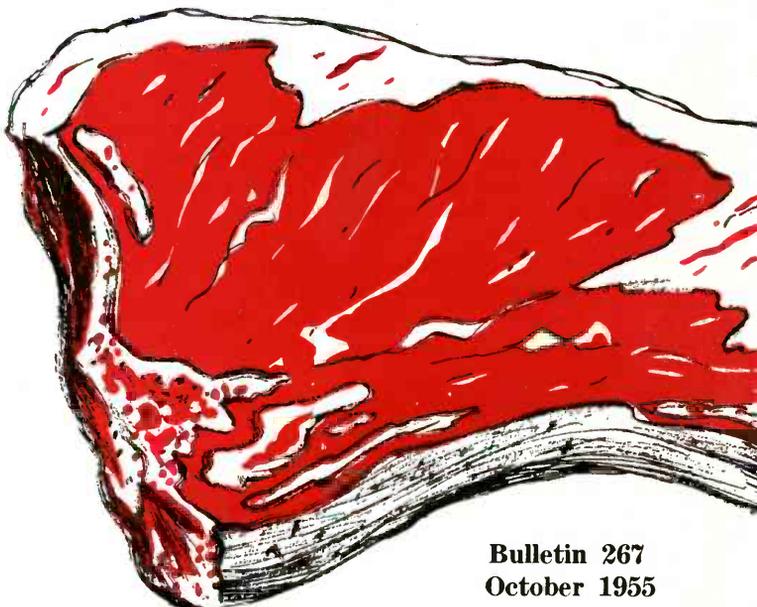
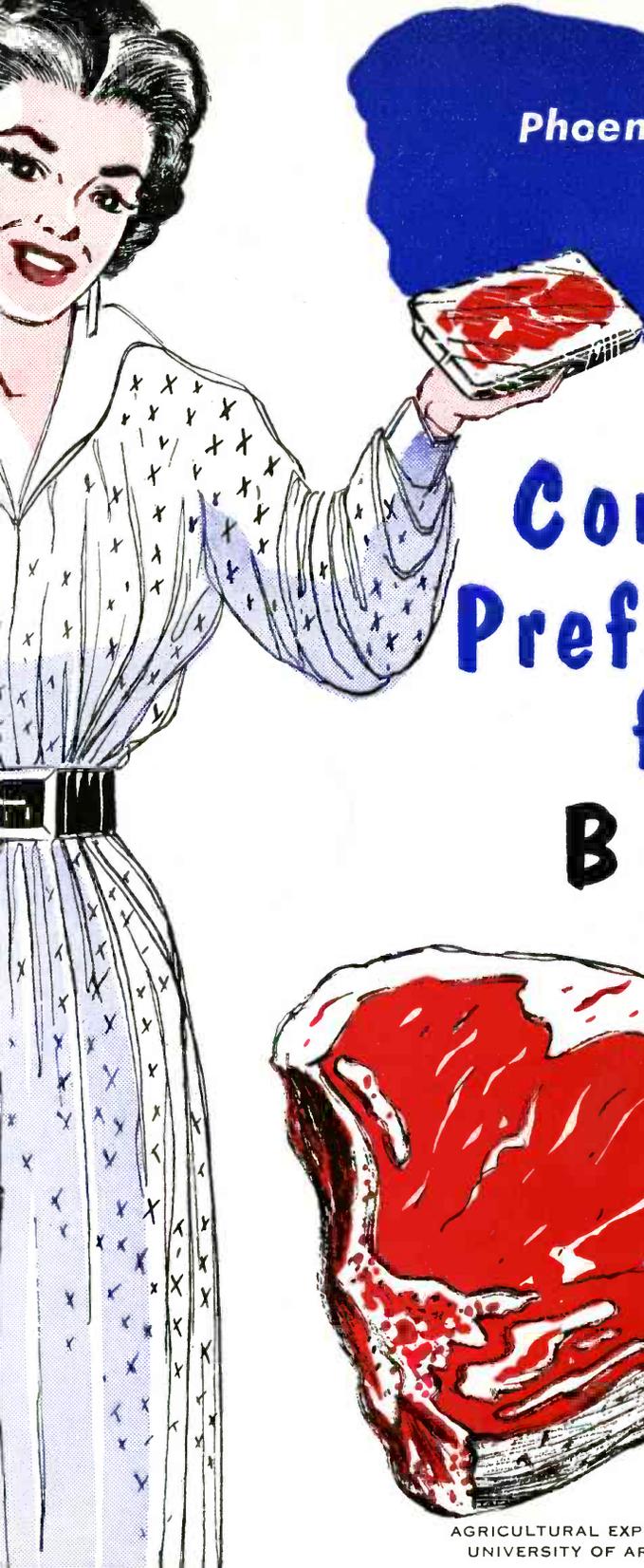


Phoenix Arizona
Survey
1955

Consumer
Preferences
for
BEEF



Bulletin 267
October 1955

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UNIVERSITY OF ARIZONA, TUCSON

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WESTERN REGIONAL RESEARCH PROJECT

This project has been conducted under Title II of the Research and Marketing Act of 1946, and is a part of a general regional project dealing with consumer preference for beef. This research is being carried out cooperatively by the Agricultural Experiment Stations of Arizona, Colorado, Oregon, Texas, Washington, and Wyoming. Studies similar to the one reported in this bulletin have been made in Denver, Colorado, by the Experiment Stations of Colorado and Wyoming, and in Houston, Texas, by the Texas Agricultural Experiment Station.

*As of reprint date.

October 1955

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Consumer Preference for Beef

Phoenix, Arizona

1955

R. E. Seltzer¹

American agriculture is becoming increasingly "promotion conscious." On every hand we see advertisements and hear radio and television commercials urging us to "drink three glasses of milk every day," "eat beef — keep slim," and so on. Agricultural commodity groups are spending large sums of money in an attempt to increase consumer demand for their products. We, in the United States, are living in a period of abundant supplies of agricultural products. If these commodities are to move into consumption in competition with each other, they must be tailored to meet the preferences of the ultimate purchaser — in most cases the housewife.

