THE EFFECT OF WEIGHT AND GRADE ON THE TRIMMED, COOKED AND COOKED EDIBLE PORTION OF RETAIL BEEF CUTS

Thesis for the Degree of M. S.

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Roy Wayne Porter

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By

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AN ABSTRACT

Submitted to the College of Agriculture
Michigan State University of Agriculture and
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MASTER OF SCIENCE

Department of Animal Husbandry

1960

Approved L. J. Bratzler

Roy Wayne Porter

ABSTRACT

The right sides of 27 beef carcasses representing 3 weight groups within each of the grades of standard, good and choice were used in this study. Twenty-five retail cuts were taken from each of these sides according to a standardized procedure, thus, a total of 675 cuts were involved. After removal from the carcass, the cuts were trimmed to 3/8 inch external fat, cooked by one of four methods, immediately after which they were separated into the following components: external fat, intermuscular fat, bone, and lean. Weights of the cuts were taken immediately before and after trimming as well as immediately before and after cooking. Weights were also taken on the cut trimmings and each of the components of the cooked cuts.

The yield of the trimmed retail cut as a percentage of the untrimmed retail cut, cooking yield as a percentage of the trimmed retail cut, and yield of cooked edible portion as a percentage of the trimmed retail cut was calculated for each cut studied. In calculating the yields of cooked edible portion, only the cooked lean of each cut was considered edible. Analysis of variance was carried out on each of these yields for certain of the more important cuts in the carcass to determine whether carcass weight and grade had a significant effect on these yields and to determine the significant differences between these yields from the various cuts included in the statistical analysis.

The results indicated that carcass grade had a highly significant effect on the yields of the trimmed retail cuts as a percentage of the untrimmed retail cuts. An increase in carcass grade was accompanied by

a decrease in this yield for the cuts analyzed statistically. The cuts from standard grade carcasses yielded significantly higher than those from good grade carcasses, which in turn had significantly higher yields than those from choice grade carcasses. Carcass weight had no consistent effect from grade to grade on the yields of the trimmed retail cuts from the untrimmed retail cuts.

Differences in cooking yields attributable to grade were restricted mainly to the cuts which were either broiled or roasted. In both cases, the cuts from choice grade carcasses had the lowest cooking yields. The influence of carcass weight on cooking yield was apparent only in the case of the braised chuck roasts from standard and good grade carcasses, in which case the cuts from the heavier carcasses had higher cooking yields than those from the lighter carcasses. The results of this study seemed to indicate that the main factors affecting cooking losses were cooking method and degree of doneness, and the composition of the trimmed retail cut.

Carcass weight had no significant effect on the yield of cooked edible portion from any of the cuts analyzed statistically. Carcass grade had a significant effect on this yield only in the instance of the broiled cuts, in which case the cuts from choice grade carcasses had significantly lower yields than those from either standard or good grade carcasses. Again, as in the case of the cooking yields, the factors mainly responsible for differences in yields of cooked edible portion seemed to be cooking method and degree of doneness and the composition of the trimmed retail cut.

Considerable differences between cut was found for each of the yields studied. A nomogram is presented as an aid in calculating the cost/lb. of cooked edible portion of any retail cut from the cost/lb. of the trimmed retail cut and the yield of cooked edible portion expected from the particular cut under consideration.

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INTRODUCTION

Meat is the most expensive item in the food budget of many families, and the kind, quality and cut of meat purchased by the consumer is dependent upon his preferences and his economic position. Thus, it is evident that the comparative yield of the cooked edible portion from various retail cuts is of considerable importance.

Jull and Maw (1923) reported the percentage of raw edible portion of various kinds of domestic fowl. Since that time considerable work has been reported on both raw and cooked edible portion of parts and of whole domestic fowl.

Bull (1947) observed that as the grade of beef increased, the percentage of lean in various retail cuts decreased. Wilford and Garrigus (1952) and Kemp et al. (1953) noted the same relationship in the wholesale cuts of lamb. Kropf and Graf (1959) stated that as the carcass grade increased the yield of boneless beef decreased. Callow (1949) indicated that as the cattle carcass increased in weight and hence fatness, the percentage of muscle tissue decreased and this decrease in percentage of lean became progressively less as the carcass weight increased.

The consumer is interested in the amount of cooked edible portion which can be expected from a given retail meat cut. This was the basis for the present study in which the trimmed retail cuts from three weight groups within the grades of choice, good and standard cattle were evaluated for yield of cooked edible lean portion.

This value was reported as the cooked lean percent of the raw trimmed retail cut. It was attempted further to determine if a difference existed in the yield of cooked edible portion of the various retail cuts from different weights and grades of beef carcasses.

REVIEW OF LITERATURE

Poultry

There is considerable information available concerning the yield of edible meat from various kinds of domestic fowl. Jull and Maw (1923) reported the yield of raw edible portion as a percentage of the dressed weight of various kinds of domestic birds. The kinds of bird and their respective yields were: unfattened broilers, 54.27%; fattened broilers, 60.73%; unfattened roasters, 56.86%; fattened roasters, 63.07%; fattened capons, 67.46%; fattened hens, 64.22%; squab guineas, 60.25%; squab pigeons, 73.94%; ducks, 60.17%; geese, 65.07%; turkeys, 66.53%. Broadbent and Bean (1952) observed the yield of raw edible meat as % of eviscerated weight to be 70.4%, 74.2% and 74.2% for chickens, ducklings and turkeys, respectively.

Maw (1939), in a study of the factors influencing market quality in poultry, observed that as the carcass grade of chicken increased, the yield of edible portion increased. In the same study, he reported that the yield of raw edible portion (meat, fat, skin and giblets, excluding neck) as the percentage of chilled dressed weight in the case of cockerels increased as the carcass weight increased, ranging from 51% to 63% for 2 pound to 6 pound carcasses, respectively. Maw noted a sex and class difference in this yield as shown by these average percentages: pullets, 69.5%; capons, 68.6%; and cockerels, 66.3%. Hathaway et al. (1953) also observed that, in general, females yielded a higher percentage of raw edible meat than did males.

Harshaw (1943) reported the proportion of the parts of chicken as a percentage of the dressed weight to be: breast 18.04%; drumsticks 12.57%; thighs 13.85%; neck 4.41%; wings 8.47%; back 16.26%; organs (heart, liver, empty gizzard and abdominal fatty tissue) 5.71%. In the same study Harshaw found that the raw edible portion (excluding skin and bones) was 71.71% for the breasts and 74.90% for the drumsticks and thighs.

Brown and Bean (1952), in a study of different market classes of chickens, reported the average raw edible yield (skin, fat and lean) from five market classes of chickens to be 70.5% of the clean dressed weight. Headley (1948) observed that the amount of edible meat on dressed or drawn turkeys varied directly with weight.

Various information is available on the cooked yield of edible portion in poultry. Maw (1939) observed that the cooked edible yield (meat, skin and fat) of medium sized roasters was 58% of the drawn carcass weight. In a study of eight breeds of chickens, Morrison et al. (1954) cooked the chickens at fifteen pounds pressure for twenty minutes, after which the bones were removed. The remainder was considered edible, the yield according to this method ranged between 67.2% and 69.3%.

In a summary of cooked edible portion yields of poultry and various meats, Alexander and Schopmeyer (1949) included data on various classes of chicken and various cooking methods. They indicated that roasting chickens gave larger yields of cooked muscle than stewing hens in proportion to their ready to cook weight, bone-

in. Harshaw et al. (1941) observed that higher raw weight chickens had higher cooking losses during roasting.

Stotts and Darrow (1953) indicated an influence of breeds on the yield of cooked edible portion. From a study involving four hundred broilers, they concluded that Cornish crossbreds gave consistently higher cooked edible yields and had significantly higher cooked meat-to-bone ratio than purebreds and non-Cornish crossbreds. The cooked edible portion was considered to be the cooked weight with the bone removed.

Tadle et al. (1955) found no difference in the yield of cooked edible meat between different meat-type broiler crosses or between sexes. The birds were cooked in an autoclave for 20 minutes at 15 pound pressure, the cooked edible meat included the skin and giblets but not the neck, tendons, or cartilage. The average yield of cooked edible meat from the broilers studied was 51.3% of their ready to cook weight. They reported that the yields of cooked edible meat for the various parts of the broilers were as follows: heart 67.2%, liver 66.8%, breast 63.4%, gizzard 58.6%, legs and thighs 53.3%, wings 50.0% and back 41.7%.

Snyder and Orr (1953), in a study to determine the market possibilities and yields of goslings dressed at various ages, concluded that the highest yield of cooked edible meat was 51.1%, attained at 12 weeks of age.

In a study of cooked turkey, Alexander et al. (1948) reported the yield of edible portion (muscle, skin plus adhering fat, giblets)

was 53% of the New York dressed weight for Beltsville small white females. In comparing the cooked yields of different weight turkeys, Sweet et al. (1954) found that toms weighing over 20 pounds had the highest cooked meat yield. Alexander et al. (1951) observed that age and sex in turkeys influenced the yield of cooked edible portion. An increase in age beyond 28-30 weeks in females was accompanied by a decrease in yield of cooked edible meat.

Pork

Hankins and Ellis (1943) presented estimates of the values for the amount of edible meat in the whole carcass, ham, loin, full shoulder, bacon, and backfat from 175, 200, 225 and 250 pound hogs. The estimated values for edible meat represented both muscle and fat from trimmed cuts. Bull (1951) reported the average percentage of fat, lean, skin and bone in the various cuts from 161 pork carcasses of approximately 225 pounds live weight. The cuts represented were: fatback, clear plate, ham, picnic, Boston butt, loin (roasts and chops), bacon, spareribs, and neck bones.

Alexander and Schopmeyer (1949) found that loin and rib chops cut 3/4 inch thick yielded 39.4% cooked muscle when fried and 35.5% cooked muscle when braised with no water added. These results were based on one sample of 3 loin and 3 rib chops cooked by each of the two methods indicated. In the same experiment, one sample of pork liver was cooked by each of the two methods, yielding 74.5% when fried and 76.2% when braised with no water added. These yields were

based on ready to cook weights, and in the case of the chops the ready to cook weight included bone.

In a study of cooked edible portion of smoked hams, Alexander and Hankins (1952) found that dry cured hams cooked to 76°C internal temperature averaged 50% edible portion (muscle and intermuscular fat) of the weight of the baked ham, and 43% cooked edible portion of the weight before cooking. They indicated that in both dry and commercially cured hams cooking losses varied directly with moisture content.

Leverton and Odell (1958) evaluated the percentage of cooked lean, marble, fat and waste portions of 9 cuts from 3 different sides of pork. The lean was divided into two portions; extremely lean, with no visible fat and the lean marbled with fat portion.

Lamb

Hankins and Foster (1940) determined the percentage of fat, lean, edible portion (fat and lean), bone and ligament in the primary cuts of 51 lamb carcasses representing 6 different market grades. The percentage of edible portion and fat increased and the percentage of lean decreased with an increase in grade.

Hankins (1947) reported the average percentage of fat, lean and bone in 64 dressed lamb carcasses to be 25.25%, 53.00%, and 21.75%, respectively. Average percentages of these components were reported for the breast, leg, loin, neck, rib, and shoulder cuts from the carcasses.

Bull (1951) reported the percentage of fat, lean and bone in the cuts from 27 prime, 44 choice and 22 good lambs. As grade increased, the percentage of fat increased and the percentage of lean decreased in the cuts.

Wilford and Garrigus (1952) noted the same relationship, indicating a tendency for good carcasses to contain more lean and choice carcasses a larger percentage of fat. Kemp et al. (1953) reported similar results, also noting an increase in leg, shoulder, neck, and foreleg and a decrease in loin, rack, kidney fat, breast and flank as a percentage of the carcass with a decrease in grade.

The effect of cooking temperature and carcass grade on losses during roasting of lamb and mutton legs was studied by Alexander and Clark (1943). They observed that lower cooking temperatures caused smaller cooking losses and that higher grade lamb and mutton had higher cooking losses. Leverton and Odell (1958) reported the percentage of cooked lean, marble, fat and waste portions of various cuts from 4 different lamb carcasses.

Beef

Hankins and Foster (1940) determined the average content of separable fat, lean, edible meat and bone of the carcasses and each of 11 primary cuts from the choice, good, commercial, and utility grades of dressed steers. Data from 71 cattle were represented, and showed an increase in percentage fat and edible portion and a decrease in percentage lean in the carcass and each of the cuts as carcass grade increased. Hankins and Howe (1946) reported the average

percentage fat, lean and bone in 84 steer carcasses to be 23.77%, 58.27% and 17.98%, respectively. In the same experiment, average percentage of fat, lean and bone in 36 heifer carcasses was determined to be 29.16%, 55.75% and 15.10%, respectively, indicating a larger percentage of fat and a smaller percentage of lean in heifer than in steer carcasses.

Bull (1947) indicated that as the grade of beef increased the percentage of lean in the retail cuts decreased. Physical composition of the various retail cuts was determined for 15 prime, 12 choice, 16 good, 15 commercial and 8 utility carcasses.

Callow (1949) stated that as the cattle carcass increased in weight and hence, fatness, the percentage of muscle decreased, this decrease became progressively less as the carcass weight increased.

Pierce (1957) reported a portion of a study to determine the relationship of certain carcass characteristics of beef to the yields of wholesale and retail cuts. He observed higher wholesale yields of short loin, rib, flank, brisket, plate and hindquarter and lower yields of round, sirloin, chuck and foreshank as finish grade and fat depth increased. Higher conformation grade indicated a higher yield of round, short loin, rib, brisket and foreshank but lower yields of sirloin, chuck, flank, plate and hindquarter. Heavier carcasses had more chuck, rib, flank, brisket and plate than lighter carcasses, but lower yields of other cuts.

Kropf and Graf (1959) indicated that the yield of boneless beef and percentage of fat increased as carcass grade increased when

commercial, good and choice carcasses were compared. Steer, cow and heifer carcasses in that order showed decreasing boneless beef yield and an increase in percentage of fat.

Bull et al. (1930) found heifer ribs to be fatter than steer ribs and when they were cooked, the total cooking losses were greater for the fatter ribs. Paul and McLean (1946) in their studies on veal, observed that cooking losses and cooking time both increased as the internal temperature of the cut increased. They also observed large variations in cooking losses among the different muscles tested and a slight increase in cooking loss as the size of the animal increased. In an earlier experiment with beef roasts, Satorius and Child (1938) observed variations in cooking losses from different muscles. They found no difference between total cooking losses between grades but found greater total cooking losses in cows than in steers.

Alexander and Clark (1939), in a series of experiments involving 595 rib roasts, found less shrinkage due to evaporation and larger drip losses in rib roasts from the higher grades of beef. Standing rib roasts shrank less and cooked more rapidly than boned rolled roasts, and of the factors studied, cooking temperature had the greatest influence on shrinkage and cooking time. These results were confirmed by Chappell (1954) who also observed an increase in cooking losses with increased cooking temperature and increased cooking time. Clark and Van Duyne (1949), in a comparison of cooking methods, found that roasts cooked in a pressure saucepan had signi-

ficantly greater losses in drip and total cooking losses than those roasted in an oven.

Alexander and Schopmeyer (1949), using paired cuts from both sides of a choice steer, found that third and fifth chuck ribs yielded 36.9% cooked muscle when braised with water added and 35.1% cooked muscle when braised without added water based on ready to cook weight. The same paired cuts from another carcass yielded 35.5% and 37.1% cooked muscle when braised with and without water, respectively, based on their ready to cook weight. They found that calf liver yielded 67.0% when fried and 66.8% when braised without water and beef liver yielded 67.9% when fried and 61.0% when braised without water. They concluded that as a group, yields of cooked muscle of stewing hens, beef chuck, and pork chops were similar, ranging from 33% to 39% of their ready to cook weight, bone-in. Also, liver yielded an average of 69% of its weight before cooking, based on calf, beef, and pork liver.

Paul et al. (1950) studied the effect of boning on cooking losses in cattle from commercial, good, and choice grades and found no significant differences in cooking losses. When cooked to an internal temperature of 58°C they found the cooking losses expressed as percentage of bone-in raw weight of the following cuts to be: club steak 14.8%, porterhouse steak 14.1%, sirloin steak 14.7%, rib roast 18.1%, chuck arm roast 36.4%, chuck rib roast 31.5%, rump roast 28.0% and short ribs 26.3%.

Lowe et al. (1952) observed boneless roasts to have larger cooking losses than bone-in roasts, which agreed with the findings

of Alexander and Clark (1939). In the case of pot roasts, Lowe et al. (1952) found that the greatest cooking losses had occurred by the time the internal temperature reached 90°C and that continued cooking beyond this point only slightly increased the cooking losses. They also found the cooking losses in the case of broiled steaks and chops to vary with oven temperature which was in agreement with Chappell (1954) and Alexander and Clark (1939).

Day (1953) compared the cooking losses of the Longissimus dorsi muscle and the cost of both raw and cooked edible meat represented by this muscle from utility, commercial, and good grades of beef carcasses. No difference attributable to grade was found in the average total cooking weight losses, volatile, or drip losses. Based on this one muscle, cost of a given edible portion increased with grade on both raw and cooked basis.

Aldrich and Lowe (1954), in comparing different grades of beef rounds, observed no difference in cooking losses between choice and good grades. However, they found highly significant differences in cooking losses of different muscles in the round. Total cooking losses for all cuts and grades cooked to 90°C internal temperature averaged 34.5%.

Toepfer et al. (1955), in a study of boneless beef, found that plate waste was 38% more in the case of serving untrimmed cuts as against serving trimmed cuts. In each instance the cooked yield of boneless beef averaged about 65% of its raw weight.

Leverton and Odell (1958) reported the percentage of cooked lean, marble, fat and waste portions in the retail cuts from three different veal and three different beef carcasses.

A summary of cooked edible yields of the various kinds and classes of meats has been reported by Pecot and Watt (1956). The results of considerable unpublished as well as published information were compiled in this report.

EXPERIMENTAL PROCEDURE

I Source of Carcasses

The right sides from 27 beef carcasses were used in this study. Three grades; standard, good and choice were represented as well as 3 weight groups within each grade (table I). The carcasses were selected to be near the middle of their weight groups and to represent the average of their respective grades. The carcasses were all federally graded and were purchased from local packers. Steer carcasses were selected in all cases except in the standard 300/400 pound group, where only heifer carcasses were available.

