread crumb)

Doneness

Specify color: If well done how well?

Can you cut it with a knife or with a fork?