This study attempts to describe these consumer preferences for a particular product — beef, in a particular area — Phoenix, Arizona. The results obtained should be of use to livestock and meat organizations interested in beef promotion, to organizations concerned with consumer education, to meat processors, wholesalers, and retailers, to ranchers and cattle feeders, and finally, to consumers, themselves.²

This report summarizes the results of part one of a two-part research project. What consumers say they prefer when asked questions in an interview, and what they select when confronted by an actual choice in the retail store, may not always be the same. Certain feelings of pride, or attempts to answer in the way that the consumer feels the question should be answered, may introduce an element of error into the results of a personal-interview type study. Part one of this study of consumer preferences involved a house-to-house survey using personal interviews with the consumers contacted. Part two will offer beef of varying quality characteristics for sale so that consumer reactions to actual selections of meat may be obtained. The preferences as obtained can then be checked against consumers' replies to similar aspects of the interview-type study.

Procedure

Although this bulletin deals only with the study of consumer preferences made in Phoenix, Arizona, similar studies were being conducted concurrently in Denver, Colorado, and Houston, Texas. Related work is also being carried out at Washington State College, at Oregon State College, and at the University of California.

¹ Agricultural Economist, University of Arizona.

² The detailed summary tables, on which this study is based, are available on request. Requests should be sent to: Department of Agricultural Economics, University of Arizona, Tucson, Arizona.

In conducting this project an effort was made to secure agreement as to details of procedure which were to be followed by all of the participating states. This plan was adopted so that the results obtained in the various states might be compared in order to bring out possible geographical differences in consumer preferences for beef. Arizona, Colorado, Oregon, Texas, Washington, and Wyoming cooperated in the development of the procedures used. Assistance was also obtained from various agencies of the United States Department of Agriculture.

Sample Design

Considering funds available, it was decided to attempt to interview five hundred households in the Phoenix Metropolitan Area. The size of sample represented 0.5 per cent of the total of approximately 100,000 households in the area. The objective of the sampling system used was to

obtain a sampling coverage proportional to the number of households throughout the city. In October, 1954, the Phoenix Republic and Gazette newspapers had completed an actual count of occupied dwellings in this area. Utilizing the facilities of the Arizona Service Bureau, a commercial mailing and listing service, a 0.5 per cent systematic sample was drawn. The newspapers had established 18 sub-areas, each of which was relatively homogeneous in-so-far as population density was concerned. By drawing the sample from each of these sub-areas, the goal of coverage proportional to the number of households was obtained (Table 1). To reduce travel time between sample households, the sample elements were drawn in clusters of three.

Interviewing Procedure

Employing the supervision of the Arizona Service Bureau, three professional interviewers

TABLE 1. SAMPLE DESIGN, HOUSEHOLD SURVEY OF CONSUMER PREFERENCES FOR BEEF, PHOENIX, ARIZONA, 1955

| Phoenix City Zone Number | Number of occupied dwellings in Zone | Number of sample households in Zone |
|--------------------------|--------------------------------------|-------------------------------------|
| 1 | 5,610 | 27 |
| 2 | 6,151 | 30 |
| 3 | 4,065 | 21 |
| 4 | 7,086 | 35 |
| 5 | 7,593 | 39 |
| 6 | 6,188 | 30 |
| 7 | 5,748 | 30 |
| 8 | 5,205 | 27 |
| 9 | 6,660 | 33 |
| 10 | 7,908 | 39 |
| 11 | 7,073 | 35 |
| 12 | 6,120 | 30 |
| 13 | 7,316 | 36 |
| 14 | 3,086 | 15 |
| 15 | 3,368 | 18 |
| 16 | 5,292 | 27 |
| 17 | 2,330 | 12 |
| 18 | 3,554 | 18 |
| Total | 100,353 | 502 |

were hired. The house-to-house interviews were conducted during April and May, 1955. The interviewers were each given a detailed set of instructions, and a short training period was held prior to the start of actual field work. In the event that the interviewers were unable to contact the sample household on the first visit, two call-backs

were specified before an alternative sample element could be taken.

The individual questionnaires were designed to permit direct transfer of results to International Business Machine cards, and the summary tables were made by the International Business Machines Service Bureau in Phoenix.

Preference Regarding Type of Meat, Poultry or Fish

Beef is, by far, the favorite type of meat desired by Phoenix consumers. When asked to indicate their preference, regardless of price, from a list of common meats, poultry and fish, 426 out of 491 consumers interviewed, or 86.8 per cent, chose beef. Chicken was second in popularity, 31 consumers, or 6.3 per cent, indicated it is their first preference; and pork (both fresh and cured) ran third with 12 consumers, or 2.5 per cent, listing this meat as their favorite.

Favorite Cuts of Beef

Consumers were asked to name their three favorite cuts of beef when price was not a consideration. Table 2 shows the distribution of their first, second, and third choices among the major cuts and products mentioned. The items shown in Table 2 as miscellaneous steaks, roasts and beef cuts and products included 31 different cuts or products, ranging from fillet mignon steak to soup bones.

TABLE 2. FAVORITE BEEF CUTS AND BEEF DISHES

| Beef Cut or Beef Dish | —First Choice— | | —Second Choice— | | —Third Choice— | |
|--------------------------------------|----------------|--------------------------|-----------------|---------------------------|----------------|--------------------------|
| | Number | % of Total First Choices | Number | % of Total Second Choices | Number | % of Total Third Choices |
| T-bone steak | 90 | 18.3 | 45 | 9.2 | 16 | 3.3 |
| Sirloin steak | 52 | 10.6 | 37 | 7.5 | 15 | 3.0 |
| Rib steak | 27 | 5.5 | 22 | 4.5 | 4 | 0.8 |
| Round steak | 58 | 11.8 | 41 | 8.4 | 28 | 5.7 |
| Miscellaneous steaks | 27 | 5.5 | 22 | 4.5 | 18 | 3.7 |
| Steak unspecified | 39 | 7.8 | 29 | 5.9 | 15 | 3.0 |
| Chuck roast | 21 | 4.3 | 44 | 9.0 | 35 | 7.1 |
| Rump roast | 16 | 3.3 | 21 | 4.3 | 14 | 2.9 |
| Rib roast | 18 | 3.7 | 25 | 5.1 | 16 | 3.3 |
| Miscellaneous roasts | 17 | 3.5 | 27 | 5.5 | 12 | 2.4 |
| Roast unspecified | 52 | 10.6 | 63 | 12.7 | 26 | 5.3 |
| Ground beef | 19 | 3.9 | 27 | 5.5 | 86 | 17.5 |
| Ground round | 17 | 3.5 | 13 | 2.7 | 34 | 6.9 |
| Hamburger | 14 | 2.9 | 29 | 5.9 | 79 | 16.2 |
| Miscellaneous beef cuts and products | 24 | 4.8 | 46 | 9.3 | 93 | 18.9 |
| Total | 491 | 100.0 | 491 | 100.0 | 491 | 100.0 |

T-bone steak was the most popular steak and the most popular beef item mentioned, 90 persons, or 18.3 per cent, mentioning this cut as their favorite. Round steak was second in popularity, 58 people, or 11.8 per cent, selecting this cut; and sirloin steak was third with 52, or 10.6 per cent. A total of 293 persons, or 59.7 per cent of those interviewed, listed steak as their favorite beef cut.