Table I

Distribution of Carcasses By Grade and Weight

Grade	Weight Group	Number
USDA Choice	500/600	3
	600/700	3
	700/800	3
USDA Good	400/500	3
	500/600	3
	600/700	3
USDA Standard	300/400*	3
	400/500	3
	500/600	3

*Group consisted of heifer carcasses.

II Cutting Procedure

The sides were cut into wholesale cuts according to the procedure outlined by Wellington (1953) except for some slight modifications. After removing the rib and shortplate, the brisket and foreshank were

separated from the chuck by cutting on a line just above the bony rise (lateral condyle of the humerus) and parallel to the top of the chuck, thus a square cut chuck was obtained. The round was removed by cutting just behind and parallel to the aitch bone (canner style). Weights were obtained on the quarters and wholesale cuts on a dial pan scale to the nearest .1 pound.

The retail cuts were cut from their respective wholesale cuts, weighed, trimmed to 3/8 inch external fat thickness where necessary and in certain indicated instances, had bone and lean removed. The trimmed retail cuts were then weighed and the fat trim, bone trim and in certain cases, the lean was reweighed for each cut, all weights being taken to the nearest .05 pound on a dial pan scale.

Short ribs were removed from the wholesale rib by cutting from a point on the 12th rib 6 inches from the split vertebra body and parallel with the vertebra column.

From the rib, a 7th and 8th rib standing rib roast, a $1\frac{1}{2}$ inch 9th rib steak and a 10th and 11th rib standing rib roast were removed and weighed separately. The external fat was trimmed to 3/8 inch thickness and the fat trim weighed separately for each cut. The vertebra body was removed and weighed for each cut and in the case of the standing rib roasts, the ribs were sawed through close to the rib-vertebra junction before the cuts were reweighed.

From the shortplate, 3 inch shortribs were cut from the 9th, 10th, 11th, and 12th ribs. The brisket was boned and an 8 inch piece cut from the anterior end. A 2 inch crosscut shank slice was cut from the center of the foreshank.

A 3 rib English corner was removed from the chuck by cutting 2/5 of the distance from the vertebra body to the end of the 5th rib and perpendicular to the top of the chuck, the other cut being made as close to the 3rd rib as possible. The 3rd rib was removed from the English corner and the remaining 4th and 5th rib English corner was used.

Parallel to the cut made in removing the foreshank and brisket, two 2 inch chuck arm roasts were cut adjacent to each other. Each roast was separated at the heavy fat seam just above the cross-cut ribs, and this exposed fat as well as the external fat covering was then trimmed to 3/8 inch thickness. The fat and lean adhering to the removed cross-cut ribs was then separated.

After squaring the blade face of the chuck, three 2 inch blade roasts were removed. The 3rd and 5th rib blade roasts were then cut across the rib, perpendicular to and even with the end of the blade bone and the vertebra body removed. From the neck, 2 pounds of 1 inch cubes were cut for stew.

The anterior face of the shortloin was first squared, then a $1\frac{1}{2}$ inch club steak removed and the vertebra body sawed off. After squaring the other end of the shortloin, two $1\frac{1}{2}$ inch porterhouse steaks were removed, the first one including the 5th lumbar vertebra. In the second porterhouse steak, the Longissimus dorsi muscle was boned out as a strip steak. The tenderloin was also removed from the second porterhouse steak.

Three $1\frac{1}{2}$ inch steaks were taken from the sirloin; wedgebone, doublebone, and pinbone sirloin steaks. After both faces of the

sirloin was squared, a 1½ inch wedgebone steak was removed first, then a 1½ inch pinbone steak from the opposite end followed by the removal of a 1 inch steak and then a 1½ inch doublebone steak. After removing the flank steak from the flank, the silver skin was removed and the steak weighed.

The sirloin tip, or knuckle, was removed from the canner style round and a 1 inch sirloin tip steak removed from the anterior face. A 3/4 inch full round steak (minus tip) was then cut from the remaining round. A heel of round roast was removed from the round by cutting parallel with the face of the round at the largest part of the stifle joint and parallel to this cut at a point approximately 6 inches below it toward the hock. The remaining round was then separated into top and bottom round, a 3/4 inch top round steak and a 1 inch bottom round steak were then removed from the anterior face.

The cutting was done by one individual in the MSU meats laboratory. Each side was cut and the cooking data obtained before preceeding to the next side. The cuts were stored at 3.3°C for approximately 10 hours before transfer to the Foods and Nutrition Laboratory for cooking.

III Cooking

Four cooking methods were utilized: braising, broiling, roasting and simmering, for the various cuts studied. The cuts were kept in a 3.3°C cooler while waiting to be cooked. Before cooking, the weight of the cut was obtained, as well as the combined weight of the cooking utensil and rack for each cut.

All braising was done according to the method suggested by Paul and Bean (1956), except that 100 ml. of water was added to each cut after browning. Heavy cast iron skillets and dutch ovens were used with tight fitting cast iron or glass covers. Browning of the cuts was accomplished on top of an electric range and the cooking was done in large gas heated ovens.

In the broiling procedure, the cut was first weighed, then placed on a rack in a shallow pan which was previously weighed. A cooking thermometer was then placed as near as possible to the center of the largest muscle. The broiling was done in an electric oven at 177°C with the door slightly open to vent the oven and the cut was 8 inches from the heat source. When the internal temperature of the cut reached 35-40°C, the cut was turned over and broiled until the internal temperature reached 58°C.

Roasting was done by placing the weighed cut fat side up on a rack in a shallow pan which was previously weighed. A meat thermometer was then inserted into the center of the largest muscle after which the cut was placed in a gas oven preheated to 163°C. The internal temperature of the roasted cuts was allowed to reach 76°C.

Simmering was accomplished by weighing the cut and then browning in a previously weighed cast iron skillet. Browning of the cross-cut shank was done the same as for the braised cuts. However, the 1 inch neck cubes were turned until they were completely browned. After browning, 200 ml. of water was added, a tight glass lid applied and the cuts were cooked for $2\frac{1}{2}$ hours at 82°C on top of an electric range.

A total of 25 cuts from the right side of each carcass studied was cooked by 4 different methods (table II).

Table II

Cooking Methods Used For The Various Cuts

Cut	Cooking method
3rd rib chuck blade roast	braise
5th rib chuck blade roast	braise
1st chuck arm roast	braise
2nd chuck arm roast	braise
2 rib English Corner	braise
sirloin tip steak	braise
flank steak	braise
full cut round steak minus tip	braise
top round steak	braise
bottom round steak	braise
heel of round roast	braise
9th, 10th, 11th, 12th short ribs from plate	braise
boneless brisket roast	braise
9th rib steak	broil
club steak	broil
porterhouse steak	broil
tenderloin steak	broil
boneless strip steak	broil
pinbone sirloin steak)	broil
double bone sirloin steak)minus tip	broil
wedgebone sirloin steak)	broil
7th and 8th standing rib roast	roast
10th and 11th standing rib roast	roast
cross-cut foreshank	simmer
1 in. cubes from neck	simmer

After reaching the desired degree of doneness each cut was weighed as soon as possible and the weight of the pan, rack, and drippings obtained. All external fat was removed and weighed, the intermuscular fat and bone were removed and weighed separately. The remaining cooked lean was weighed as cooked edible portion. All weights were obtained to the nearest .01 pound.

Analysis of variance was carried out in accordance with Snedecor (1956) on certain of the retail cuts for: yield of trimmed retail cut from the untrimmed retail cut, cooking yield of the trimmed retail cut, and yield of cooked edible portion from the raw trimmed retail cut.

RESULTS AND DISCUSSION

Table III contains the means based on 27 carcasses of the following 3 yields for the 25 cuts studied: yield of trimmed retail cut (expressed as % of the untrimmed retail cut), cooking yield (expressed as % of the trimmed retail cut), yield of cooked edible portion (expressed as % of the trimmed retail cut). The trimmed retail cuts in this study resembled as closely as possible those offered to the consumer in retail markets in the midwest area. The cooked edible portion of each cut represents the cooked lean only, thus serving as a standard basis for the portion of each cooked cut to be termed "edible" and to satisfy the most discriminative consumer. Therefore, the cooking yield and yield of cooked edible portion found in this study are quite comparable to those which a consumer could expect from a cut purchased in a retail market.

Yield of trimmed retail cut (expressed as % of the untrimmed cut)

The yields of the trimmed retail cuts indicates the relative amount of trimming required for the various retail cuts from carcasses of different weights and grades. Table IV indicates the manner in which the cuts were grouped to facilitate consideration of this yield. The yields of the cuts in group A were not statistically analyzed because either they required little or no trimming, or they represented the retail cuts of lesser importance in the beef carcass. The yields of the cuts included in group B were combined in an analysis of variance, and the yield of round steak (group C) was considered separately in an analysis of variance because it yielded considerably higher than the cuts included in group B.

Table III

Means of the 27 carcasses for the following yields of the retail cuts studied: yield of trimmed retail cut, cooking yield, and yield of cooked edible portion

Cut	Yield of trimmed retail cut (%)	Cooking yield (%)	Yield of cooked edible portion (%)
Round steak	98.5	62.1	48.1
Wedge bone sirloin steak	95.7	81.7	59.7
Double bone sirloin steak	94.5	80.5	52.1
Pin bone sirloin steak	90.5	81.5	51.0
Porterhouse steak	87.7	77.3	55.0
9th rib steak	91.2	78.9	50.5
Club steak	85.4	77.1	49.6
7th and 8th rib roast	94.1	72.4	42.8
10th and 11th rib roast	91.4	71.5	44.1
1st arm chuck roast	84.9	64.4	47.4
2nd arm chuck roast	77.0	64.2	45.6
3rd rib chuck roast	93.4	68.2	42.4
5th rib chuck roast	93.8	68.8	40.9
2 rib English Corner	99.6	71.1	37.4
Strip steak	89.4	74.4	64.9
Tenderloin steak	100.0	79.9	79.9
Sirloin tip steak	95.6	59.6	46.5
Flank steak	98.4	61.1	58.9
Top round steak	97.1	58.3	53.3
Bottom round steak	98.7	60.1	53.6
Heel of round pot roast	99.7	65.4	53.8
Boneless brisket	91.0	67.8	43.8
Shortribs	96.3	77.0	34.2
1 inch neck cubes	100.0	63.6	63.6
Cross-cut foreshank	100.0	72.3	44.8

Table IV

Distribution of the retail cuts within the groups utilized in considering the yield of the trimmed retail cut

GROUP A	GROUP B	GROUP C
tenderloin steak	pinbone sirloin steak	round steak
boneless strip steak	wedge bone sirloin steak	
top round steak	double bone sirloin steak	
bottom round steak	7th and 8th standing rib roast	
flank steak	10th and 11th standing rib roast	
sirloin tip steak	3rd rib chuck blade roast	
2 rib English corner	5th rib chuck blade roast	
heel of round roast	1st chuck arm roast	
boneless brisket roast	2nd chuck arm roast	
9th, 10th, 11th, 12th short-ribs from plate	9th rib steak	
1 in. cubes from neck	club steak	
cross cut foreshank	porterhouse steak	

The grade means of this yield for each of the cuts included in Group A are presented in table V. Aside from those cuts which required no trimming, there was generally more trimming necessary for the cuts from higher grade carcasses.

Table V

Grade means of the yield of trimmed retail cut for the cuts included in Group A

Cut	Standard	Good	Choice
	(%)	(%)	(%)
Tenderloin steak	100.0	100.0	100.0
Boneless strip steak	93.7	91.7	82.9
Top round steak	97.7	97.9	95.8
Bottom round steak	100.0	98.4	97.8
Flank steak	99.3	98.9	96.9
Sirloin tip steak	97.7	93.8	95.2
2 rib English corner	100.0	99.7	99.3
Heel of round pot roast	100.0	99.4	99.7
Boneless brisket	93.9	90.1	88.9
Short ribs	99.4	96.4	93.2
1 inch neck cubes	100.0	100.0	100.0
Cross-cut foreshank	100.0	100.0	100.0

Grade and cut means of this yield, together with their standard errors for the cuts included in group B are presented in Figure I. Examination of the relative yields of the various cuts in group B, as indicated by the cut means (Figure I) revealed a tendency that as the region of the loin in the carcass was approached from either end, an increasing amount of trimming was required for the retail cuts. This is evidenced by the decreasing yield of trimmed retail cut obtained as one proceeds anteriorly from the wedge bone sirloin steak (95.7%) to the double bone sirloin

steak (94.5%)and further to the pin bone sirloin steak (90.5%) and the porterhouse steak (87.7%). In addition, a decrease in the yield of the trimmed retail cut was noted as one proceeds posteriorly from the 7th and 8th rib roast (94.1%) to the 10th and 11th rib roast (91.4%), and also from the 9th rib steak (91.2%) to the club steak (85.4%). An examination of the relative yields of the 4 chuck roasts included in group B indicated that much more trimming was required for the arm chuck roasts than for the blade chuck roasts. However, it must be realized that the arm chuck roasts had some lean removed from them during trimming. The 2nd arm chuck roast yielded considerably less than the 1st arm chuck roast which can be attributed to a larger amount of intermuscular (seam) fat in the 2nd arm chuck roast than in the 1st arm, chuck roast which was observed throughout the study. On comparison of the standard errors of the means of the cut yields, it was noted that the mean yields of the cuts which required the most trimming, generally had the higher standard errors.

These cuts (group B) were combined into a single overall analysis of variance of this yield (table VI) which indicated a highly significant difference between the mean yields of the various cuts. As indicated in Figure I, no significant difference was found between the mean yield of the wedge bone sirloin steak (95.7%), double bone sirloin steak (94.5%), 7th and 8th rib roast (94.1%), 5th rib chuck roast (93.8%), and 3rd rib chuck roast (93.4%). Of these cuts, all except the 3rd rib chuck roast had significantly higher mean yields than that of the 10th and 11th rib roast (91.4%), which itself was not significantly higher than that of the 9th rib steak (91.2%), or of the pin bone sirloin steak (90.5%).

However, the mean yield of the 3rd rib chuck roast was significantly higher than that of the pin bone sirloin steak. All of the aforementioned cuts had a significantly higher mean yield than that of the porterhouse steak (87.7%) which was significantly higher than that of the club steak (85.4%), which itself was not significantly higher than that from the 1st arm chuck roast (84.9%). The mean yield of the 2nd arm chuck roast (77.0%) was significantly less than that of all of the other cuts included in group B.

From the combined analysis of variance of the yield of these cuts (table VI), a highly significant difference was noted between the grade means of this yield for the cuts in group B. The mean yield of these cuts from standard grade carcasses (92.4%) was significantly higher than that from good grade carcasses (90.4%), which itself was significantly higher than that from choice grade carcasses (87.1%). Here, as in the cuts in group A, more trimming was necessary for the cuts from higher grade carcasses. However, this is what one would expect since a larger amount of external fat is generally associated with carcasses of the higher grades.

No significant interaction was found between cuts and carcass weights within grades, suggesting that the ranking of the cuts according to this yield was the same in each carcass weight group studied. Similarly, no significant interaction was found between cuts and grades, so the ranking of the cuts according to this yield was the same in the 3 grades studied. However, a significant difference was indicated between the yield of these cuts from different weight carcasses within the grades (table VI).

FIGURE I

Grade and cut means of the yields of trimmed retail cuts (expressed as % of the untrimmed retail cut) for the cuts included in group B, together with their standard errors and significant differences between the cut means.

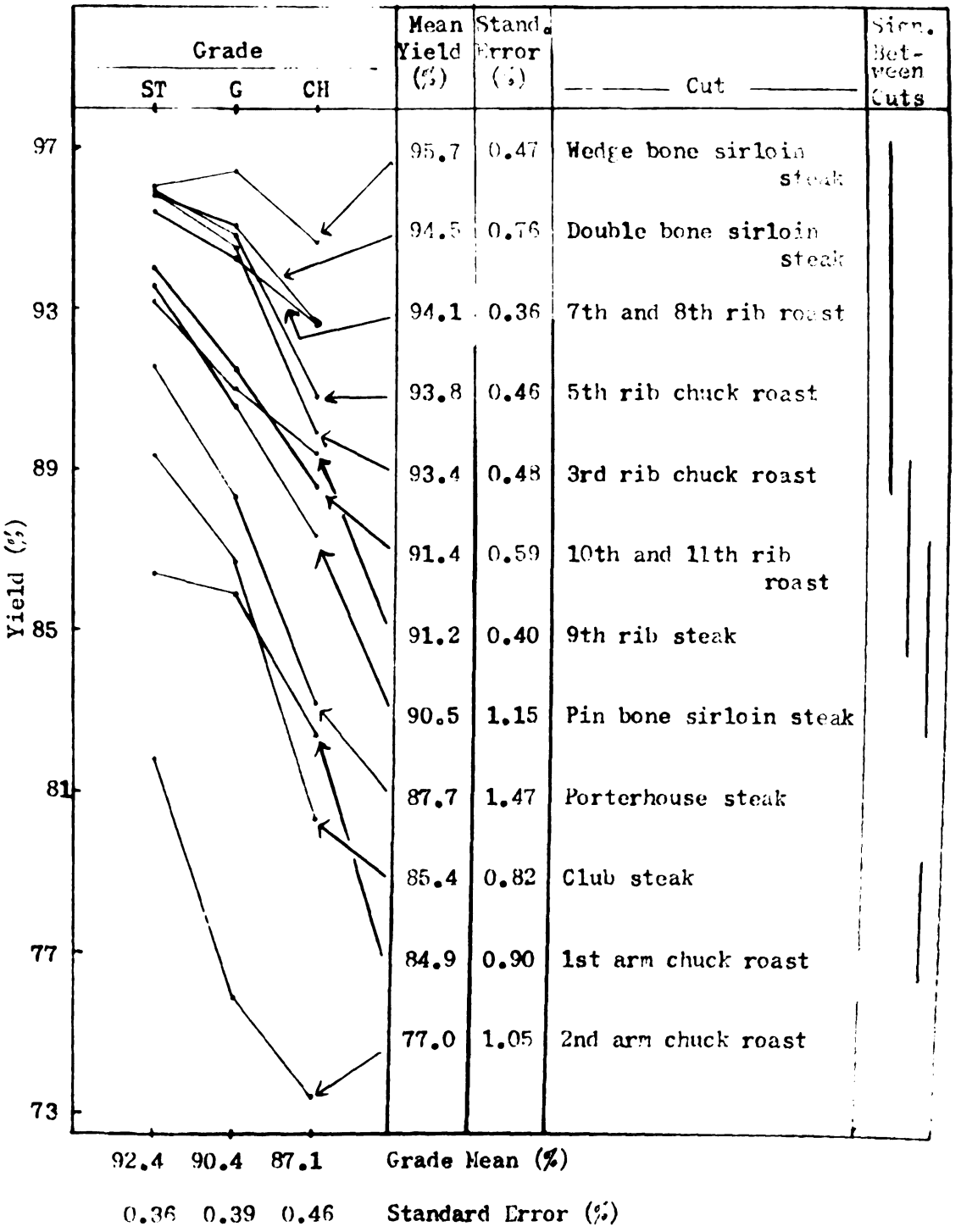


Table VI

Combined analysis of variance of the yield of trimmed retail cuts for the cuts in group B from carcasses of different weights and grades.

Source of Variance	Degrees of Freedom	Sum of Squares	Mean Square	F
Between grades	2	1545.41	772.70	14.0[1]**
Between weights (within grade)	6	330.12	55.02	3.4[2]**
Between cuts	11	8634.63	784.97	48.6[2]**
Cuts X grades	22	358.26	16.28	N.S.
Cuts X weights (within grade)	66	683.73	10.36	N.S.
Error	216	3864.83	17.89	
Pooled error	304	4906.82	16.14	
Total	323	15417.10		

1/Tested against between weights (within grade) mean square.
2/Tested against pooled error mean square formed from the Error, Cuts X weights (within grades) and Cuts X Grades.
**significant at p = .01 level.

Means of the yields of the cuts included in group B from different carcass weight groups within each grade, together with their standard errors and indications of significant differences between the means where they occur, are presented in table VII. Separate analyses of variance for each grade indicated a significant difference in the mean yield of these cuts from different weight carcasses within the grades of good and choice, but not within the grade of standard. These analyses appear in table XIII. Within the good grade the mean yield of these cuts from 400/500 lb. carcasses (91.7%) was significantly higher than that from 600/700 lb. carcasses (89.0%), but the yield from 500/600 lb. carcasses (90.6%) was not significantly different from that of the other 2 weights.

In the choice grade the mean yield of these cuts from 700/800 lb. carcasses (88.2%) was not significantly different than that from 500/600 lb. carcasses (87.8%), however, both were significantly higher than that from 600/700 lb. carcasses (85.4%). Within the standard grade no significant difference was found between the mean yield of these cuts from 300/400 lb. carcasses (92.8%), 500/600 lb. carcasses (92.7%), and 400/500 lb. carcasses (91.7%). There was, therefore, no consistent relationship indicated from grade to grade in the mean yield of these cuts from different weight carcasses. From the pooled error in the analyses of the yield of these cuts from each grade, it was noted that the variability in the yield of a particular cut from carcasses of the same weight was of the same order of magnitude in each grade (table VIII).

Table VII

Means of the yield of trimmed retail cuts for the cuts included in group B from the different carcass weight groups within each grade, together with their standard errors and indications of significant differences between the means.

Standard			Good			Choice		
Carcass wt. group	Mean yield %	Sign. Diff.	Carcass wt. group	Mean yield %	Sign. Diff.	Carcass wt. group	Mean yield %	Sign. Diff.
300/400	92.8		400/500	91.7		700/800	88.2	
500/600	92.7		500/600	90.6		500/600	87.8	
400/500	91.7		600/700	89.0		600/700	85.4	
Standard error of mean (%)	0.59			0.65			0.76	

Table VIII

Analysis of variance of the yield of trimmed retail cuts from different weight carcasses within each grade for the cuts included in group B.

Source of variance	Degrees of freedom	Standard			Good			Choice		
		Sum of squares	Mean square	F	Sum of squares	Mean square	F	Sum of squares	Mean square	F
Between weights	2	27.58	13.79	N.S.[1]	135.26	67.63	4.5[1]*	167.28	83.64	4.0[1]*
Between cuts	11	1998.18	181.65	14.4[1]**	3224.51	293.14	19.5[1]**	3770.20	52.36	2.5[1]**
Cuts x weights	22	158.46	7.20	N.S.	233.69	10.62	N.S.	291.58	13.25	N.S.
Error	72	1026.83	14.26		1179.69	16.38		1658.31	23.03	
Pooled error	94	1185.29	12.61		1413.38	15.04		1949.89	20.74	
Total	107	3211.07	---		4773.24	---		5887.38	---	

1/Tested against pooled error mean square formed from Error and Cuts x Weights.
N.S. = non-significant at p = .05 level.
* significant at p = .05 level.
** significant at p = .01 level.

Grade and carcass weight group means of the yield of trimmed round steak, together with their standard errors and indications of significant differences between the means where they occur, are presented in table IX. No significant difference was indicated between the mean yield of round steak from different grades when the grades were combined into a single analysis of variance of the yield of this cut (table X). Thus, the mean yields of round steak from standard grade carcasses (99.3%), good grade carcasses (99.2%), and choice grade carcasses (96.9%) were not significantly different (table IX). However, the analysis of variance showed a highly significant difference between the mean yield of round steak from different weight carcasses within the grades. Separate analyses of variance for each grade indicated that this was due to a significant difference between the mean yield of round steak from different weight carcasses within the choice grade (table XI). Within this grade (table IX) the mean yield of round steak from 500/600 lb. carcasses (98.6%) was significantly higher than that from 700/800 lb. carcasses (97.0%), which itself was significantly higher than that from 600/700 lb. carcasses (95.2%). It was the author's observation that, in general, the carcasses from the 700/800 lb. weight group in the choice grade were well muscled, and only a lack of finish kept them from being placed in the prime grade. This may account for the relatively high yield of trimmed retail cuts including the round steak from the carcasses of this weight group in the choice grade. There were no significant differences in the mean yield of round steak from different weight carcasses within the grades of standard and good (tables IX, XI). Here, as for the cuts in group B, the variability in the yield of round steak was of the same order of magnitude within each grade as noted from the error terms of the analyses presented in table XI.

Table IX

Grade and carcass weight group means of the yield of trimmed round steak, together with their standard errors and indications of significant differences between the means.

Standard			Good			Choice		
Carcass wt. group	Mean yield (%)	Sign. Diff.	Carcass wt. group	Mean yield (%)	Sign. Diff.	Carcass wt. group	Mean yield (%)	Sign. Diff.
300/400	100.0		400/500	100.0		500/600	98.6	
500/600	99.3		500/600	100.0		700/800	97.0	
400/500	98.4		600/700	97.7		600/700	95.2	
Standard error of weight group mean (%)	0.62			0.66			0.52	
Sign. diff. between carcass grade means								
Carcass grade mean (%)	99.3			99.2			96.9	
Standard error of carcass grade mean (%)	0.62			0.66			0.52	

Table X

Analysis of variance of the yield of trimmed round steak from different weights and grades of carcasses

Source of variance	D.F.	Sum of squares	Mean square	F
between grades	2	31.36	15.68	N.S.[1]
between weights (within grade)	6	31.32	5.25	4.8**
Error	18	19.77	1.10	
Total	26	82.45		

1/Tested against between weights (within grade) mean square.
N.S. = non-significant at p = .05 level.
** significant at p = .01 level.

Table XI

Analyses of variance of the yield of trimmed round steak from different weight carcasses within each grade.

Source of variance	D.F.	Standard			Good			Choice		
		Sum of squares	Mean square	F	Sum of squares	Mean square	F	Sum of squares	Mean square	F
between weights	2	3.70	1.85	N.S.	10.58	5.29	N.S.	17.04	8.52	10.5*
Error	6	7.00	1.17		7.94	1.32		4.84	0.81	
Total	8	10.70			18.52			21.88		

N.S. = non significant at p = .05 level.
* significant at p = .05 level.

Cooking yield (expressed as % of the trimmed retail cut)

The distribution of the retail cuts among the various groups used in considering the cooking yields is presented in table XII. The yields of the cuts in group A were not analyzed statistically because either they represented the retail cuts of lesser importance in the beef carcass or similar cuts were included in the statistical analysis. The remaining cuts were grouped in the following manner: roasted cuts in group B, broiled cuts in group C, braised cuts (except round steak) in group D, and the round steak in group E. The round steak was not included in group D with the other braised cuts because it was not as thick as the chuck roasts included in group D, and was not comparable to the cuts in group D with respect to cooking yields. Separate analyses of variance were carried out on the yields of each group of cuts in table XII except group A.

The grade means of the cooking yield for the cuts included in group A are presented in table XIII. Except for short ribs and cross-cut foreshank, the cuts in group A (which were braised or simmered) yielded considerably less than those which were broiled. The cooking yields of the broiled cuts in group A tended to be lower for the cuts from the higher grade carcasses. The relatively high cooking yields of the 2 rib English corner and short ribs among the braised cuts and the cross-cut foreshank among the cuts simmered in group A can be attributed to a considerable amount of bone in those cuts. No consistent relationship from grade to grade was indicated among the cooking yields of the braised or simmered cuts in group A.

Table XII

Distribution of the retail cuts among the various groups used in considering the cooking yields.

GROUP A	GROUP B[1]	GROUP C[2]	GROUP D[3]	GROUP E[3]
tenderloin steak	7th and 8th standing rib roast	wedge bone sirloin steak	5th rib blade chuck roast	round steak
boneless strip steak	10th and 11th standing rib roast	pin-bone sirloin steak	3rd rib blade chuck roast	
top round steak		double-bone sirloin steak	1st arm chuck roast	
bottom round steak		9th rib steak	2nd arm chuck roast	
flank steak		porterhouse steak		
sirloin tip steak		club steak		
2 rib English corner				
heel of round pot roast				
boneless brisket				
9th, 10th, 11th, 12th short ribs from plate				
1 in. neck cubes				
cross-cut foreshank				

1/Cuts in this group were roasted.
2/Cuts in this group were broiled.
3/Cuts in this group were braised.

Table XIII

Grade means of the cooking yield of each of the 12 cuts included in Group A (expressed as % of the trimmed retail cut)

Cut	Method of Cooking	Grade		
		Standard	Good	Choice
Tenderloin steak	Broil	81.2	80.6	78.0
Boneless strip steak	Broil	76.9	75.3	71.1
Top round steak	Braise	57.8	57.9	59.3
Bottom round steak	Braise	59.4	59.9	60.9
Flank steak	Braise	60.6	61.1	61.6
Sirloin tip steak	Braise	58.7	60.6	59.6
2 rib English corner	Braise	72.7	70.8	69.8
Heel of round pot roast	Braise	65.3	65.1	65.8
Boneless brisket	Braise	65.8	70.7	67.0
Short ribs	Braise	76.3	76.4	78.2
1 inch neck cubes	Simmer	64.4	62.5	64.0
Cross-cut foreshank	Simmer	71.6	72.6	72.6

Grade and cut means of the cooking yields of the 2 roasted cuts included in group B, together with their standard errors and indications of significant differences between the means, are presented in Figure II. Examination of the mean yield of each cut from grade to grade showed that the 7th and 8th standing rib roast had a higher cooking yield than the 10th and 11th rib roast in each of the 3 grades. Both the 7th and 8th standing rib roast and the 10th and 11th standing rib roast from the good grade carcasses had higher mean cooking yields than those from standard grade carcasses, which yielded higher than those from choice

grade carcasses. When the 2 cuts were combined in an analysis of variance of this yield (table XIV), no significant difference was found between the mean cooking yields of the 2 roasts or between the mean yields of these roasts from different weight carcasses within the grades. However, a highly significant difference was found between the mean cooking yields of these cuts from different grades. The mean cooking yield of the 7th and 8th standing rib roast (72.4%) was not significantly higher than that of the 10th and 11th standing rib roast (71.5%). The mean cooking yield of these 2 roasts from good grade carcasses (73.8%) was significantly higher than that from choice grade carcasses (69.7%). However, the mean cooking yield of these 2 roasts from standard grade carcasses (72.3%) was not significantly lower than that from good grade carcasses (73.8%), nor significantly higher than that from choice grade carcasses. No significant interaction was found between cuts and carcass weight groups within grade, which suggests that the ranking of these 2 cuts according to this yield was the same in each carcass weight group. Similarly, no significant interaction was found between cuts and grades, indicating that the ranking of these cuts was the same in each grade. As evidenced by the relative cooking yields of these rib roasts from different grades, no definite relationship was indicated between the cooking yield of the rib roasts and carcass grade.

For the broiled cuts included in group C, grade and cut means of the cooking yields with their standard errors and indications of significant differences between the means are presented in Figure III. The cooking yields of the cuts in group C were combined into an analysis of variance (table XV), which showed a significant difference between the mean cooking

FIGURE II

Grade and cut means of the cooking yields of the roasted cuts included in group B, together with their standard errors and indications of significant differences between the cuts.

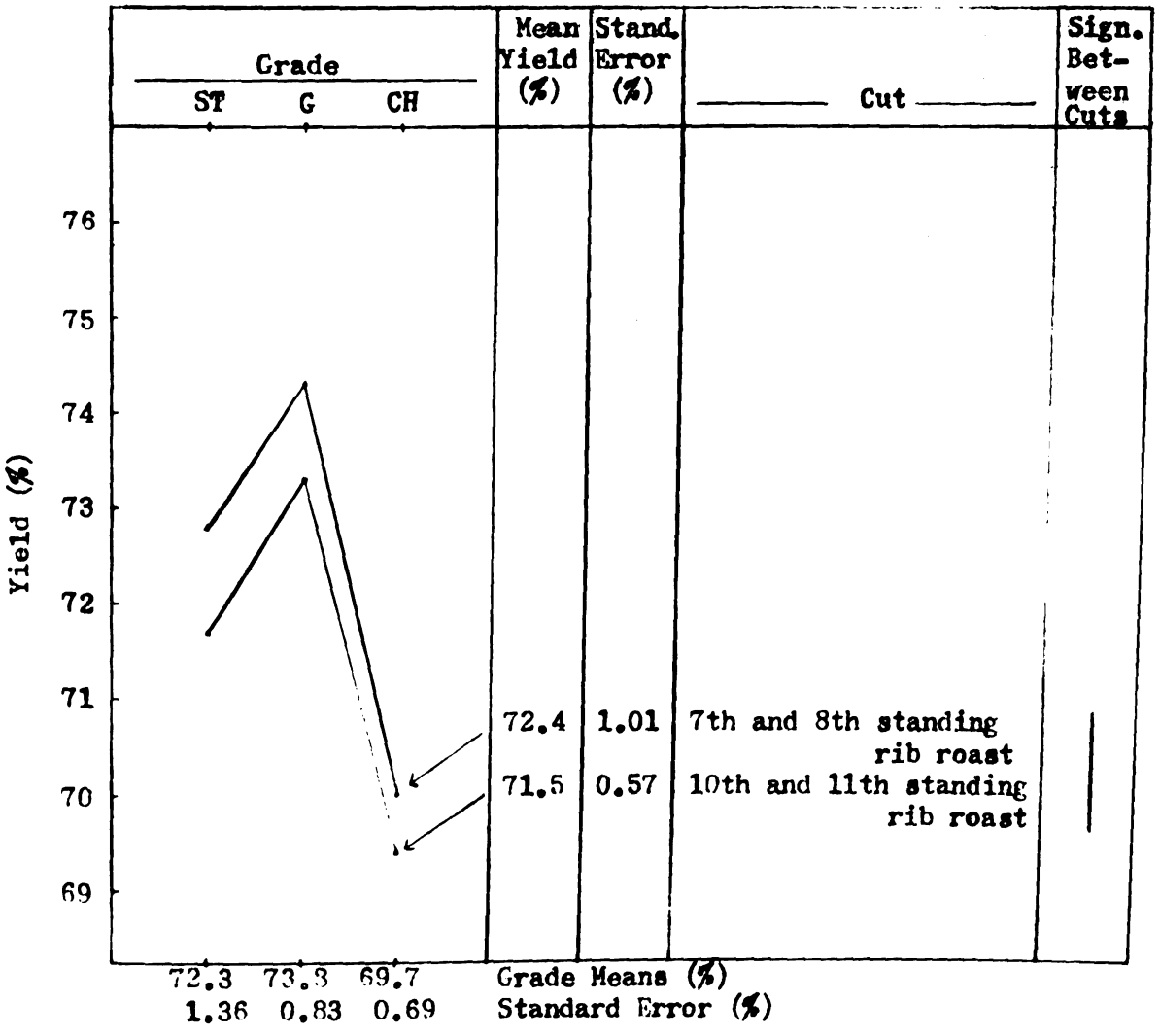


Table XIV

Combined analysis of variance of the cooking yields of the 7th and 8th, 10th and 11th standing rib roasts (group B)

Source of Variance	D.F.	Sum of Square	Mean Square	F
between grades	2	156.39	78.20	4.81*
between weights (within grade)	6	218.09	36.35	N.S.
between cuts	1	10.36	10.36	N.S.
cuts x grades	2	0.58	0.29	N.S.
cuts x weights (within grade)	6	70.99	11.83	N.S.
Error	36	651.71	18.10	
Pooled Error	44	723.28	16.44	
Total	53	1108.12		

1/Tested against pooled error mean square formed from cuts x grades, cuts x weights (within grade) and Error.
N.S. = non-significant at p = .05 level.
*significant at p = .05 level.