Among the various roasts mentioned, chuck roast was the most popular, by a narrow margin over rib roast. Twenty-one persons (4.3 per cent of the first choices) chose it while 18 chose rib roast. Rump roast followed with 16 choices.

Slightly more than 10 per cent of the consumers interviewed (50 out of 491) selected ground beef or hamburger as their first preference.

Second and third choices showed greater preference for roasts, ground beef, and miscellaneous beef items.

The most common type of answer to this question regarding favorite beef cuts and products would list some type of steak as first choice, a roast as second choice, and either ground beef, hamburger, or some other beef item as third choice. Steaks accounted for 59.7 per cent of the first choices, 39.9 per cent of the second choices and only 19.6 per cent of the third choices.

Roasts made up 25.3 per cent of the first choices, 36.7 per cent of the second choices, and 21 per cent of the third choices. Ground beef and hamburger were the first choice of 10.2 per cent of those people interviewed—made up 14.1 per cent of the second choices, but accounted for 40.5 per cent of the third choices. Other beef cuts and products amounted to 4.8 per cent of the first choices, 9.3 per cent of the second choices and 18.9 per cent of the third choices.

Although the question asked was, "What is your favorite cut of beef or beef product when price is no consideration?" consumers' preferences seem to be conditioned by what they can afford. For example, only 27 per cent of those families having income of less than \$3,000 listed the more expensive steaks as their first preference, while 49 per cent of those families earning \$6,000 per year or more indicated that these steaks were their favorite cuts of beef.

Much the same situation was found for roasts. Regardless of price, only seven per cent of those families with incomes under \$3,000 listed the more expensive roasts as their first preference while 16 per cent of those families in the \$6,000-and-over income bracket indicated that these roasts were their favorite cuts of beef.

Purchasing Habits and Preferences

Sources of Beef Purchased for Day-to-Day Use

Sixty-five per cent of the consumers interviewed said that they purchased their meat at

various supermarkets. Twenty-four per cent patronized small grocers, five per cent specialized meat markets, and the remaining six per cent bought their

meat from locker plants, meat wholesalers, farmers, or other sources.

Sources of Beef Purchased for Home Freezer or Cold Storage Locker

Of those consumers who bought meat for frozen storage, 49 per cent indicated that they bought their meat for this purpose from supermarkets, taking advantage of week-end specials, etc. Ten per cent purchased meat for frozen storage from small groceries, 10 per cent from farmers or ranchers, nine per cent from locker plants, nine per cent from meat packers, five per cent from wholesale meat dealers, and one per cent bought from other sources.

Income seemed to be related to the source of meat purchased for frozen storage. People in the \$6,000 and over income bracket bought only 33 per cent of their meat for frozen storage from supermarkets while that bought by consumers in the \$3,000 and under income class totaled 64 per cent. The higher income group relied more on specialized meat markets, locker plants, and farmers and ranchers, buying 43 per cent of their supplies from these sources as compared to 12 per cent for the lower income group.

Preference for Self-service or Butcher-service Meat Retailing

Sixty-four per cent of the consumers interviewed in Phoenix said that they preferred butcher-service to self-service in buying meats at retail. Thirty-four per cent preferred self-service and two per cent had no preference.

Each person expressing a preference was asked the reason for preferring that particular type

of service. The most important reason given for preferring butcher-service was that such service permits a better variety of cuts and sizes of meats. Thirty-four per cent of those preferring butcher-service gave this as their reason. Next in importance (24 per cent) was that butcher-service meat is fresher. Ability to see the whole piece of meat was the next most important reason (14 per cent), followed by personal confidence in the butcher (13 per cent). Nine per cent thought that butcher-type meat dealers had better meat.

Convenience was the most important reason for preferring self-service (48 per cent). Next was freedom to take time to pick out meat without being subject to sales pressure from the butcher (42 per cent). The only other major reason for preferring self-service was that such service was thought to be more sanitary (5 per cent).

There was no significant difference in preference as to type of service when such preferences were classified by income groups, age, or education of the respondent.

Persons Usually Buying Meat For the Family

Seventy-one per cent of those households interviewed stated that the wife was the person usually shopping for meat for the family. Husbands bought 10 per cent of the total; wives and husbands shopping together, 16 per cent; and other persons, three per cent.

Income seemed to have little effect on who buys the meat, except that in the medium income group there were nearly

twice as many wives and husbands shopping together.

Age affected this shopping pattern only in the group 60 years old and older, where fewer wives did the shopping and more was done by persons other than husband or wife.

Place Where Meat Shopping List Is Determined

Consumers were about equally divided in regard to whether they usually planned their meat purchases before going to the store (52 per cent) or decided after they had reached the store (47 per cent).

There was a slight tendency for those in the highest income group (\$6,000 and over) to plan more in advance, than those in the lower income groups. This tendency was more pronounced when the educational level of the consumer was considered. Fifty-seven per cent of those people with a college education planned in advance while 47 per cent of those with grade school educations planned in advance. The same was true of older people: 59 per cent of the 60 plus age group planned in advance contrasted to only 49 per cent of the under-40 group.

Nearly everyone changed his mind occasionally: only 60 out of the 491 interviewed indicated that they seldom, if ever, changed their meat list after reaching the store.

Table 3 shows the reasons given by consumers for changing their meat list after they had reached the store. While price was the major factor mentioned, the availability, appearance, and quality of the meat for sale were also important factors.

TABLE 3. REASONS FOR CONSUMER CHANGING MEAT LIST AFTER REACHING RETAIL STORE

| Reason | Per cent of total |
|---|-------------------|
| 1. Price or special sales | 40 |
| 2. Availability of meat desired | 16 |
| 3. Appearance of meat | 16 |
| 4. Quality or freshness of meat available | 4 |
| 5. No specific reason | 8 |
| 6. Other reasons | 8 |
| 7. Rarely changes mind | 8 |

Usual Length of Time Between Meat Purchases

Most people buy fresh beef once or twice a week. Over half of the people interviewed in this survey bought meat once a week and another one-fourth, twice a week. Ownership of home freezers or rental of cold storage lockers resulted in a group of consumers who buy meat infrequently, but in larger quantities for frozen storage. Just over five per cent of Phoenix consumers interviewed said that one month or more elapses between their purchases of fresh beef.

Refrigerated Storage Capacity Available

Seventy-two per cent of the households contacted had a refrigerator but no other cold storage space. Seven per cent had a home freezer or cold storage locker but no refrigerator, and 14 per cent had both a refrigerator and home freezer or cold storage locker. Seven per cent reported no refrigeration.

Quantities of Meat Purchased for Frozen Storage

Two-thirds of the consumers having home freezers or cold storage lockers usually purchased retail cuts. Seventeen per cent purchased a side of beef

at a time, 10 per cent bought beef by quarter carcass, four per cent bought wholesale cuts — and only two per cent bought an entire carcass at one time.

Size of family influenced the quantity bought at one time for freezer or locker storage. For example, 27 per cent of families of five or more people buying beef for locker or freezer storage bought beef by the side, while only eight per cent of those families having one or two people purchased in this quantity.

Income too had an effect on quantity purchased. Twenty-five per cent of high income families bought a side of beef at a time; only six per cent of low income families did so.

Preferred Weights of Roasts

Three-pound and four-pound roasts were most commonly preferred. These two weights accounted for about 40 per cent of the preferences. A range of weights from two to five pounds included all but about eight per cent of the preferences found. There was a tendency to prefer heavier standing rib roasts than chuck roasts or rolled boneless roasts.

Number of people in the family influenced the weight of the roast preferred. Considering only chuck roasts, it was found that for families of one or two people, only eight per cent of such families preferred roasts of five pounds or more where 22 per cent of the families with five or more people preferred roasts weighing five pounds or more.

Income too had its effect. Only six per cent of the low income group preferred chuck roasts of five pounds or over, whereas 24 per cent of the high income group indicated a pref-

erence for this weight roast.

Putting size of family and income together, the effects become more pronounced. For low income families of five or more persons, only eight per cent indicated a preference for chuck roast weighing five pounds or more; but for the same size family in the high income group, 41 per cent preferred roasts of five pounds or more.

Preferred Weights of Packaged Hamburger

Packages of hamburger weighing one, two, or three pounds were generally preferred. Thirty-two per cent preferred one-pound packages, a like number two pounds, and 22 per cent three pounds. One and one-half pounds was the only other popular size — preferred by seven per cent.

Whereas the low income families indicated a preference for smaller roasts than high income groups, with regard to hamburger the situation was reversed. For example, where the family consisted of more than five people, 62 per cent of low income consumers preferred hamburger in three-pound packages, but only 38 per cent of the high income group wanted this large package. The same situation prevailed between the two income groups for other sizes of families.

Hamburger was generally available in packages of the weights desired. However, most difficulty was experienced in finding one and one-half and two-pound packages. Twenty-one per cent of the consumers interviewed said that one and one-half-pound packages were not available and 24 per cent said that they could not obtain two-pound packages.

Consumers Preferences and Ideas Concerning Beef Quality

Consumers' Ideas as to What Indicates Quality in Beef

Consumers were asked to describe those factors which they considered most important in determining the desirability of the beef that they purchased. Leanness was the factor most frequently desired in beef, 25 per cent of the people interviewed mentioning this factor (Table 4). Twenty per cent looked for a

bright red or cherry red color of lean. Closely associated with color of lean was the matter of freshness, and this was desired by 13 per cent. Other factors mentioned were grade or quality, general appearance, price, marbling, amount of bone, color of fat, flavor, and aged beef. The importance of these factors can be seen from Table 4.

TABLE 4. FACTORS CONSIDERED MOST IMPORTANT BY CONSUMERS IN DETERMINING THE DESIRABILITY OF THE BEEF WHICH THEY BUY

| Factor Considered | Number | Per cent of Total |
|---|--------|-------------------|
| 1. Lean appearance, or minimum amount of fat..... | 294 | 25 |
| 2. Color of lean, bright red or cherry red preferred..... | 232 | 20 |
| 3. Freshness or juiciness..... | 151 | 13 |
| 4. Tenderness | 136 | 12 |
| 5. Grade or quality | 70 | 6 |
| 6. General appearance | 62 | 6 |
| 7. Price | 45 | 4 |
| 8. Well marbled | 31 | 3 |
| 9. Small amount of bone | 28 | 2 |
| 10. Color of fat | 28 | 2 |
| 11. Flavor | 27 | 2 |
| 12. Well aged | 25 | 2 |
| 13. Other reasons | 29 | 3 |

Consumers' Reaction to Colored Photographs Showing Variation In Beef Quality Factors

Three sets of colored photographs showing variations in beef quality factors were made. Each set included three pictures illustrating three degrees of variation in the quality factor considered. These factors were: (1) marbling, (2) color of fat, and (3) grade. Each set of pictures was shown, and the person being interviewed was asked, "Given these three pieces of beef at the same price per pound, which would you buy for your family?" After a selection had

been made, the consumer was asked the reasons for her selection.

Consumer Reaction to Pictures Showing Variations in Marbling

The photographs appearing on page 13 show the cuts used to illustrate differences in degree of marbling. The picture on the top shows a high degree of marbling, that in the center a moderate amount of marbling, and the one on the bottom, a small amount of marbling. Fifty-nine per cent of the people interviewed picked the cut on the bottom — that is, the one with the least marbling — as the one

which they would prefer for their family. Eighteen per cent selected the cut showing a moderate amount of marbling (center), and 23 per cent picked the highly marbled cut (Table 5).

The most common reason given for selecting a particular cut was that the consumer preferred a limited amount of marbling. Forty-five per cent of the reasons given were of this nature. In contrast, 16 per cent preferred a high degree of marbling for the reason that such marbling made the meat more tender or gave it better flavor. The remaining 39 per cent of the reasons given for selecting a particular cut did not pertain to the factor being considered (marbling) but were: bright red color—seven per cent, looks more tender—six per cent, juicier or fresher—11 per cent, and other reasons, 15 per cent.