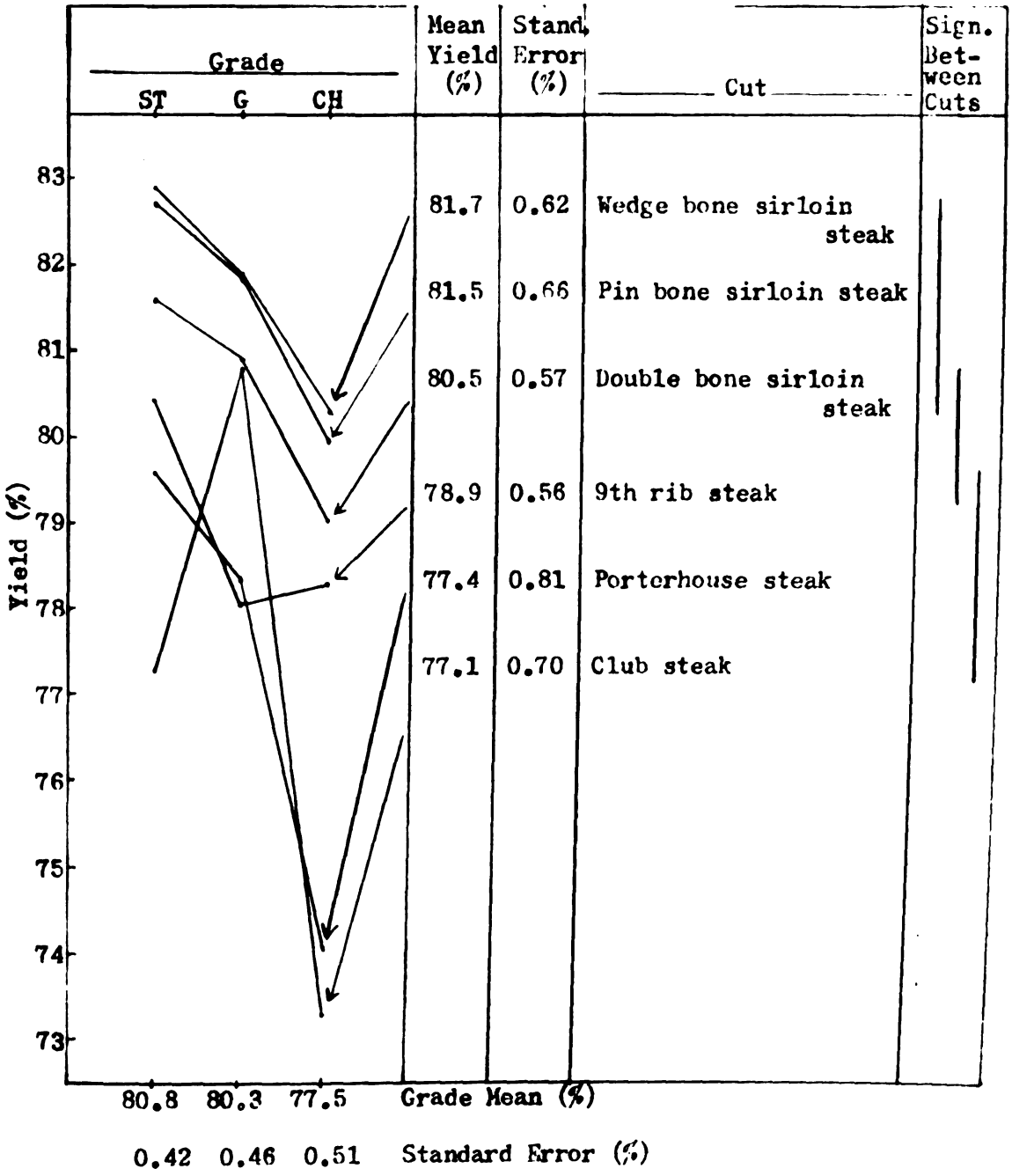
yields of these cuts from different grade carcasses. The mean cooking yield of these cuts from standard grade carcasses (80.8%) was not significantly higher than that from good grade carcasses (80.3%), however, both were significantly higher than that from choice grade carcasses (77.5%). This indicated that in general, the cooking yields of the broiled cuts included in group C were higher for these cuts from lower grade carcasses, although significant differences were not found until the grade increased from good to choice. This may be due to a smaller difference in fatness between these cuts from standard and good grade carcasses than between those from standard or good grade carcasses

and those from choice grade carcasses. The analysis of variance showed a highly significant difference between the cooking yields of the various broiled cuts included in group C (table XV). The mean cooking yield of the wedge bone sirloin steak (81.7%) was not significantly higher than that of the pin bone sirloin steak, which itself was not significantly higher than that of the double bone sirloin steak (80.5%). Of these, all but the double bone sirloin steak had a significantly higher mean cooking yield than that of the 9th rib steak (78.9%). Of the aforementioned cuts, all except the 9th rib steak had a significantly higher mean cooking yield than did the porterhouse steak (77.4%), which itself was not significantly higher than that of the club steak (77.1%). Examination of the relative cooking yields of the broiled cuts in group C as indicated by their means in figure III indicated that the sirloin steaks yielded higher than the other 3 cuts in this group.

From the analysis of variance, it was shown that no significant interaction existed between cuts and carcass weight groups within the grades, suggesting that the ranking of the broiled cuts in group C according to their cooking yield was the same in each carcass weight group within the grades. Similarly, no significant interaction was found between cuts and grades, which indicated that the ranking of these cuts according to this yield was the same in each grade. However, the analysis showed a significant difference in the mean cooking yields of these cuts from different weight carcasses within the grades (Table XV). Separate analyses of variance of each grade showed that this effect was not large enough to be significant in any of the 3 grades (Table XVI). Examination of the pooled error term in each of the analyses of variance (Table XVI) indicated

FIGURE III

Grade and cut means of the cooking yields of the broiled cuts included in group C, together with their standard errors and indications of significant differences between the cuts.



that the variability in the cooking yield of a particular cut in group C from every carcass weight group was of the same order of magnitude in each grade.

Table XV

Combined analysis of variance of the cooking yields of the broiled cuts included in group C.

Source of Variance	D.F.	Sum of Squares	Mean Square	F
between grades	2	335.68	167.84	6.42*
between weights (within grade)	6	156.58	26.10	2.21*
between cuts	5	552.61	110.52	9.21**
cuts x grades	10	196.37	19.64	N.S.
cuts x weights (within grade)	30	326.14	10.87	N.S.
Error	108	1264.23	11.70	
Pooled Error	148	1786.74	12.08	
Total	161	2831.68		

1/Tested against pooled error mean square formed from cuts x grades, cuts x weights (within grade) and Error.
2/Tested against between weights (within grade) mean square.
N.S. = non-significant at p = .05 level.
*significant at p = .05 level.
**significant at p = .01 level.

The means of the grades and cuts for the cooking yields of the braised cuts included in group D with their standard errors and indications of the significant differences between the cuts are presented in figure IV. Naturally, no significant difference was found between the mean cooking yields of these cuts from the different grades as indicated in

Table XVI

Separate analyses of variance for each grade of the cooking yields of the broiled cuts included in group C

Source of variance	D.F.	Standard			Good			Choice		
		Sum of squares	Mean square	F	Sum of squares	Mean square	F	Sum of squares	Mean square	F
between wts.	2	12.18	6.09	N.S.[1]	71.34	35.67	N.S.[1]	73.06	36.53	N.S.[1]
between cuts	5	203.60	40.72	4.0[1]*	128.93	25.79	N.S.[1]	416.45	83.29	6.7[1]**
cuts x wts.	10	122.33	12.23	N.S.	140.83	14.08	N.S.	62.98	6.30	N.S.
Error	36	343.51	9.54		409.99	11.39		510.73	14.19	
Pooled Error	46	465.84	10.12		550.82	11.97		573.71	12.46	
Total	53	681.62			751.11			1063.27		

1/Tested against pooled error mean square made up of cuts x wts. and Error.
N.S. = non-significant at p = .05 level.
* significant at p = .05 level.
**significant at p = .01 level.

the combined analysis of variance of the cooking yields of these cuts in table XVII, since the mean cooking yields of these cuts was identical for each of the 3 grades (66.4%). The analysis of variance did indicate a highly significant difference between the mean cooking yields of the various cuts (Table XVII). The mean cooking yield of the 5th rib blade chuck roast (68.8%) was not significantly higher than that of the 3rd rib blade chuck roast, however, both were significantly higher than that of the 1st arm chuck roast (64.4%), which itself was not significantly higher than that of the 2nd arm chuck roast (64.2%). Thus, among the chuck roasts the blade chuck roasts had higher cooking yields than the arm chuck roasts. This was likely due to a larger amount of bone and fat in the blade chuck roasts than in the arm chuck roasts. It was observed throughout the study that during braising the fatter cuts had lower cooking losses than the lean cuts. From the combined analysis of variance (Table XVII), it was shown that no significant interaction existed between cuts and carcass weight groups within grades, suggesting that the ranking of the cuts in group D according to their cooking yield was the same from each carcass weight group within the grades. Similarly, the combined analysis of variance showed no significant interaction between cuts and grades, which indicated that the ranking of these cuts according to this yield was the same in each grade. However, a significant difference was found between the mean cooking yield of these cuts from different weight carcasses within the grades (Table XVII).

Means of the cooking yields of the braised cuts from each carcass weight group within the grades, together with their standard errors and significant differences between the means are presented in table XVIII.

FIGURE IV

Grade and cut means of the cooking yields of the braised cuts included in group D, together with their standard errors and indications of significant differences between the cuts.

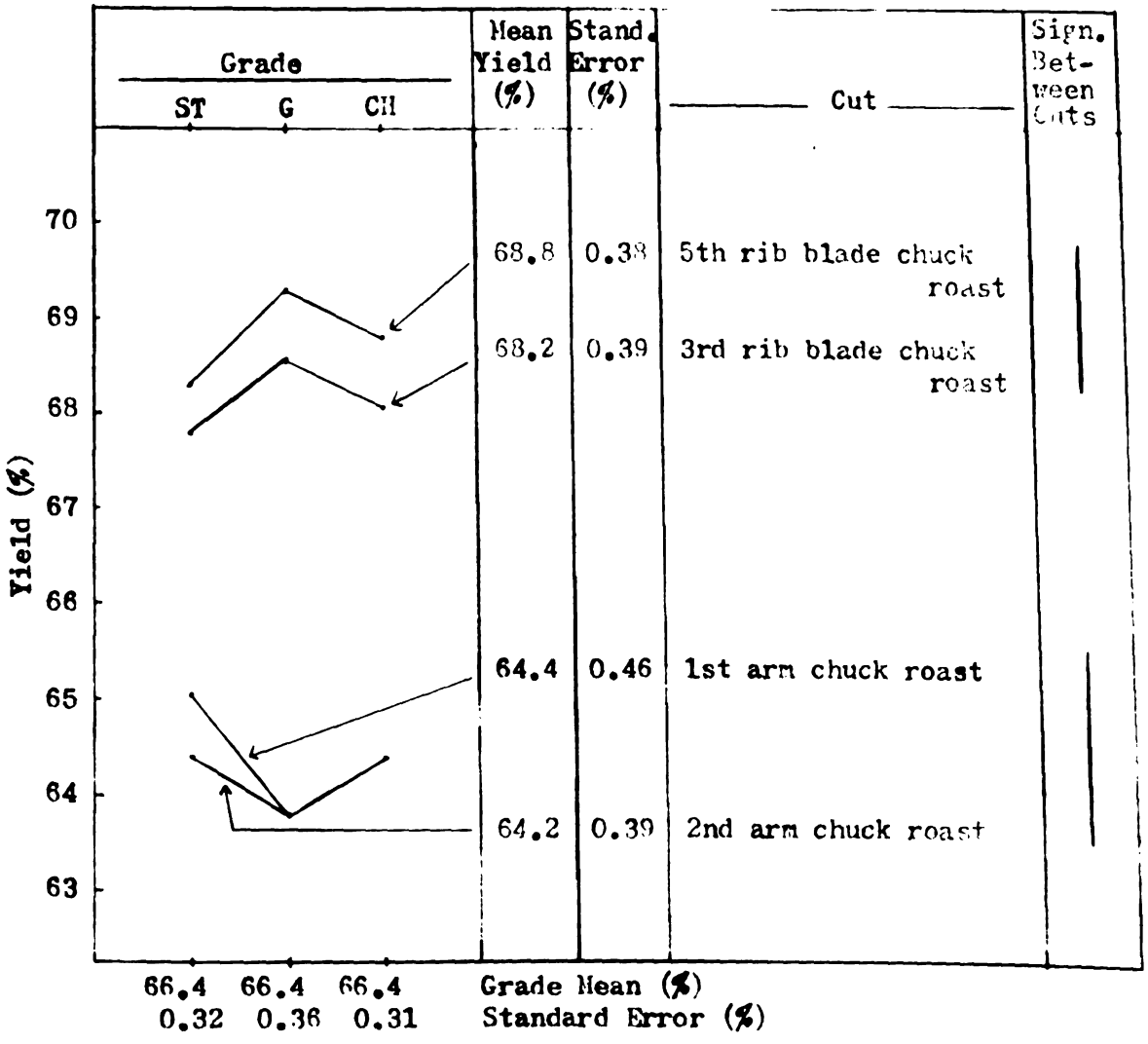


Table XVII

Combined analysis of variance of the cooking yields of the braised cuts included in group D.

Source of Variance	D.F.	Sum of Squares	Mean Square	F
between grades	2	0.09	0.05	N.S.[1]
between weights (within grade)	6	123.45	20.58	6.0[1]**
between cuts	3	484.89	161.63	47.1[1]**
cuts x grades	6	18.10	3.02	N.S.
cuts x weights (within grade)	18	29.15	1.62	N.S.
Error	72	282.27	3.92	
Pooled Error	96	329.52	3.43	
Total	107	939.00		

1/Tested against pooled error mean square formed from cuts x grades, cuts x weights (within grade) and Error.
N.S. = non-significant at p = .05 level.
**significant at p = .01 level.

Separate analyses of variance of the cooking yields of these cuts for each grade (Table XIX) indicated a significant difference between the mean yields of these cuts from different weight carcasses in the standard and good grades but not in the choice grade. Within the standard grade the mean cooking yields of these cuts from 300/400 lb. carcasses (68.1%) was significantly higher than that from 400/500 lb. carcasses (66.0%), which itself was not significantly higher than that from 500/600 lb. carcasses (65.1%). In the good grade, the mean yield of these cuts from 400/500 lb. carcasses (68.1%) was significantly higher than that from 500/600 lb. carcasses (66.1%), which in turn was significantly higher

than that from 600/700 lb. carcasses (64.9%). In the choice grade the mean yield of these cuts from 600/700 lb. carcasses (66.7%) was not significantly higher than that from 700/800 lb. carcasses (66.4%), which itself was significantly higher than that from 500/600 lb. carcasses (66.3%). Examination of the relative mean cooking yields of the cuts included in group D from carcasses of different weights within the grades (Table XVIII) revealed a decrease in the cooking yield of these cuts as the weight of the carcasses decreased within both the standard and good grades but not within the choice grade. This is probably due to the larger proportion of bone in these cuts from the lighter carcasses in the standard and good grades. As evidenced by the pooled error terms in the separate analyses of variance for each grade (Table XIX), the variability in the cooking yield of a particular cut in group D from every carcass weight group was of the same order of magnitude in each grade.

Table XX contains the grade means of the cooking yield of the round steak, together with their standard errors. Analysis of variance (Table XXI) showed a significant difference between the mean cooking yields of round steak from different grade carcasses but not from different weight carcasses. The mean cooking yield of round steak from choice grade carcasses (63.3%) was not significantly higher than that from good grade carcasses (62.4%), however, both were significantly higher than that from standard grade carcasses (60.6%). Thus, an increase in cooking yield of the round steak was observed as carcass grade increased. This could be due to a larger amount of fat in the round steaks from the higher grade carcasses, because during braising there was a tendency for the fatter cuts to have lower cooking losses than the leaner cuts.

Table XVIII

Means of the cooking yields of the braised cuts included in group D from each carcass weight group within each grade, together with their standard errors and indications of significant differences between the means.

Standard			Good			Choice		
Carcass weight group	Mean yield (%)	Sign. diff.	Carcass weight group	Mean yield (%)	Sign. diff.	Carcass weight group	Mean yield (%)	Sign. diff.
300/400	68.1		400/500	68.1		600/700	66.7	
400/500	66.0		500/600	66.1		700/800	66.4	
500/600	65.1		600/700	64.9		500/600	66.3	
Standard error of mean (%)	0.30			0.33			0.31	

Table XIX

Separate analyses of variance for each grade of the cooking yields of the braised cuts included in group D.

Source of variance	D.F.	Standard			Good			Choice		
		Sum of squares	Mean square	F	Sum of squares	Mean square	F	Sum of squares	Mean square	F
between carcass weights	2	59.44	29.72	9.0[1]**	63.23	31.62	8.0[1]**	0.78	0.39	N.S.[1]
between cuts	3	103.32	34.44	10.4[1]**	247.01	82.34	20.8[1]**	152.66	50.89	16.3[1]**
cuts x weights	6	7.86	1.31	N.S.	8.46	1.41	N.S.	12.83	2.14	N.S.
Error	24	91.15	3.80		110.19	4.59		80.93	3.37	
Pooled Error	30	99.01	3.30		118.65	3.96		93.76	3.13	
Total	35	262.76			428.95			247.20		

1/Tested against the pooled error mean square formed from cuts x weights and Error.
N.S. = non-significant at p = .05 level.
**significant at p = .01 level.

Table XX

Grade means of the cooking yield of the round steak (group E), together with their standard errors and indications of significant differences.

Grade	Mean yield (%)	Standard error (%)	Sign. diff.
choice	63.3	0.54	|
good	62.4	0.59	|
standard	60.6	0.63	

Table XXI

Analysis of variance of the cooking yield of the round steak (group E).

Source of variance	Degrees of freedom	Sum of squares	Mean square	F
between grades	2	34.90	17.45	5.6*
between weight groups (within grade)	6	21.05	3.51	N.S.
Error	18	55.95	3.11	
Total	26	111.90		

*significant at p = .05 level.