There appeared to be a definite relationship between income and preference for marbling in beef. The highly marbled cut was the first choice of only 16 per cent of the consumers in the low income group, but was the first choice of 38 per cent in the high income group. A similar relationship was found with respect to educational level. Only 10 per cent of those consumers who had not gone be-

yond grade school picked the highly marbled cut, whereas 33 per cent of those who had gone to college picked the highly marbled beef. There was a greater tendency (30 per cent) for the 40-60 age group to pick the highly marbled meat, than was found for the under 40-age group (18 per cent) or the 60 and over group (20 per cent).

Consumer Preference for Color of Fat

Phoenix consumers definitely prefer beef with white fat. When shown the color-of-fat pictures illustrated on page 12, 310 out of 491, or 63 per cent indicated that this was their preference. Twenty-five per cent favored creamy fat and 11 per cent liked yellow fat (Table 6).

The major reason given for preferring white fat was that meat with such fat looks fresher. Twenty per cent of all color-of-fat preference reasons were of this nature. Other reasons for preferring white fat were: more appetizing, better flavor, firmer, better grade of meat, meat with white fat is more tender, more wholesome, comes from healthy animal, comes from younger animal, more vitamins in white fat, and white fat is juicier. However, some 21 people stated that

TABLE 5. CONSUMER PREFERENCE FOR MARBLING IN BEEF
(ALL CUTS SAME PRICE PER POUND)

| Amount of Marbling | —First Choice— | | —Second Choice— | | —Third Choice— | |
|-----------------------------|----------------|------------|-----------------|------------|----------------|------------|
| | Number | % of Total | Number | % of Total | Number | % of Total |
| Large amount of marbling | 114 | 23 | 121 | 25 | 257 | 52 |
| Moderate amount of marbling | 89 | 18 | 299 | 61 | 102 | 21 |
| Small amount of marbling | 288 | 59 | 71 | 14 | 132 | 27 |



they didn't think beef with white fat had been properly aged.

Creamy-colored fat was preferred for the reasons that it looks "healthy," has better flavor, means better quality meat, and adds to the flavor of the meat.

Those who preferred yellow fat thought that the meat with such fat was richer, had better flavor, was more tender, better grade, and came from grain-fed beef. The principal objection to yellow fat was that it appeared old or dirty. Other objections were that yellow fat was associated with grass-fed beef, commercial grade beef, strong flavor, and looked half cooked.

There was no pronounced association between preferences with respect to fat color and income, age, or education except that low income groups and groups with only a grade school education were less critical of yellow fat. For example, yellow fat was the first choice of 15 per cent of those people with a grade school education, but was preferred by only nine per cent of those who had attended college.

Consumer Preference for Grades of Beef

Consumers were asked to choose between three pictures (next page) showing choice, good, and commercial beef, assuming that all three cuts were priced the same per pound. There was no indication on the pictures of the grade of beef represented.

Confronted with these pictures, 41 per cent of the consumers selected U S Good as their first preference, 31 per



VARIATIONS IN COLOR OF FAT IN BEEF Yellow — Creamy — White

VARIATIONS IN GRADES OF BEEF



Highly
Marbled



US
Choice



Moderately
Marbled



US
Good



Slightly
Marbled



US
Commercial



VARIATIONS IN MARBLING OF BEEF

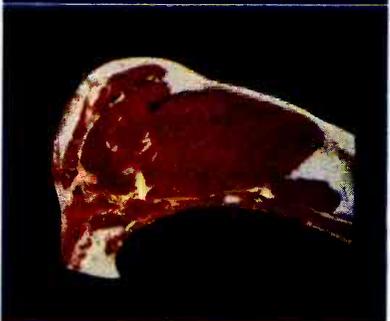
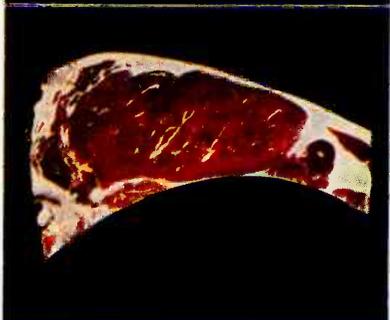
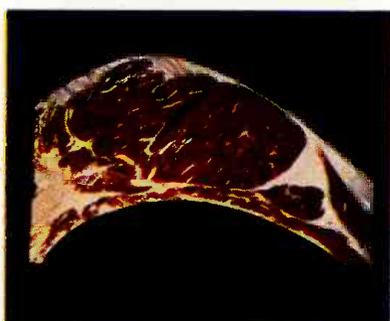


TABLE 6. CONSUMER PREFERENCE FOR COLOR OF FAT IN BEEF
(ALL CUTS SAME PRICE PER POUND)

| Color of Fat | —First Choice— | | —Second Choice— | | —Third Choice— | |
|---------------|----------------|------------|-----------------|------------|----------------|------------|
| | Number | % of Total | Number | % of Total | Number | % of Total |
| White | 310 | 63 | 66 | 13 | 110 | 22 |
| Creamy | 125 | 25 | 333 | 68 | 29 | 6 |
| Yellow | 52 | 11 | 88 | 18 | 348 | 71 |
| No preference | 4 | 1 | 4 | 1 | 4 | 1 |

TABLE 7. CONSUMER PREFERENCE FOR GRADES OF BEEF
(ALL GRADES SAME PRICE PER POUND)

| Beef grade | —First Choice— | | —Second Choice— | | —Third Choice— | |
|---------------|----------------|----|-----------------|----|----------------|----|
| | Number | % | Number | % | Number | % |
| US Choice | 156 | 32 | 161 | 33 | 172 | 35 |
| US Good | 204 | 41 | 181 | 37 | 105 | 21 |
| US Commercial | 131 | 27 | 149 | 30 | 214 | 44 |

cent U S Choice and 27 per cent U S Commercial beef (Table 7).

Consumers were then asked for their reasons for selecting the particular cut which they chose. The most common reason given by those choosing the Good and Commercial grades was that they preferred a limited amount of fat. Color was the next most important grade factor in the minds of these consumers, 79 or 11 per cent preferring a bright red color. Tenderness was next in importance, seven per cent, and was followed by freshness and a preference for marbling, six per cent each. A preference for fine texture accounted for five per cent of the reasons. General appearance, and such factors as amount of bone, color of fat, size of cut, age of beef, etc., made up the rest of the reasons given.

Grade preferences were definitely related to the income and educational status of the person interviewed. Although the question as to which cut of meat was preferred specifically stated that all three cuts were the same price per pound, it was found that only 23 per cent of the low income group selected U S Choice as their first preference, while 40 per cent of the high income group favored this cut. The same relationship occurred when choices of consumers with no more than a grade school educa-

tion were compared with those of consumers having attended college. Only 26 per cent of those people with a grade school education picked U S Choice as their first preference while 42 per cent of the college level preferred this grade.

Age seemed to make little difference with respect to grade preferences except that the 40-60 year group favored U S Choice to a greater extent than the younger or the older group. This difference is probably associated with income, as this age group would tend to have the highest average income.

Dependence on Butchers' Advice for Getting Desirable Beef

About half of the consumers contacted relied to some degree on the butcher's advice for getting good beef. Two hundred thirty-eight said that they did rely on the advice of their butchers for getting desirable meat, and 249 did not.

There was a tendency for people with a college education to rely on the advice of the butcher to a greater extent (53 per cent) than those people with a grade school or high school education (47 per cent). The high income group also placed more reliance on the butcher's advice (56 per cent) than the medium income group (47 per cent) or the low income group (44 per cent).

Older people definitely depended on the butcher's advice to a greater extent (75 per cent) than middle-aged (42 per cent) or young people (50 per cent).

Acquaintance With and Use of USDA Beef Grades

The official United States Department of Agriculture beef grades are: Prime, Choice, Good, Commercial, Utility, and Canner and Cutter. People interviewed in this survey were asked to name as many of these grades as possible. Only 16.5 per cent of those people interviewed were able to name as many as three of these grades, 16.5 per cent could name two, and 16 per cent could name one. The remaining 51 per cent of the consumers were unacquainted with these grades.

There was a direct relationship between the education of the consumers interviewed and their knowledge of these grades. Of those people who had not gone beyond grade school, only three per cent knew as many as three grades, while of those who had gone to college, 30 per cent knew at least three grades.

U S Choice was the grade most commonly mentioned, accounting for 30 per cent of the grades named. U S Good was next with 21 per cent, and was followed by U S Prime, 15 per cent. All of the USDA grades

were named and in addition a variety of other grades were thought to be USDA grades. These were: Grade AAA, Grade AA, Grade A, Grade B, Grade C, Number 1, Number 2, Premium, Select, Standard, Special, Economy, Excellent, U S Consumer, and Government Inspected. Of these, Grade A was named by 70 respondents, and Government Inspected by 14.

Of those persons interviewed, 34 per cent said that they bought meat by grade, 20 per cent were acquainted with grades but did not use them, and the remaining 46 per cent knew nothing about beef grades. Use of grades was related to education, age, and income. Forty-nine per cent of the college educated group bought beef by grade, 37 per cent of the high school group, and only 12 per cent of the grade school group.

Younger people tend to buy more on grade than do older people. Thirty-seven per cent of the under-40 age group bought by grade, as compared to 32 per cent of the 40-60 year group, and 28 per cent of the over-60 group. The influence of income on use of grades was illustrated by the fact that 53 per cent of the high income group used grades, while but 15 per cent of the low income group bought beef by grade.

Beef Preparation and Beef Cookery

The satisfaction obtained from the use of a particular cut of beef often depends on the use of proper methods of cooking that particular cut. In order to get some idea of beef cooking methods used by Phoenix consumers, a series of questions

were asked concerning cooking equipment and methods of beef cookery.

Equipment Used for Cooking Beef

All but one of the 491 households contacted owned an oven,

and of the 490 having an oven, 425 or 87 per cent used the oven for cooking beef. Ninety-six per cent had a broiler and of these, 81 per cent used the boiler for beef. Sixteen per cent had a deep well cooker as a part of their stove, and two-thirds used their cooker for beef. Twenty-eight per cent owned electric roasters and of these 72 per cent used them for beef. Fifty-seven per cent used pressure cookers for preparing beef. Only 14 per cent had a meat thermometer and only two-thirds of them used it for beef.

Preference as to Degree of "Doneness" in Roasts and Steaks

People's tastes vary with regard to how thoroughly they prefer to have their meat cooked. In Phoenix, of those people contacted, 52 per cent preferred their steak well-done, 38 per cent medium, and 10 per cent rare. With respect to roasts, 66 per cent preferred well done, 30 per cent medium, and only four per cent rare. Both income and education influenced the degree of "doneness" preferred. Higher income groups and college-educated consumers had a greater preference for rare and medium degrees of "doneness."

Oven Temperatures Used in Cooking Beef Roasts

Low temperatures (near 300 degrees Fahrenheit) are generally recommended for roasting beef. Twenty-two per cent of the consumers interviewed said that they roasted beef at oven temperatures ranging from 250 to 300 degrees, while 63 per cent used temperatures above 300 degrees. The most common temperature used was 350 degrees

— by 39 per cent of those reporting. Fifteen per cent did not know what oven temperature was used. There was a slight tendency for people with more years of schooling to cook at lower temperatures. For example, 26 per cent of the college-educated group used temperatures of 300 degrees or less, while 22 per cent of those with a grade school or high school education roasted beef at 300 degrees or less.

Another practice sometimes recommended in roasting beef is to start the roast at a relatively high temperature, and then, after a short time, reduce the temperature to around 300 degrees and finish the roasting process. Twenty-five per cent of the persons interviewed followed this procedure. Only six per cent raised the oven temperature as cooking progressed. Fifty-five per cent did not change the oven temperature during the roasting process.

Use of Left-Over Roast

Most families in this survey get about three meals out of a beef roast; the meal at which the roast was first served, plus two additional meals. The most common uses of left-over roast were cold roast and sandwiches. Hash and reheated roast were next in importance, followed by stew and beef pie. A total of 30 different ways of serving left-over beef roast were mentioned.

Use of Juice and Fat Left from Roasting Beef

The principal use of juice from a beef roast was for gravy. Ninety per cent of the consumers interviewed used this juice for gravy. Other uses for juice from

the roast were in soup, in hash, beef and noodles, in dressing, and to serve just as juice.

About half of the people contacted said that they make no use of the fat drippings from a beef roast, but throw the fat away. About eight per cent saved the fat for frying, seven per cent mixed the juice for gravy, and five per cent fed the fat to their dog or cat. Eight people said that they made soap.

Use of Meat Tenderizer

Consumers were asked whether or not they had ever used a powder or a liquid made especially for tenderizing meat. Seventy per cent of those contacted had used such a tenderizer. More people with a grade school and high school education had tried tenderizers than had the college-educated group. Eighty per cent of the group having only a grade school education had tried tenderizers, while only 58 per cent

of the college-educated group had used them.