The results of this study seemed to indicate that the main factors affecting cooking losses were cooking method and degree of doneness and the composition of the cut. A decrease in cooking yield was found to accompany an increase in degree of doneness as indicated by the cooking yield of the broiled cuts being higher than that of the roasted cuts, which in turn was higher than that of the braised cuts. This is in agreement with the results observed from veal studies by Paul and McLean (1946)

Yield of cooked edible portion (expressed as % of the trimmed retail cut)

It has been shown in this and previous studies (Paul and McLean (1946), Chappell (1954)) that as the degree of doneness as measured by the internal temperature of a cut is increased the cooking losses also increased. Therefore, since the different cooking methods employed in this study involved cooking cuts to different degrees of doneness, it is evident that cooking method would affect the yield of cooked edible portion. For this reason the cuts were grouped in the very same manner for the consideration of their yields of cooked edible portion as they were previously for consideration of their cooking yields. The distribution of the retail cuts among the various groups used in considering the cooked edible portion yields is presented in table XXII.

The yields of the cuts included in group A were not analyzed statistically, however, the yields of the cuts in the remaining groups were statistically analyzed. The cuts in group B were roasted, those in group C were broiled, and the cuts in groups D and E were braised. Again, as in the previous discussions of other yields, the round steak was considered separately with regards to its yield of cooked edible portion. It must be kept in mind that in this study the yield of cooked edible portion represents the cooked lean portion of the cut only.

Grade means of the yield of cooked edible portion of the cuts included in group A, together with the cooking method employed for each of these cuts are presented in table XXIII. Examination of the relative yields of cooked edible portion from grade to grade of the various cuts included in group A revealed no consistent relationship. However, considerable difference was noted between the yields of the different cuts in

Table XXII

Distribution of the retail cuts among the various groups used in considering the cooked edible portion yields.

GROUP A	GROUP B[1]	GROUP C[2]	GROUP D[3]	GROUP E[3]
tenderloin steak	7th and 8th standing rib roast	wedge bone sirloin steak	5th rib blade chuck roast	round steak
boneless strip steak	10th and 11th standing rib roast	pin bone sirloin steak	3rd rib blade chuck roast	
top round steak		double bone sirloin steak	1st arm chuck roast	
bottom round steak			2nd arm chuck roast	
flank steak		9th rib steak		
sirloin tip steak		porterhouse steak		
2 rib English corner		club steak		
heel of round pot roast				
boneless brisket				
9th, 10th, 11th, 12th short ribs from plate				
1 in. neck cubes				
cross-cut foreshank				

1/Cuts in this group were roasted.
2/Cuts in this group were broiled.
3/Cuts in this group were braised.

group A. The cuts in group A notably high in bone and/or fat content yielded less than those containing smaller amounts of these constituents when cooked by the same method.

Table XXIII

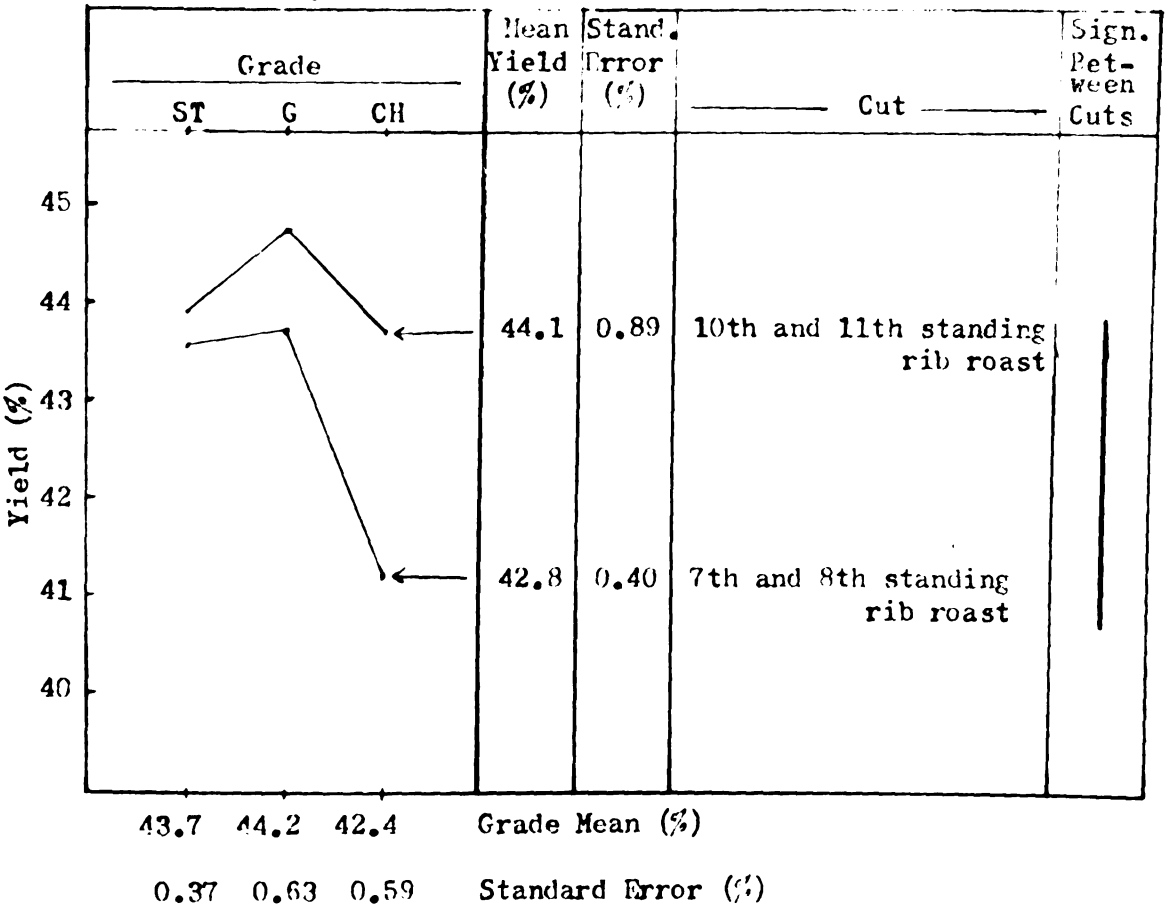
Grade means of the yield of cooked edible portion of the cuts included in group A (expressed as % of the trimmed retail cut)

Cut	Method of Cooking	Grade		
		Standard %	Good %	Choice %
tenderloin steak	Broil	81.2	80.6	78.0
boneless strip steak	Broil	65.3	66.5	62.9
top round steak	Braise	52.6	53.8	53.5
bottom round steak	Braise	55.0	54.0	51.7
flank steak	Braise	59.3	59.4	58.1
sirloin tip steak	Braise	47.2	45.5	46.8
2 rib English corner	Braise	39.5	37.0	35.8
heel of round pot roast	Braise	54.9	54.3	52.4
boneless brisket	Braise	44.7	45.0	41.7
short ribs	Braise	35.8	34.1	32.6
1 in. neck cubes	Simmer	64.4	62.5	64.0
cross-cut foreshank	Simmer	44.2	44.2	46.0

Grade and cut means of the yields of cooked edible portion of the 7th and 8th standing rib roast and the 10th and 11th standing rib roast (group B), together with their standard errors are presented in Figure V. A combined analysis of variance of the yields of these cuts (table XXIV) indicated no significant difference between the mean yield of the 10th

FIGURE V

Grade and cut means of the yields of cooked edible portion of the roasted cuts included in group B, together with their standard errors and indications of significant differences between the cuts.



and 11th standing rib roast (44.1%) and that of the 7th and 8th standing rib roast (42.8%). Also, no significant difference was indicated between the mean yield of these cuts from standard grade carcasses (43.7%), good grade carcasses (44.2%), and choice grade carcasses (42.4%). The analysis indicated that no significant difference existed between the mean yield of these cuts from different weight carcasses within the grades. Further, the combined analysis of variance of the yields of these cuts showed no significant interaction between cuts and grades, suggesting that the ranking of these standing rib roasts according to this yield was the same in each of the 3 grades studied. Similarly, no significant interaction was shown between cuts and carcass weights (within grade), indicating that within each grade, these cuts ranked the same in each carcass weight according to this yield.

Table XXIV

Combined analysis of variance of the yields of cooked edible portion of the 7th and 8th, 10th and 11th standing rib roasts (group B)

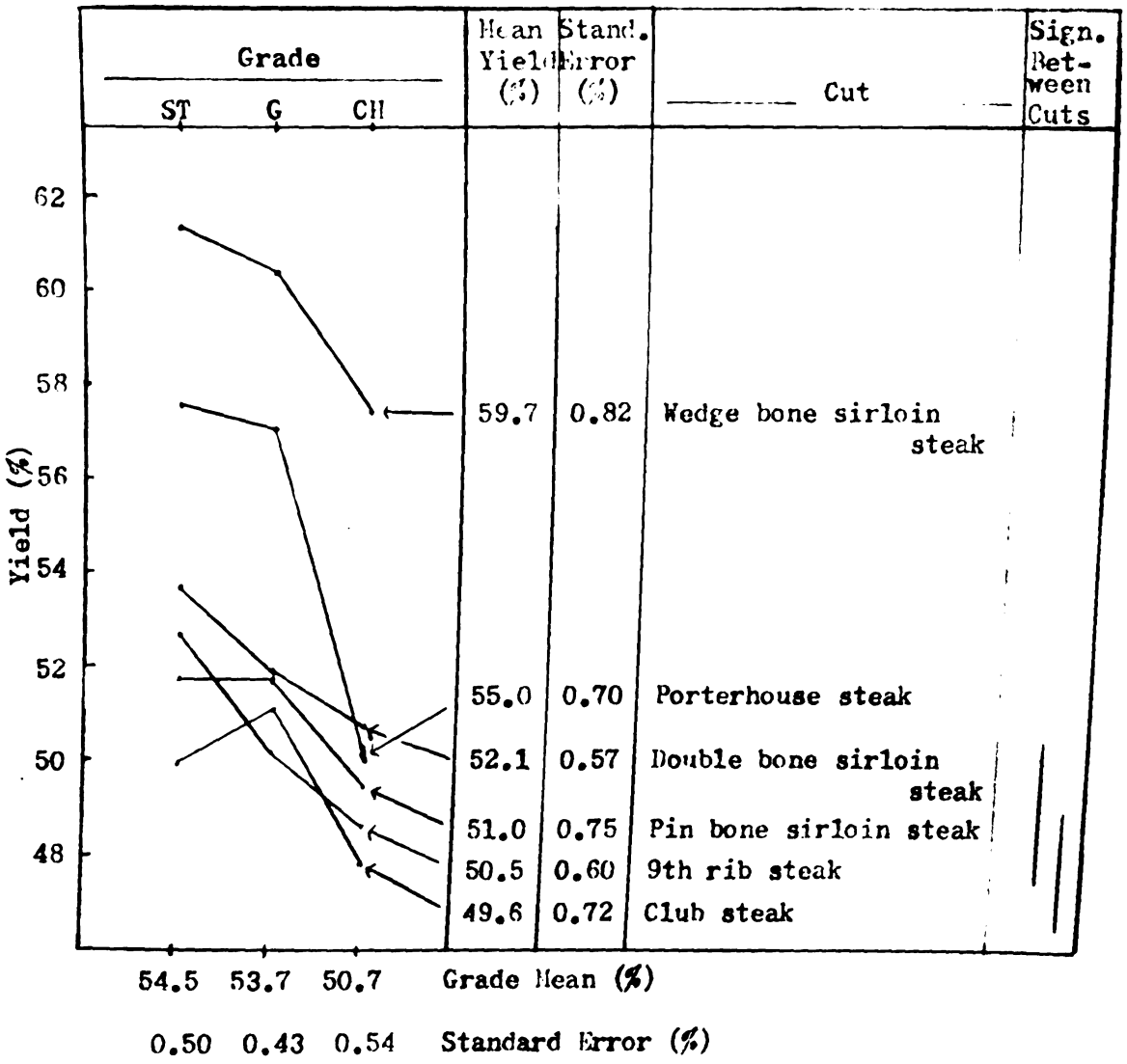
Source of Variance	D.F.	Sum of Squares	Mean Square	F
between grades	2	30.84	15.42	N.S.[1]
between weights (within grade)	6	45.93	7.66	N.S.
between cuts	1	22.76	22.76	N.S.[1]
cuts x grades	2	10.72	5.36	N.S.
cuts x weights (within grade)	6	43.68	7.28	N.S.
Error	36	462.43	12.84	
Pooled error	44	516.83	11.75	
Total	53	616.33		

1/Tested against pooled error mean square formed from cuts x grades, cuts x weights (within grade) and Error.
N.S. = non-significant at p = .05 level.

Grade and cut means of the yields of cooked edible portion of the broiled cuts included in group C, together with their standard errors are presented in Figure VI. The yields of these cuts were combined into a single overall analysis of variance which is presented in table XXV. This analysis showed a highly significant difference between the mean yields of these cuts from different grade carcasses. The mean yield of these cuts from standard grade carcasses (54.5%) was not significantly higher than that from good grade carcasses (53.7%), however, both were significantly higher than that from choice grade carcasses (50.7%). This can be attributed to a larger amount of fat present in the cuts from choice grade carcasses than in the cuts from either the standard or good grade carcasses. The analysis showed no significant difference between the mean yields of these cuts from different weight carcasses within the grades, but, a highly significant difference was indicated between the mean yields of the various cuts (table XXV). The mean yield of the wedge-bone sirloin steak (59.7%) was significantly higher than that of the porterhouse steak (55.0%), which itself was significantly higher than the mean yields of the remaining cuts in this group. The mean yield of the double-bone sirloin steak (52.1%) was not significantly higher than that from either the pin-bone sirloin steak (51.0%) or the 9th rib steak (50.5%), and the mean yields of the latter 2 cuts were not significantly different. Of the aforementioned cuts in this group, all except the pin-bone sirloin steak and the 9th rib steak had significantly higher mean yields that that of club steak (49.6%). Examination of the relative yields of the broiled cuts in group C as indicated by their yield means (Figure VI) revealed a tendency for the cuts containing a smaller amount of bone to have higher

FIGURE VI

Grade and cut means of the yields of cooked edible portion of the broiled cuts included in group C, together with their standard errors and indications of significant differences between the cuts.



yields of cooked edible portion than those cuts containing a larger amount of bone.

No significant interaction was found between cuts and grades (table XXV) indicating that the ranking of these cuts according to this yield was the same in each grade. Likewise, no significant interaction was found between cuts and carcass weights (within grade), indicating that according to this yield these cuts ranked the same in each carcass weight group within each of the 3 grades studied.

Table XXV

Combined analysis of variance of the yields of cooked edible portion of the broiled cuts included in group C.

Source of Variance	D.F.	Sum of Squares	Mean Square	F
between grades	2	427.09	213.54	16.7[1]**
between weights (within grade)	6	58.78	9.80	N.S.
between cuts	5	1953.09	390.62	30.6[1]**
cuts x grades	10	137.92	13.79	N.S.
cuts x weights (within grade)	30	337.16	11.24	N.S.
Error	108	1416.56	13.12	
Pooled error	148	1891.64	12.78	
Total	161	4330.61		

1/Tested against pooled error mean square formed from cuts x grades, cuts x weights (within grade) and Error.
N.S. = non-significant at p = .05 level
**Significant at p = .01 level.

Figure VII presents the grade and cut means of the yields of cooked edible portion of the cuts included in group D together with their standard errors. The yields of these cuts were combined into an analysis of variance

which is presented in table XXVI. This analysis showed no significant difference between the mean yield of these cuts from different grade carcasses. Therefore, no significance was found between the mean yield of these cuts from standard (44.4%), good (43.9%), or choice (44.0%) grade carcasses. Neither was there any significant difference indicated between the mean yield of these cuts from different weight carcasses within the grades studied. A highly significant difference was indicated between the mean yields of the various cuts. The mean yield of the 1st arm chuck roast (47.4%) was significantly higher than that of the 2nd arm chuck roast (45.6%) which was significantly higher than that of the 3rd rib blade chuck roast (42.4%), itself being significantly higher than that of the 5th rib blade chuck roast. Observation of the relative yields of these cuts as indicated by their yield means (Figure VII) showed that the arm chuck roasts had higher yields of cooked edible portion than the blade chuck roasts. This is undoubtedly due to a greater amount of bone present in the blade chuck roasts than in the arm chuck roasts.

The combined analysis of variance of the yield of these cuts (table XXVI) showed no significant interaction between cuts and grades, suggesting that the ranking of these cuts according to this yield was the same in each grade. Similarly, no significant interaction was found between cuts and carcass weights (within grade) indicating that the ranking of these cuts according to this yield was the same in each carcass weight group for each of the 3 grades studied.

FIGURE VII

Grade and cut means of the yields of cooked edible portion of the braised cuts included in group D, together with their standard errors and indications of significant differences between the cuts.