Consumers who had tried the tenderizers were asked their opinion of them. Of these people 22 per cent said that they liked the tenderizers and thought they were satisfactory. However, 18 per cent felt that tenderizers were generally unsatisfactory, and an additional three per cent said that they were unsatisfactory in that they affected the taste of the meat. Fifty-seven per cent of those who had tried tenderizers had no opinion of them.

Round steak was the cut of beef on which tenderizer was most frequently used. Stew meat and chuck roast were also commonly treated with tenderizer. Many people mentioned that they used the tenderizer on the cheaper cuts. Most of the answers were that they used tenderizer on roasts and steaks in general.

Frequency of Consumer Use of Cuts of Beef and Beef Products

A great variety of cuts of beef and beef products are available to Phoenix consumers. Table 8 shows the frequency with which the people contacted in this survey used various cuts of beef and beef products.

Round steak had been used at some time by more people than any other cut of beef or beef product (by 92 per cent). Ground beef ran a close second with 91 per cent. However, ground beef and hamburger were used more frequently than any other beef product. Sixty-five per cent of the households interviewed stated that they used ground beef

at least once a week, and 42 per cent said they used hamburger at least once a week.

The most popular steaks were round steak, T-bone and sirloin. The most popular roasts were chuck, rump roast, and round bone roast. Ninety per cent said they had used wieners or frankfurters, and 70 per cent had used bologna. Seventy-four per cent had used beef liver, 66 per cent stew meat, and 65 per cent short ribs. Among the processed beef products the most popular were chili con carne (49 per cent), corned beef (46 per cent) and dried beef (42 per cent).

TABLE 8. FREQUENCY OF CONSUMER USE OF CUTS OF BEEF AND BEEF PRODUCTS

| Cut of Beef or Beef Product | Have used | Use every | Use every | Use less |
|---|-----------------|----------------------|-----------------|-----------------------------|
| | at some time | 7 days or oftener | 8 to 30 days | often than every 30 days |
| | per cent | per cent | per cent | per cent |
| STEAKS | | | | |
| Round steak | 92 | 40 | 39 | 13 |
| T-bone steak | 84 | 20 | 40 | 24 |
| Sirloin steak | 75 | 17 | 39 | 19 |
| Rib steak | 58 | 11 | 27 | 20 |
| Cube steak | 58 | 12 | 22 | 24 |
| Sirloin tip steak | 36 | 2 | 14 | 20 |
| Chip steak or steakettes | 31 | 7 | 9 | 15 |
| Club steak | 29 | 4 | 8 | 17 |
| Chuck steak | 24 | 2 | 9 | 13 |
| Flank steak | 23 | 1 | 4 | 18 |
| Fillet Mignon steak | 23 | 1 | 7 | 15 |
| Porterhouse steak | 21 | 1 | 4 | 16 |
| ROASTS | | | | |
| Chuck roast | 85 | 29 | 45 | 11 |
| Rump roast | 66 | 6 | 36 | 24 |
| Round bone roast | 59 | 7 | 33 | 19 |
| Boned and rolled rib roast | 43 | 3 | 14 | 26 |
| Boned & rolled rump roast | 33 | 2 | 13 | 18 |
| Brisket pot roast | 29 | 2 | 12 | 15 |
| Sirloin tip roast | 26 | 1 | 10 | 15 |
| Heel of round roast | 20 | 1 | 5 | 15 |
| SAUSAGE MEATS | | | | |
| Wieners and frankfurters | 90 | 31 | 41 | 18 |
| Bologna | 70 | 28 | 27 | 15 |
| Liverwurst | 51 | 9 | 24 | 18 |
| Salami | 50 | 14 | 20 | 16 |
| Meat loaf | 40 | 9 | 21 | 10 |
| Pressed beef loaf | 27 | 4 | 11 | 12 |
| Thuringer sausage | 16 | 3 | 5 | 8 |
| Fresh beef sausage | 4 | | 2 | 2 |
| MISCELLANEOUS FRESH BEEF CUTS AND PRODUCTS | | | | |
| Ground beef | 91 | 65 | 21 | 5 |
| Beef liver | 74 | 13 | 39 | 22 |
| Stew meat | 66 | 19 | 28 | 19 |
| Short ribs | 65 | 5 | 29 | 31 |
| Hamburger | 65 | 42 | 17 | 6 |
| Tongue | 22 | | 7 | 15 |
| Heart | 21 | | 9 | 12 |
| Ox tails | 14 | | 6 | 8 |
| Kidney | 12 | 1 | 5 | 6 |
| Brains | 12 | 1 | 3 | 8 |
| Sweetbreads | 9 | | 3 | 6 |
| Rolled plate | 8 | | 4 | 4 |
| Tripe | 4 | | 1 | 3 |
| CURED OR CANNED BEEF PRODUCTS | | | | |
| Chili con carne | 49 | 4 | 23 | 22 |
| Corned beef | 46 | 4 | 14 | 28 |
| Dried beef | 42 | 3 | 13 | 26 |
| Canned beef stew | 31 | 3 | 9 | 19 |
| Frozen beef pie | 29 | 3 | 11 | 15 |
| Canned beef | 22 | 2 | 6 | 14 |
| Beef bacon or breakfast beef | 12 | 3 | 3 | 6 |
| Canned beef for babies | 10 | 7 | 1 | 2 |

The cuts most frequently used were, in order of frequency: (1) ground beef, (2) hamburger, (3) round steak, (4) wieners, and (5) chuck roast.

There was a definite relationship between consumer income and the frequency of use of the various beef cuts and beef products.

A much larger percentage of the high income group used steak than was true for the lower income levels. The extreme variation was fillet mignon. Fifty-one per cent of the high income group had used this steak at some time, but only 11 per cent of the low income consumers had ever eaten it.

For T-bone steak, it was found that 92 per cent of the high income group bought this item, but only 75 per cent of the low income group had ever used it. Further, 26 per cent of the high income group had T-bone steak at least once a week, whereas the comparable figure for the low-income consumers was 16 per cent.

Round steak was used in about the same frequency by all income classes, about 90 per cent having used this steak and 40 per cent serving it at least once a week. Chuck steak and flank steak were used to a greater extent by the low income group than by those people in the medium and high income brackets.

A similar use pattern was found in the use of roasts. The more expensive roasts, rib roasts and sirloin tip, were used more frequently by those people in the higher income levels, while the cheaper roasts, chuck and brisket pot roast, were used more often by the lower income groups.