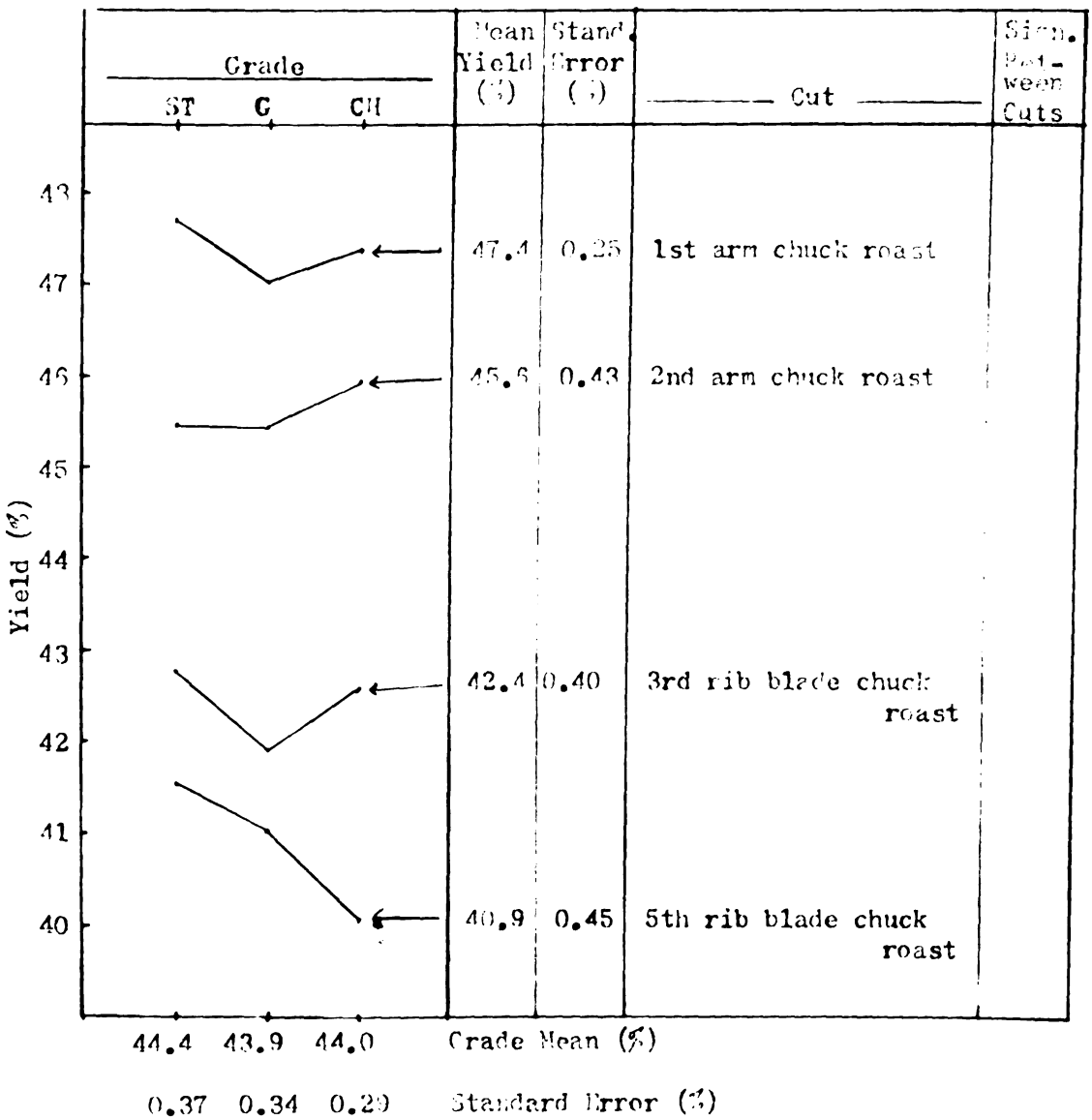


Table XXVI

Combined analysis of variance of the yields of cooked edible portion of the braised cuts included in group D.

Source of Variance	D.F.	Sum of Squares	Mean Square	F
between grades	2	5.51	2.75	N.S.[1]
between weights (within grade)	6	18.22	3.04	N.S.
between cuts	3	698.08	232.69	62.21**
cuts x grades	6	12.14	2.02	N.S.
cuts x weights (within grade)	18	50.38	2.80	N.S.
Error	72	296.49	4.12	
Pooled error	96	359.01	3.74	
Total	107	1080.80		

1/Tested against pooled error mean square formed from cuts x grades, cuts x weights (within grade) and Error.
N.S. = non-significant at p = .05 level.
**significant at p = .01 level.

The grade means of the yield of cooked edible portion of the round steak (group E), together with their standard errors are presented in table XXVII. Analysis of variance of the yields of round steak from different weights and grades of carcasses (table XXVIII) showed no significant difference between the mean yield of round steak from different weight carcasses within the grades nor between the mean yield of round steak from carcasses of different grades. Actually, the mean yield of round steak was essentially the same for each grade, the means were 48.0%, 48.1%, and 48.1% for standard, good, and choice grade carcasses, respectfully. Thus, it is apparent that carcass grade and weight had no effect on the yield of cooked edible portion of the round steak.

Table XXVII

Grade means of the yield of cooked edible portion of round steak (group E), together with their standard errors.

Grade	Standard	Good	Choice
Mean yield (%)	48.0	48.1	48.1
Standard error (%)	1.32	0.45	0.45
Sign. Diff.			

Table XXVIII

Analysis of variance of the yield of cooked edible portion of the round steak (group E)

Source of Variance	D.F.	Sum of Squares	Mean Square	F
between grades	2	0.08	0.04	N.S.
between weights (within grade)	6	8.03	1.34	N.S.
Error	18	116.65	6.48	
Total	26	124.76		

N.S. = non-significant at p = .05 level.

Carcass weight had no significant effect on the yield of cooked edible portion obtained from any of the cuts statistically analyzed. Carcass grade had a significant effect on this yield only in the instance of the broiled cuts in group C, where those cuts from choice grade carcasses yielded significantly less than those cuts from either standard or good grade carcasses. It is conceivable that this could be due to the fact that of the groups of cuts statistically analyzed, the cuts in this one (group C) would be expected to have the most external fat and the effect

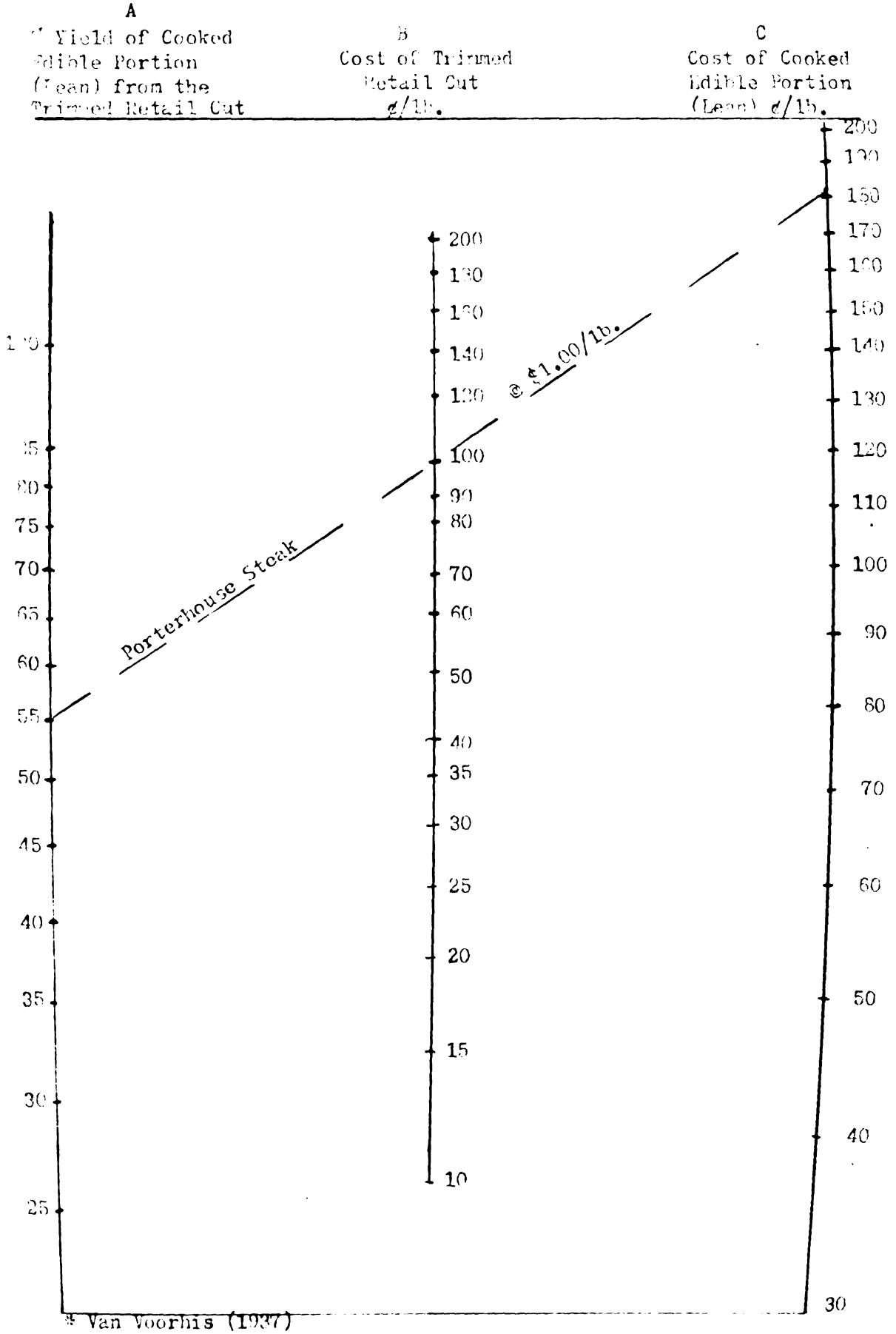
of grade on the cooked edible portion yields of this group of cuts would be more pronounced than for any of the other groups analyzed statistically. Considerable difference was noted between the yields of the various cuts, and since only the cooked lean was considered edible, cuts consisting of a smaller proportion of fat and/or bone tended to have higher yields of cooked edible portion than those made up of a larger proportion of these constituents when subjected to the same method of cooking. Cooking method seemed to have an effect on the yield of cooked edible portion, with those cuts cooked to lower degrees of doneness having higher yields of cooked edible portion. Generally, the broiled cuts had higher yields of cooked edible portion than those cooked by the other methods. However, this is not a true comparison since the different cooking methods were applied to different cuts.

Two factors enter into the economy of a retail cut when one is concerned with the cost per serving or edible portion cost, these factors being; the cost of the retail cut and the yield of cooked edible portion which can be expected from this retail cut. Figure VIII is presented as an aid in calculating the cost/lb. of cooked edible portion when the cost/lb. of the retail cut and yield of cooked edible portion expected from this retail cut are known. In Figure VIII, A represents the % yield of cooked edible portion (lean) of the trimmed retail cut, B represents the cost of the trimmed retail cut (¢/lb.), and C represents the effective cost of cooked edible portion (lean) from the retail cut (¢/lb.). To obtain the cost of cooked edible portion from a given cut, one simply locates the % yield of cooked edible portion of the particular cut on A, then connects this point by means of a straight line with the cost of the trimmed

retail cut (¢/lb.) on B and extends this straight line to C and the point on C where the line intersects represents the cost of the cooked edible portion (¢/lb.). An example is given using porterhouse steak which yields 55% cooked edible portion and in this case the retail cut costs $1.00/lb., therefore, the cost of cooked edible portion is $1.82/lb. as indicated in Figure VIII.

CHART VIII*

Guide for calculating the cooked edible portion cost of any retail cut.



* Van Voorhis (1937)

SUMMARY AND CONCLUSIONS

In general, for the cuts included in the statistical analysis, carcass grade had a significant effect on the yields of the trimmed retail cuts as a percentage of the untrimmed retail cut. The cuts from standard grade carcasses generally yielded higher than those from good grade carcasses, which in turn yielded higher than those from choice grade carcasses, indicating that more trimming was necessary for the cuts from carcasses of the higher grades. Carcass weight had no consistent effect from grade to grade on the yields of the trimmed retail cuts from the untrimmed retail cuts. There was a tendency for an increased amount of trimming required for the retail cuts as the loin region of the beef carcass was approached from either end.

Differences in cooking yields attributable to grade were restricted mainly to the cuts which were either broiled or roasted. In the case of the broiled cuts, there was no significant difference between the cooking yields of these cuts from standard and good grade carcasses, but the cuts from both of these grades had significantly higher cooking yields than those from the choice grade. The roasted cuts from good grade carcasses had significantly higher cooking yields than those from choice grade carcasses, however, no significant difference was found between the cooking yields of these cuts from standard and good grade carcasses or between those from standard and choice grade carcasses. In both instances, the lowest cooking yields were found in the cuts from choice grade carcasses. Carcass weight influenced cooking yields only in the case of the braised chuck roasts from standard and good grade carcasses. Within these grades,

the braised chuck roasts from the heavier carcasses had higher cooking yields than those from lighter carcasses.

The results of this study seemed to indicate that the main factors affecting cooking losses were cooking method and degree of doneness, and the composition of the trimmed retail cut. A decrease in cooking yield was found to accompany an increase in degree of doneness. The effect of the composition of the cuts on cooking yield was shown by wide differences in cooking yields of various cuts cooked by the same method. Generally, the cuts containing the largest amounts of bone had the highest cooking yields within any group of cuts cooked by the same method. For the dry heat methods of cooking, the fatter cuts tended to have lower cooking yields. However, when braised, the cuts containing the larger amounts of fat had higher cooking yields than those containing smaller amounts of fat.

Carcass weight had no significant effect on the yield of cooked edible portion from any of the cuts statistically analyzed. Carcass grade had a significant effect on this yield only in the instance of the broiled cuts, in which case the cuts from choice grade carcasses had significantly lower yields of cooked edible portion than those cuts from either standard or good grade carcasses. Considerable difference was found between the yields of cooked edible portion from the various cuts studied. This appeared to be mainly due to the same factors as those found to be primarily responsible for differences in cooking yields, namely; method of cooking and composition of the trimmed retail cut. Those cuts cooked to lower degrees of doneness generally had higher yields of cooked edible portion, hence, the broiled cuts had higher values for this

yield than the cuts cooked by the other methods. Since only the cooked lean was considered as edible, the cuts consisting of a smaller proportion of fat and/or bone tended to have higher yields of cooked edible portion than those made up of a larger proportion of these constituents.

A chart is presented as a guide in calculating the cost/lb. of cooked edible (lean) portion for any retail cut when the cost/lb. of the trimmed retail cut and the yield of cooked edible (lean) portion expected from this trimmed retail cut are known.

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Appendix Table I

Weight of the right side and wholesale cuts from the right side of each cattle

Carcass Grade (USDA)	Carcass Weight Group	Cattle No.	Side Wt. (lbs.)	Front qtr. (lbs.)	Hind qtr. (lbs.)	Fore-shank (lbs.)	Brisket (lbs.)	Chuck (lbs.)	Short-plate (lbs.)	Rib (lbs.)	Flank (lbs.)	Canner-Round (lbs.)	Loin (Sirloin on) (lbs.)	Rump (lbs.)	Kidney Knob (lbs.)
Standard	300/400	4	172.0	91.4	80.6	8.0	7.0	46.0	15.2	14.5	7.8	31.6	25.2	11.0	4.0
Standard	300/400	25	183.2	93.7	89.5	6.5	6.2	51.0	13.5	15.6	8.1	36.6	29.3	9.8	4.4
Standard	300/400	26	166.4	81.0	85.4	5.6	6.2	49.2	13.3	15.8	8.4	33.7	27.8	9.4	4.8
Standard	400/500	3	228.9	120.1	108.8	8.3	8.4	63.3	18.4	21.3	11.5	43.5	33.8	17.8	3.4
Standard	400/500	19	231.8	120.7	111.1	9.4	7.8	61.8	18.9	20.8	11.8	44.0	34.0	12.5	8.2
Standard	400/500	20	229.1	115.1	114.0	8.9	6.3	62.8	17.1	18.3	13.6	46.4	33.8	12.6	7.6
Standard	500/600	21	269.9	138.9	131.0	11.2	8.0	77.4	20.8	20.2	13.0	56.3	37.2	13.9	9.2
Standard	500/600	15	275.2	140.4	134.8	12.8	9.6	73.9	19.6	23.4	13.4	56.4	38.8	15.9	10.3
Standard	500/600	5	273.2	139.4	133.8	11.2	9.5	75.6	21.3	20.4	15.2	59.0	38.3	15.4	5.4
Good	400/500	12	223.8	117.2	106.6	8.2	7.1	63.8	18.3	18.8	12.1	46.2	28.9	12.6	5.3
Good	400/500	27	247.5	124.3	123.2	9.8	8.7	67.1	17.1	20.1	14.2	52.0	33.6	14.3	8.5
Good	400/500	28	238.0	124.0	114.0	8.8	7.3	69.5	16.8	20.3	12.0	47.0	35.8	12.1	5.5
Good	500/600	6	288.7	147.7	141.0	11.5	12.0	73.0	26.1	24.2	15.4	54.9	41.3	17.1	12.5
Good	500/600	11	270.0	139.2	130.8	10.5	11.2	73.2	22.3	20.8	15.2	56.7	37.6	14.9	6.4
Good	500/600	17	273.4	140.2	133.2	9.6	8.3	76.5	20.8	23.5	13.8	54.2	41.7	16.5	6.8
Good	600/700	1	303.0	158.0	145.0	9.2	12.4	87.7	23.8	24.7	18.9	57.3	43.6	21.0	4.2
Good	600/700	16	322.1	166.6	155.5	14.0	13.5	89.0	23.8	26.5	15.0	60.9	45.2	18.4	16.0
Good	600/700	18	314.8	164.1	150.7	10.2	8.0	94.8	24.0	25.8	18.4	60.9	46.1	17.8	8.1
Choice	500/600	8	314.5	159.0	155.5	10.2	10.4	85.4	25.7	26.8	20.1	61.0	39.5	12.7	22.1
Choice	500/600	10	277.3	147.4	129.9	8.7	8.7	80.5	24.7	23.4	18.3	52.3	38.8	12.9	7.9
Choice	500/600	24	274.4	144.3	130.1	9.4	11.5	75.3	22.4	23.5	16.6	48.0	39.7	14.8	9.6
Choice	600/700	2	328.3	173.7	154.6	9.2	13.4	88.4	28.1	33.6	20.0	55.4	50.6	21.8	6.8
Choice	600/700	9	323.4	173.3	150.1	14.4	14.9	90.2	27.0	25.5	17.6	60.4	46.5	16.2	9.2
Choice	600/700	13	318.2	162.8	155.4	11.0	14.7	82.4	24.8	28.7	18.9	56.6	45.2	17.1	14.1
Choice	700/800	7	376.0	193.4	182.6	14.8	15.7	98.2	31.4	32.3	22.4	70.2	57.3	24.6	9.0
Choice	700/800	14	368.8	188.0	180.8	14.1	15.7	92.5	30.8	32.7	23.5	60.7	58.4	21.6	16.4
Choice	700/800	23	370.5	194.5	176.0	13.2	12.8	108.3	28.6	34.0	17.4	68.9	54.8	23.0	11.4

Appendix Table II
1st Arm Roast
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Un-trimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Inter-muscular fat	Bone	Edible portion (lean)
4	3.70	.05	.20	.15	3.30	3.30	2.06	.25	.17	.20	1.42
25	3.75	.10	.05	.15	3.45	3.48	2.52	.13	.21	.25	1.66
26	3.65	.15	.20	.15	3.20	3.19	2.13	.12	.23	.22	1.51
3	4.05	.10	.20	.15	3.60	3.61	2.40	.09	.18	.27	1.79
19	4.70	.35	.30	.40	3.70	3.69	2.35	.10	.15	.23	1.81
20	4.55	.40	.30	.20	3.65	3.67	2.37	.13	.11	.27	1.80
21	5.30	.35	.20	.25	4.50	4.48	2.83	.15	.25	.37	2.12
15	4.65	.35	.30	.20	3.80	3.80	2.41	.13	.04	.32	1.87
5	5.00	.05	.15	.10	4.70	4.69	2.95	.18	.18	.31	2.20
12	4.65	.15	.15	.30	3.95	3.97	2.64	.17	.35	.29	1.82
27	4.95	.30	.20	.35	4.10	4.14	2.75	.29	.21	.30	1.89
28	5.60	.30	.30	.30	4.70	4.68	3.03	.20	.22	.29	2.27
6	4.00	.15	.20	.35	3.90	3.92	2.42	.26	.05	.22	1.86
11	5.30	.35	.20	.35	4.35	4.38	2.83	.27	.12	.28	2.10
17	5.25	.35	.30	.25	4.35	4.33	2.86	.14	.20	.33	2.14
1	6.60	.15	.30	.30	5.85	5.82	3.37	.35	.30	.30	2.69
16	6.20	.4	.20	.45	5.15	5.12	3.20	.22	.17	.35	2.38
18	6.30	.25	.20	.35	5.50	5.49	3.50	.14	.40	.38	2.52
8	5.50	.1	.20	.30	4.90	4.88	3.16	.41	.15	.24	2.30
10	5.90	.45	.30	.50	4.60	4.59	3.06	.26	.32	.30	2.10
24	6.05	.25	.15	.55	5.15	5.14	3.26	.28	.22	.25	2.45
2	5.60	.30	.20	.70	4.40	4.30	2.83	.32	.19	.29	2.03
9	6.50	.6	.20	.60	5.20	5.14	3.18	.36	.08	.24	2.43
13	5.95	.40	.20	.45	4.90	4.91	3.14	.28	.17	.31	2.36
7	5.80	.20	.40	.40	4.90	4.83	3.04	.33	---	.28	2.38
14	5.80	.45	.15	.55	4.70	4.69	2.98	.42	.08	.27	2.16
23	7.55	.55	.35	.45	6.25	6.25	4.14	.26	.50	.38	2.97

*weight immediately before cooking.

Appendix Table III
2nd Arm Roast
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	4.10	.05	.05	.60	3.40	3.40	2.21	.32	.14	.29	1.42
25	4.20	.15	.05	.55	3.45	3.47	2.29	.24	.13	.26	1.62
26	4.15	.25	.15	.50	3.25	3.24	2.14	.26	.12	.22	1.47
3	4.05	.05	.15	.15	3.70	3.68	2.42	.28	.20	.28	1.62
19	4.85	.35	.10	.85	3.50	3.50	2.28	.31	---	.22	1.72
20	4.65	.30	.10	.70	3.55	3.55	2.25	.21	.10	.26	1.66
21	5.65	.40	.25	.65	4.45	4.45	2.74	.22	.14	.32	2.01
15	5.40	.40	.15	.55	4.30	4.28	2.78	.29	.08	.34	2.02
5	5.15	.05	.10	.15	4.85	4.85	2.98	.26	.24	.33	2.09
12	4.95	.35	.15	.60	3.85	3.84	2.51	.27	.14	.28	1.79
27	5.50	.40	.20	.80	4.10	4.13	2.76	.33	.18	.32	1.86
28	5.75	.50	.20	.80	4.25	4.30	2.71	.28	.13	.25	1.99
6	5.15	.35	.15	.70	3.70	3.71	2.32	.24	.16	.30	1.58
11	6.25	.50	.15	1.10	4.50	4.51	2.89	.33	.24	.27	2.00
17	5.50	.45	.20	.40	4.50	4.47	2.83	.34	---	.29	2.15
1	6.90	.15	.20	1.05	5.50	5.50	3.39	.55	.45	.30	2.36
16	6.90	.5	.15	1.30	5.00	4.97	3.15	.44	.10	.34	2.20
18	6.55	.45	.25	.65	5.20	5.20	3.31	.37	---	.31	2.54
8	5.80	.15	.15	1.25	4.30	4.41	2.77	.35	---	.29	2.07
10	5.80	.50	.20	1.15	4.00	4.00	2.60	.30	.23	.27	1.81
24	6.05	.30	.15	1.20	4.45	4.43	2.79	.37	.17	.23	1.97
2	5.80	.35	.15	.95	4.40	4.30	2.84	.47	---	.26	2.06
9	7.60	.8	.15	1.10	5.55	5.51	3.47	.52	.16	.40	2.40
13	7.30	.55	.15	1.25	5.40	5.38	3.48	.46	.29	.29	2.38
7	6.50	.40	.20	.90	4.90	4.89	3.13	.43	---	.29	2.38
14	7.70	.65	.15	1.60	5.30	5.32	3.46	.41	.14	.39	2.42
23	7.90	.50	.20	1.15	6.10	6.07	4.04	.50	.27	.37	2.82

*weight immediately before cooking.

Appendix Table IV
3rd. Rib Chuck Blade Roast
Summary of weights before and after cooking (lb.)

	before cooking						after cooking				
Cattle No.	Un-trimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Inter-muscular fat	Bone	Edible portion (lean)
4	3.45	---	.10	---	3.35	3.35	2.34	.24	.15	.50	1.40
25	3.35	---	.20	---	3.15	3.15	2.23	.22	.06	.43	1.46
26	3.55	---	.10	---	3.45	3.40	2.31	.26	.08	.53	1.38
3	4.90	---	.15	.10	4.65	4.59	3.05	.22	.22	.67	1.95
19	3.55	---	.10	---	3.45	3.43	2.33	.18	.06	.62	1.43
20	4.00	---	.15	---	3.85	3.84	2.54	.21	.07	.65	1.58
21	4.05	---	.20	---	3.85	3.85	2.58	.12	.09	.69	1.63
15	4.70	---	.20	---	4.50	4.51	3.10	.10	.05	.88	2.07
5	4.50	---	.05	.20	4.25	4.25	2.79	.16	.16	.59	1.81
12	3.75	---	.15	.15	3.45	3.41	2.36	.18	.16	.67	1.38
27	4.65	---	.25	---	4.40	4.45	3.24	.15	.11	.88	2.03
28	4.50	---	.15	---	4.35	4.37	2.97	.16	.13	.76	1.83
6	4.10	---	.25	.10	3.75	3.80	2.51	.17	.09	.69	1.55
11	3.85	---	.15	---	3.70	3.72	2.61	.16	.17	.72	1.48
17	4.80	---	.15	---	4.65	4.66	3.21	.20	.10	.78	2.02
1	5.50	---	.15	.35	5.00	4.96	3.17	.10	---	.99	2.08
16	4.95	---	.15	.05	4.75	4.74	3.22	.15	.12	.84	2.06
18	5.00	---	.20	---	4.80	4.79	3.40	.35	.22	.84	1.90
8	4.20	---	.25	.25	3.70	3.67	2.40	.13	.13	.58	1.51
10	4.60	---	.30	.50	3.90	3.89	2.71	.21	.20	.59	1.63
24	4.85	---	.25	.15	4.45	4.44	3.00	.17	.19	.63	1.96
2	5.85	---	.10	.40	5.35	5.33	3.57	.40	---	.81	2.29
9	4.75	---	.25	.30	4.20	4.24	2.89	.23	.11	.55	1.95
13	5.10	---	.25	.25	4.60	4.60	3.25	.25	.15	.80	1.95
7	4.10	---	.20	.30	3.60	3.65	2.50	.28	.09	.63	1.46
14	5.70	---	.25	.25	5.20	5.25	3.57	.27	.22	.93	2.15
23	6.20	---	.30	---	5.90	5.90	4.04	.32	.20	.83	2.59

*weight immediately before cooking.

Appendix Table V

7th and 8th Standing Rib Roast

Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	3.75	---	.15	---	3.60	3.57	2.73	.16	.34	.60	1.51
25	4.25	---	.20	---	4.05	4.06	3.03	.19	.31	.57	1.82
26	4.20	---	.20	---	4.00	4.01	2.93	.22	.28	.60	1.72
3	4.80	---	.10	.05	4.65	4.64	3.28	.13	.30	.78	1.99
19	5.00	---	.25	---	4.75	4.73	3.51	.14	.36	.83	2.12
20	4.95	---	.25	---	4.70	4.69	3.43	.18	.48	.70	2.01
21	5.45	---	.25	---	5.20	5.16	3.71	.11	.46	.80	2.20
15	5.45	---	.25	---	5.20	5.18	3.80	.14	.25	.90	2.44
5	5.20	---	.30	---	4.90	4.94	3.36	.17	.35	.72	2.06
12	5.55	---	.20	.05	5.30	5.28	4.04	.28	.44	.90	2.33
27	5.15	---	.20	---	4.95	5.00	3.69	.21	.35	.84	2.18
28	5.25	---	.20	---	5.05	5.10	3.62	.17	.51	.71	2.12
6	5.40	---	.25	.15	5.00	5.07	3.91	.27	.61	.81	2.07
11	5.55	---	.25	---	5.30	5.28	4.24	.22	.55	.73	2.31
17	5.60	---	.20	.05	5.35	5.33	3.92	.18	.33	.76	2.53
1	6.90	---	.25	.50	6.15	6.10	4.40	.12	.50	.74	2.67
16	6.65	---	.40	---	6.25	6.22	4.66	.18	.59	.94	2.81
18	6.25	---	.30	.05	5.90	5.91	4.08	.16	.39	.88	2.54
8	6.90	---	.30	.10	6.50	6.50	4.34	.15	.64	.86	2.60
10	6.00	---	.30	.30	5.40	5.38	4.00	.30	.67	.61	2.36
24	5.70	---	.25	---	5.45	5.46	3.68	.23	.40	.70	2.26
2	8.30	---	.20	.40	7.70	7.61	5.20	.25	1.05	.75	3.14
9	6.80	---	.40	.20	6.30	6.27	4.50	.27	.82	.81	2.58
13	6.30	---	.30	.20	5.80	5.83	4.00	.19	.66	.79	2.25
7	8.10	---	.50	.30	7.30	7.30	4.84	.31	.64	.98	2.82
14	7.30	---	.60	.10	6.60	6.55	4.75	.29	.87	.81	2.75
23	8.00	---	.35	---	7.65	7.45	5.49	.24	.74	1.08	3.26

*weight immediately before cooking.

Appendix Table VI

5th Rib Chuck Blade Roast

Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	3.05	---	.10	.05	2.90	2.90	2.09	.15	.25	.54	1.09
25	2.55	---	.10	---	2.45	2.48	1.71	.16	.13	.29	1.10
26	2.80	---	.10	---	2.70	2.71	1.88	.13	.13	.40	1.16
3	3.85	---	.10	.10	3.65	3.67	2.46	.15	.30	.47	1.55
19	2.90	---	.10	---	2.80	2.82	1.96	.14	.17	.51	1.13
20	3.25	---	.15	---	3.10	3.12	2.05	.10	.06	.47	1.36
21	3.35	---	.20	---	3.15	3.20	2.16	.07	.15	.54	1.33
15	3.50	---	.15	---	3.35	3.37	2.30	.11	.15	.66	1.31
5	3.90	---	.05	---	3.85	3.85	2.55	.19	.17	.43	1.67
12	3.10	---	.10	.05	2.95	2.95	2.08	.15	.19	.48	1.21
27	3.55	---	.20	---	3.35	3.38	2.48	.13	.18	.57	1.50
28	3.45	---	.15	---	3.30	3.30	2.34	.12	.19	.55	1.39
6	3.25	---	.15	.10	3.00	3.05	2.05	.14	.24	.47	1.17
11	3.35	---	.15	.05	3.15	3.19	2.20	.14	.23	.52	1.27
17	3.30	---	.15	---	3.15	3.15	2.19	.15	.15	.43	1.40
1	5.15	---	.20	.15	4.80	4.77	3.13	.15	.45	.68	1.82
16	3.90	---	.15	---	3.75	3.74	2.51	.10	.19	.65	1.51
18	3.50	---	.10	---	3.40	3.39	2.40	.17	.20	.62	1.38
8	3.20	---	.20	.10	2.90	2.88	2.00	.15	.21	.37	1.11
10	3.50	---	.20	.20	3.10	3.11	2.20	.21	.28	.37	1.26
24	3.80	---	.20	.10	3.50	3.54	2.39	.16	.29	.43	1.46
2	4.75	---	.15	.40	4.20	4.18	3.02	.15	.68	.68	1.51
9	3.95	---	.35	.15	3.45	3.51	2.30	.14	.37	.34	1.50
13	3.85	---	.20	.05	3.60	3.62	2.57	.20	.44	.48	1.40
7	3.70	---	.30	.20	3.20	3.20	2.15	.23	.23	.32	1.32
14	4.60	---	.25	---	4.35	4.32	2.99	.33	.26	.60	1.75
23	4.40	---	.20	---	4.20	4.23	2.82	.20	.29	.53	1.74

*weight immediately before cooking.

Appendix Table VII
Porterhouse Steak
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	1.70	---	---	.15	1.55	1.57	1.30	.14	---	.18	.93
25	2.20	---	---	.15	2.05	2.09	1.58	.12	---	.20	1.19
26	1.75	---	---	.20	1.55	1.58	1.24	.13	---	.15	.89
3	2.90	---	---	.50	2.40	2.33	1.72	.17	---	.22	1.29
19	2.25	---	---	.05	2.20	2.18	1.72	.19	---	.22	1.28
20	2.00	---	---	.05	1.95	1.96	1.55	.18	---	.24	1.09
21	2.35	---	---	.15	2.20	2.20	1.89	.12	---	.32	1.42
15	2.30	---	---	.10	2.20	2.18	1.79	.14	---	.30	1.24
5	2.60	---	---	.40	2.20	2.17	1.73	.24	---	.22	1.18
12	2.15	---	---	.25	1.90	1.91	1.51	.19	---	.29	.98
27	2.25	---	---	.15	2.10	2.13	1.72	.15	---	.29	1.22
28	2.55	---	---	.15	2.40	2.43	1.83	.17	---	.26	1.32
6	2.50	---	---	.20	2.30	2.28	1.85	.32	---	.25	1.26
11	2.45	---	---	.35	2.10	2.11	1.71	.20	---	.25	1.20
17	2.75	---	---	.40	2.35	2.36	1.86	.17	---	.27	1.32
1	3.70	---	---	.95	2.75	2.68	1.91	.24	---	.15	1.52
16	2.60	---	---	.25	2.35	2.37	1.79	.10	---	.24	1.53
18	2.90	---	---	.25	2.65	2.65	2.18	.15	---	.36	1.62
8	2.25	---	---	.20	2.05	2.10	1.52	.20	---	.29	.96
10	2.75	---	---	.65	2.10	2.12	1.45	.35	---	.24	.96
24	2.45	---	---	.20	2.25	2.26	1.76	.23	---	.24	1.21
2	4.55	---	---	1.60	2.95	2.87	2.10	.31	---	.40	1.46
9	3.20	---	---	.50	2.70	2.65	1.83	.27	---	.30	1.18
13	3.50	---	---	.65	2.85	2.86	2.15	.21	---	.38	1.50
7	3.80	---	---	.90	2.90	2.86	2.43	.51	---	.25	1.67
14	3.40	---	---	.50	2.90	2.92	2.06	.33	---	.27	1.52
23	3.30	---	---	.10	3.20	3.23	2.43	.26	---	.49	1.61

*weight immediately before cooking.

Appendix Table VIII

10th and 11th Standing Rib Roast

Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	2.65	---	.10	---	2.55	2.60	2.00	.15	.15	.43	1.17
25	2.95	---	.20	---	2.75	2.75	2.04	.18	.11	.41	1.23
26	3.15	---	.20	---	2.95	2.96	2.12	.27	.12	.39	1.27
3	4.90	---	.20	.15	4.55	4.49	3.23	.21	.20	.68	2.10
19	4.45	---	.20	---	4.25	4.26	3.31	.29	.17	.63	2.04
20	3.75	---	.20	---	3.55	3.56	2.64	.26	.12	.52	1.65
21	4.40	---	.40	---	4.00	3.99	2.92	.18	.24	.59	1.86
15	4.70	---	.30	---	4.40	4.40	2.26	.30	.13	.67	1.19
5	4.45	---	.15	.05	4.25	4.25	3.17	.29	.29	.65	2.04
12	3.55	---	.25	.05	3.25	3.26	2.57	.30	.24	.53	1.44
27	4.55	---	.35	---	4.20	4.26	3.29	.30	.25	.58	2.04
28	3.95	---	.25	---	3.70	3.75	2.64	.38	.10	.42	1.64
6	5.10	---	.30	.20	4.60	4.63	3.20	.20	.34	.69	1.88
11	4.25	---	.15	.05	4.05	4.06	3.05	.25	.32	.46	1.83
17	4.75	---	.25	.10	4.40	4.40	3.43	.25	.22	.59	2.20
1	5.30	---	.20	.60	4.40	4.39	3.08	.31	.20	.67	1.90
16	5.95	---	.40	.05	5.50	5.47	4.00	.42	.23	.75	2.47
18	5.25	---	.35	.05	4.85	4.87	3.31	.18	.27	.70	2.08
8	7.00	---	.50	.30	6.20	6.23	4.43	.33	.45	.71	2.82
10	5.10	---	.40	.60	4.10	4.13	2.95	.17	.29	.47	1.93
24	5.35	---	.35	.10	4.90	4.91	3.30	.26	.28	.47	2.20
2	7.05	---	.30	.60	6.15	6.14	3.87	.30	.29	.55	2.83
9	5.00	---	.35	.35	4.30	4.32	2.93	.18	.38	.65	1.65
13	5.60	---	.30	.50	4.80	4.80	3.23	.23	.23	.57	2.08
7	6.90	---	.30	.30	6.30	6.22	4.42	.43	.32	1.00	2.48
14	6.55	---	.35	.20	6.00	6.00	4.44	.33	.58	.79	2.62
23	7.70	---	.40	---	7.30	7.31	5.22	.50	.37	.78	3.30

*weight immediately before cooking.

Appendix Table IX

Wedgebone sirloin steak minus tip

Summary of weights before and after cooking (lb.)