There did not appear to be as extreme variation in the use of roasts as was found for steaks. The greatest variation was found in the use of the sirloin tip roast, 34 per cent of the high income group using this roast and but 16 per cent of the low income group.

Income had little relationship to the use of sausage meats. High income groups tended to use more liverwurst and salami and low income groups used more meat loaf.

The distinction between ground beef and hamburger appeared where use was considered in relation to income. The high income group used more ground beef than the others and the low income group used more hamburger. Among the specialty beef items, only sweetbreads were used with greatest frequency by the high income group. On the other hand, the low income group used more tongue, heart, kidneys, tripe, brains and ox tails than did the others. They also used more stew meat, short ribs, and rolled beef plate.

In the cured or processed beef line, high income groups used more dried beef, beef bacon, and canned beef for babies and low income groups used the most canned beef and canned beef stew. Corned beef, chili con carne, and frozen beef pie were used with about the same frequency by all income groups.

When consumers' use of various cuts of beef and beef products were classified by the educational level of the people contacted, the pattern of use was found to be very similar to that obtained from income classifica-

tion. The apparent relationship between education levels and income earned would seem to account for this similarity.

When use of beef was examined in relation to age of the consumer, it was found that, in general, the young (under 40) and the middle aged (40-60) groups consumed more steak but relatively fewer roasts than did the 60 years and over group. There

was a tendency for the young group to use more processed, or semi-prepared beef items. For example, they used more wieners, more chip steaks, more bologna, more chili con carne, more frozen beef pie, and more canned beef items than did any other age group. The young group also used more hamburger and ground beef than did the others.

Consumer Recognition of Beef Promotion Slogans

The American beef cattle industry is making a concerted effort to induce people to eat more beef. As a part of this program, various cattlemen's associations have used slogans displayed on automobile stickers, roadside signs, and in other places. In an effort to get some idea of how well these slogans are getting across to Phoenix consumers, each person interviewed was asked whether he or she had seen or heard of certain of these slogans. As was to be expected, the slogan "Eat Beef — Keep Slim," originated and used by the Arizona Cattle Growers' Association, was most widely known in Phoenix, 78 per cent of the consumers interviewed stating that they had seen or heard of this slogan. The next most widely known was "Eat More Beef," 65

per cent recognizing this slogan. "Enjoy Beef for Health" was known by 36 per cent of those interviewed, "Eat Beef, Eat Better, Feel Better" by 26 per cent and "Watch Your Curves—Eat Beef" by 23 per cent. Since some people tend to recognize anything that sounds reasonable, a fictitious slogan, "Beef Builds Health," was included in the list. Twenty-seven per cent were sure they had previously seen or heard this slogan.

Consumers are interested in beef and are eager to learn more about selecting meat for use by their family. This study points out the current status of consumer knowledge about and use of cuts of beef and beef products and may serve as a guide for educational programs in the meats field.

SUMMARY AND CONCLUSIONS

From interviews with 491 Phoenix consumers in May, 1955, the following conclusions were obtained:

1. Beef is the favorite meat of Phoenix consumers, 87 per cent favoring beef over any other meat, poultry or fish.
2. T-bone steak, round steak, and sirloin steak, in the order named, were the three favorite beef cuts. Fifth in over-all popularity and first among the roasts was chuck roast. Slightly over 10 per cent of the persons interviewed selected ground beef or hamburger as their first preference.
3. Consumers' preferences are conditioned by what they can afford.
4. About two-thirds of the beef purchased for day-to-day use and about half of that bought for frozen storage, was obtained from supermarkets.
5. Sixty-four per cent of the 491 consumers interviewed stated that they preferred butcher-service to self-service. Better availability of various cuts and sizes and fresher meat were the major reasons given for preferring butcher service. Convenience and freedom to pick out meat without working with the butcher were of primary importance to those preferring self-service.
6. Wives usually bought the meat in 71 per cent of the families contacted.
7. About half of the people usually plan their meat purchase before going to the market, while the other half generally decide at the store. Price or special sales, availability of cuts desired, or appearance of meat were important factors where meat lists were changed after reaching the store.
8. Seventy-five per cent of the families contacted bought fresh meat either once or twice a week.
9. Eighty-six per cent owned refrigerators, and 21 per cent had home freezers or rented a cold storage locker.
10. Three and four pound roasts were most commonly preferred. A range of weights from two to five pounds accounted for all but eight per cent of the preferences stated.

Weight of roast per person in the family tends to be proportioned to family income.

11. Packages of hamburger weighing one, two and three pounds were generally preferred. Low income families bought more hamburger per person than did high income families.
12. Leanness is the characteristic most looked for in beef by Phoenix consumers. Bright red color, and freshness were next in importance among those factors looked for by these consumers.
13. When shown colored photographs illustrating high, moderate, and low degrees of marbling in beef, 59 per cent preferred the cut with the least marbling, 18 per cent the moderately marbled cut, and 23 per cent that with the highest degree of marbling.
14. Phoenix consumers definitely prefer beef with white fat. When shown color photographs illustrating differences in color of fat, 63 per cent picked the cut with the whitest fat.
15. Consumers were asked to choose from three pictures showing cuts of Choice, Good and Commercial beef. Forty-one per cent selected US Good as their preference, 32 per cent US Choice, and 27 per cent US Commercial.
16. Phoenix consumers are generally poorly acquainted with the United States grades of beef. Of the six grades only 16.5 per cent of the Phoenix consumers contacted could name as many as three grades, 16.5 per cent could name two, 16 per cent could name one, and the remaining 51 per cent were unacquainted with these grades.
17. Twenty-two per cent of the Phoenix housewives contacted roasted beef at 300 degrees or lower. The most common temperature used was 350 degrees.
18. Most families got about three meals out of a beef roast.
19. Seventy per cent of those people contacted had used meat tenderizer. Twenty-two per cent thought such tenderizers were satisfactory, 21 per cent thought them unsatisfactory, and 57 per cent had no opinion.
20. Round steak had been used at some time by more people than any other cut of beef or beef product. Ground beef ran a close second. However, ground beef and hamburger were more frequently used than any other beef item.
21. Consumer income, educational status of the consumer and age of the consumer all definitely affected the pattern of use of the various cuts of beef and beef products.
22. The slogan "Eat Beef — Keep Slim" was recognized by 78 per cent of the consumers interviewed.