Cattle No.	BEFORE COOKING						AFTER COOKING				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	# Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	2.65	---	---	.10	2.55	2.57	2.13	.09	.16	.25	1.55
25	2.80	---	---	.05	2.75	2.76	2.36	.15	.26	.31	1.57
26	2.45	---	---	---	2.45	2.44	2.02	.08	.18	.23	1.47
3	3.20	---	---	.30	2.90	2.82	2.31	.11	.09	.36	1.72
19	3.30	---	---	.20	3.10	3.09	2.62	.09	.10	.30	2.08
20	3.20	---	---	.15	3.05	3.03	2.66	.11	.11	.41	1.98
21	3.65	---	---	---	3.65	3.63	2.94	.04	.13	.39	2.26
15	4.20	---	---	.25	3.95	3.95	3.24	.08	.15	.43	2.52
5	2.80	---	---	.10	2.70	2.67	2.07	.12	.07	.34	1.47
12	2.50	---	---	.05	2.45	2.43	1.98	.09	.09	.37	1.38
27	3.60	---	---	.10	3.50	3.53	2.90	.07	.15	.27	2.33
28	3.05	---	---	.10	2.95	2.95	2.34	.06	.17	.25	1.80
6	3.10	---	---	---	3.10	3.07	2.50	.05	.15	.37	1.79
11	2.75	---	---	.05	2.70	2.66	2.08	.07	.14	.39	1.42
17	4.05	---	---	.15	3.90	3.88	3.23	.12	.21	.36	2.44
1	4.30	---	---	.40	3.90	3.86	3.17	.16	.09	.37	2.37
16	4.15	---	---	.15	4.00	3.99	3.45	.11	.27	.45	2.55
18	4.20	---	---	.25	3.95	3.94	3.25	.10	.29	.43	2.36
8	2.45	---	---	---	2.45	2.46	1.99	.07	.18	.42	1.30
10	3.30	---	---	.20	3.10	3.06	2.45	.10	.32	.34	1.59
24	3.50	---	---	.15	3.35	3.38	2.86	.08	.30	.34	2.10
2	5.75	---	---	.60	5.15	5.11	3.73	.08	.49	.32	2.72
9	3.80	---	---	.20	3.60	3.57	2.90	.19	.23	.36	2.02
13	4.35	---	---	.15	4.20	4.19	3.53	.19	.20	.42	2.69
7	3.85	---	---	.20	3.65	3.63	3.09	.10	.25	.43	2.20
14	5.00	---	---	.35	4.65	4.64	3.56	.20	.13	.28	2.80
23	4.80	---	---	.30	4.50	4.51	3.50	.06	.42	.45	2.49

#weight immediately before cooking.

Appendix Table X

Full cut round steak minus tip

Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	1.45	--	--	--	1.45	1.46	.87	.07	.05	.12	.63
25	1.95	--	--	--	1.95	1.97	1.24	.06	.05	.13	.97
26	1.85	--	--	--	1.85	1.82	1.15	--	.06	.14	.95
3	2.60	--	--	--	2.60	2.53	1.53	.10	.09	.15	1.20
19	2.05	--	--	.05	2.00	2.04	1.25	.10	.04	.10	1.02
20	2.20	--	--	.05	2.15	2.14	1.24	.05	.03	.09	1.02
21	3.00	--	--	--	3.00	3.00	1.82	.08	.05	.17	1.59
15	2.65	--	--	--	2.65	2.60	1.60	.12	.08	.21	1.18
5	2.25	--	--	.05	2.20	2.21	1.28	.11	--	.20	.97
12	2.30	--	--	--	2.30	2.28	1.48	.13	.10	.19	1.10
27	2.15	--	--	--	2.15	2.11	1.32	--	.06	.22	1.00
28	2.15	--	--	--	2.15	2.09	1.30	.07	.04	.19	1.01
6	2.50	--	--	--	2.50	2.51	1.62	.12	.10	.24	1.19
11	2.50	--	--	--	2.50	2.49	1.56	.10	.11	.14	1.18
17	2.45	--	--	--	2.45	2.44	1.53	.05	.10	.16	1.21
1	2.90	--	--	.10	2.80	2.71	1.58	.16	--	.15	1.27
16	3.20	--	--	--	3.20	3.17	1.93	.05	.04	.15	1.60
18	2.90	--	--	.10	2.80	2.80	1.77	.09	.10	.24	1.33
8	2.20	--	--	--	2.20	2.24	1.40	.10	.08	.15	1.05
10	2.45	--	--	.05	2.40	2.39	1.57	.20	.13	.14	1.08
24	2.40	--	--	.05	2.35	2.34	1.45	.06	.07	.16	1.15
2	2.50	--	--	.10	2.40	2.35	1.50	.12	.08	.13	1.15
9	2.30	--	--	.10	2.20	2.22	1.39	.18	--	.10	1.10
13	3.40	--	--	.20	3.20	3.17	2.06	.15	.06	.20	1.55
7	3.20	--	--	.10	3.10	3.10	1.95	.18	.12	.22	1.46
14	3.35	--	--	.10	3.25	3.26	2.10	.22	.10	.14	1.61
23	3.30	--	--	.10	3.20	3.20	1.96	.07	.12	.19	1.52

*weight immediately before cooking.

Appendix Table XI

Double bone sirloin steak minus tip

Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Un-trimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Inter-muscular fat	Bone	Edible portion (lean)
4	2.65	--	--	.10	2.55	2.59	2.24	.07	.17	.48	1.47
25	3.60	--	--	--	3.60	3.60	3.00	.11	.24	.69	1.91
26	3.25	--	--	.15	3.10	3.07	2.31	.10	.13	.59	1.47
3	3.60	--	--	.20	3.40	3.37	2.78	.21	.07	.69	1.70
19	3.30	--	--	.15	3.15	3.17	2.58	.11	.03	.68	1.71
20	3.75	--	--	.15	3.60	3.60	3.01	.09	.07	.70	2.05
21	4.45	--	--	.05	4.40	4.40	3.67	.13	.34	.64	2.45
15	4.65	--	--	.30	4.35	4.34	3.43	.14	.27	.62	2.33
5	3.15	--	--	.25	2.90	2.88	2.29	.09	.08	.51	1.57
12	2.70	--	--	.10	2.60	2.65	2.25	.12	.09	.70	1.39
27	3.70	--	--	.05	3.65	3.65	3.10	.11	.25	.67	1.99
28	4.05	--	--	.10	3.95	3.97	3.23	.17	.31	.47	2.18
6	3.65	--	--	.15	3.50	3.51	2.86	.10	.33	.50	1.83
11	3.10	--	--	.05	3.05	3.04	2.43	.10	.19	.61	1.44
17	4.35	--	--	.20	4.15	4.16	3.32	.13	.09	.79	2.27
1	4.85	--	--	.75	4.10	3.97	2.95	.07	.10	.86	1.92
16	4.60	--	--	.25	4.35	4.37	3.43	.10	.10	.79	2.29
18	4.45	--	--	.25	4.20	4.24	3.52	.13	.14	.96	2.13
8	2.70	--	--	.05	2.65	2.67	2.13	.09	.18	.42	1.42
10	3.65	--	--	.35	3.30	3.32	2.70	.12	.14	.64	1.75
24	4.25	--	--	.10	4.15	4.16	3.32	.20	.37	.57	2.05
2	5.65	--	--	.95	4.60	4.60	3.39	.13	.17	.62	2.39
9	4.15	--	--	.25	3.90	3.91	3.01	.16	.29	.72	1.75
13	5.05	--	--	.25	4.80	4.79	3.85	.15	.37	.77	2.53
7	4.30	--	--	.40	3.90	3.88	3.05	.14	.23	.72	1.88
14	5.50	--	--	.50	5.00	4.98	4.02	.26	.10	.96	2.59
23	5.20	--	--	.20	5.00	5.03	4.02	.07	.17	1.04	2.59

*weight immediately before cooking.

Appendix Table XII

Pinbone sirloin steak minus tip

Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	#Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	2.55	--	--	.25	2.30	2.28	1.82	.09	.05	.41	1.19
25	3.25	--	--	.15	3.10	3.12	2.71	.16	.06	.62	1.79
26	2.85	--	--	.25	2.60	2.59	2.11	.17	.06	.61	1.19
3	3.40	--	--	.40	3.00	3.01	2.34	.12	.14	.48	1.58
19	2.80	--	--	.15	2.65	2.66	2.25	.12	.15	.61	1.31
20	3.00	--	--	.15	2.85	2.85	2.35	.05	.05	.59	1.55
21	3.60	--	--	---	3.60	3.59	3.07	.15	.11	.91	1.79
15	4.00	--	--	.10	3.90	3.90	3.25	.10	.04	.90	2.13
5	3.10	--	--	.30	2.80	2.80	2.31	.08	.12	.68	1.39
12	2.40	--	--	.15	2.25	2.25	1.96	.11	.06	.55	1.18
27	3.00	--	--	.20	2.80	2.80	2.06	.07	.06	.57	1.45
28	3.25	--	--	.25	3.00	3.00	2.31	.11	.07	.59	1.47
6	3.30	--	--	.40	2.90	2.92	2.51	.21	.10	.70	1.42
11	3.10	--	--	.15	2.95	2.95	2.53	.17	.06	.57	1.67
17	3.50	--	--	.40	3.10	3.08	2.57	.14	.05	.58	1.75
1	4.50	--	--	1.05	3.45	3.44	2.67	.05	.12	.77	1.73
16	3.65	--	--	.20	3.45	3.46	2.86	.10	---	.67	1.90
18	3.75	--	--	.25	3.50	3.51	2.93	.15	.16	.92	1.59
8	3.00	--	--	.20	2.80	2.84	2.22	.17	.08	.69	1.30
10	3.25	--	--	.60	2.65	2.68	2.16	.10	.07	.53	1.34
24	3.65	--	--	.35	3.30	3.31	2.71	.14	.20	.54	1.57
2	5.60	--	--	1.60	4.00	3.94	2.99	.12	.13	.71	1.93
9	4.20	--	--	.40	3.80	3.80	2.96	.14	.05	.62	2.11
13	4.65	--	--	.55	4.10	4.12	3.26	.18	.13	.88	2.00
7	4.00	--	--	.30	3.70	3.68	3.07	.18	.15	.67	2.02
14	4.80	--	--	.65	4.15	4.12	3.46	.26	.12	1.05	1.92
23	3.65	--	--	.30	3.35	3.36	2.63	.08	.08	.76	1.60

#weight immediately before cooking.

Appendix Table XIII

Boneless brisket roast

Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	#Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	2.45	--	--	.15	2.30	2.30	1.44	.25	.22	--	.97
25	2.85	--	--	.25	2.60	2.62	1.74	.48	.11	--	1.12
26	2.80	--	--	.20	2.60	2.60	1.68	.53	.04	--	1.17
3	2.80	--	--	.10	2.70	2.68	1.76	.55	.08	--	1.11
19	3.85	--	--	.35	3.50	3.51	2.43	.71	.09	--	1.55
20	2.70	--	--	.05	2.65	2.65	1.73	.40	.06	--	1.21
21	3.10	--	--	.10	3.00	3.01	1.95	.40	.08	--	1.44
15	3.70	--	--	.25	3.45	3.45	2.39	.54	.10	--	1.68
5	3.05	--	--	.25	2.80	2.80	1.79	.44	.08	--	1.24
12	3.25	--	--	.20	3.05	3.06	2.13	.66	.10	--	1.33
27	3.65	--	--	.50	3.15	3.20	2.23	.69	.05	--	1.41
28	3.25	--	--	.15	3.10	3.14	2.04	.45	.06	--	1.45
6	3.20	--	--	.30	2.90	2.92	2.34	.70	.08	--	1.51
11	4.80	--	--	.50	4.30	4.31	3.69	.78	.16	--	1.94
17	4.00	--	--	.40	3.60	3.58	2.38	.49	.28	--	1.59
1	5.75	--	--	1.15	4.60	4.57	3.01	.80	.27	--	1.94
16	5.30	--	--	.40	4.90	4.87	3.20	.64	.33	--	2.13
18	3.95	--	--	.30	3.65	3.67	2.50	.70	.12	--	1.60
8	4.70	--	--	.40	4.30	4.33	2.95	1.23	.06	--	1.60
10	4.20	--	--	.35	3.85	3.80	2.61	.87	.12	--	1.72
24	4.50	--	--	.50	4.00	4.00	2.68	.99	.05	--	1.59
2	5.30	--	--	1.25	4.05	4.02	2.64	.67	.33	--	1.64
9	5.20	--	--	.10	5.10	5.11	3.33	.35	.52	--	2.38
13	6.50	--	--	1.05	5.45	5.45	3.70	1.27	.24	--	2.09
7	6.40	--	--	.80	5.60	5.62	3.61	1.00	.24	--	2.38
14	6.80	--	--	.30	6.50	6.47	4.36	.94	.62	--	2.65
23	4.95	--	--	.65	4.30	4.27	2.94	.87	.05	--	1.90

#weight immediately before cooking.

Appendix Table XIX

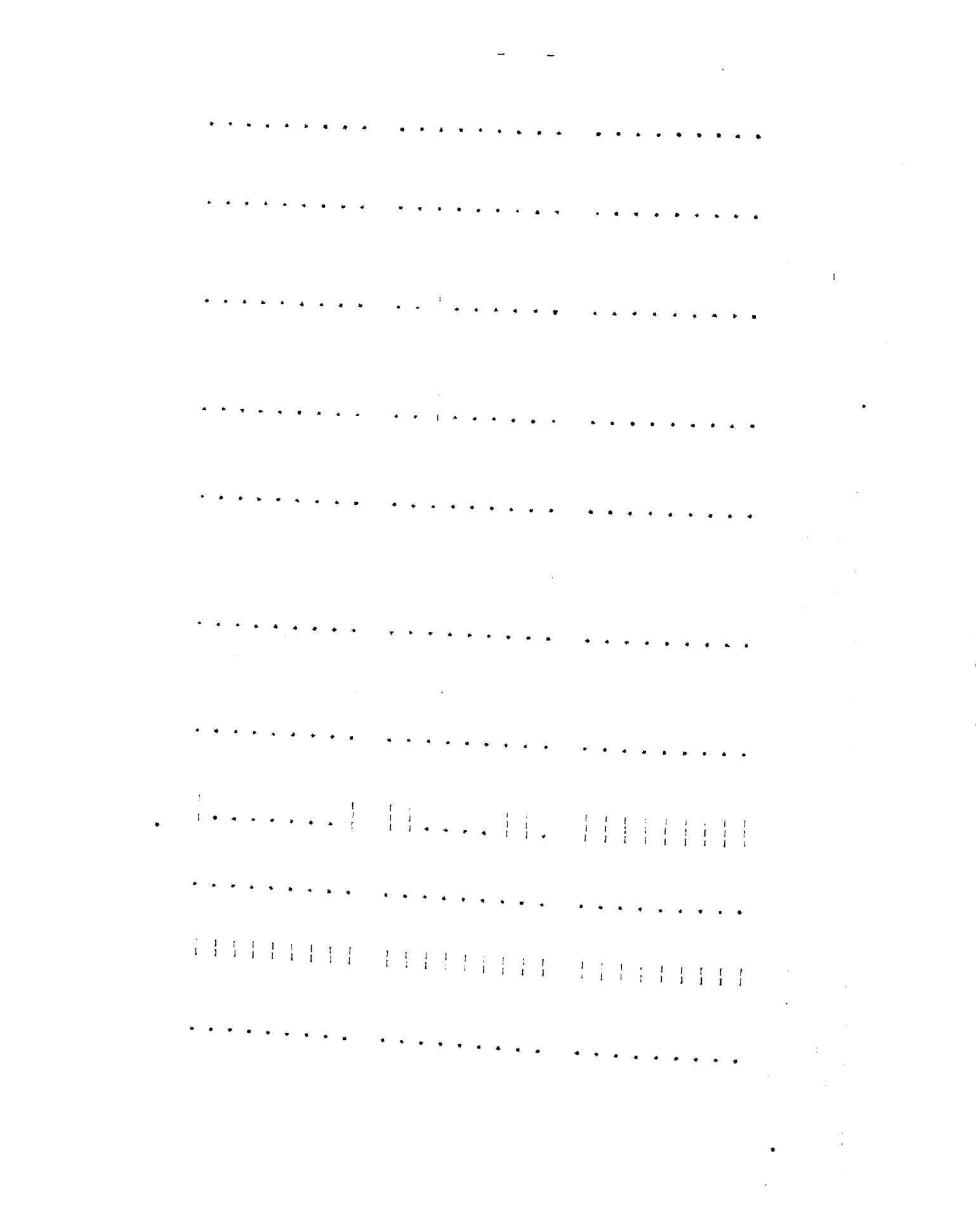
Appendix Table XIV

9th rib steak

Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	1.35	---	.10	---	1.25	1.27	1.03	.06	.09	.21	.67
25	1.60	---	.10	---	1.50	1.48	1.21	.07	.10	.21	.81
26	1.55	---	.10	---	1.45	1.41	1.15	.09	.14	.21	.69
3	2.10	---	.10	---	2.00	1.94	1.46	.06	.18	.33	.89
19	1.95	---	.15	---	1.80	1.79	1.40	.04	.07	.33	.92
20	1.80	---	.15	---	1.65	1.67	1.35	.04	.05	.31	.93
21	1.90	---	.15	---	1.75	1.74	1.43	.02	.09	.27	1.00
15	2.20	---	.15	---	2.05	2.03	1.62	.04	.04	.35	1.10
5	1.85	---	.10	---	1.75	1.78	1.48	.06	.07	.38	.94
12	1.70	---	.10	.05	1.55	1.54	1.18	.11	.13	.22	.76
27	1.75	---	.15	---	1.60	1.64	1.35	.07	.12	.33	.81
28	1.95	---	.10	---	1.85	1.86	1.40	.04	.15	.25	.91
6	2.00	---	.15	.05	1.80	1.83	1.42	.08	.17	.32	.87
11	2.15	---	.15	.05	1.95	1.98	1.57	.06	.15	.29	1.03
17	2.05	---	.10	.05	1.90	1.92	1.59	.04	.11	.31	1.08
1	2.10	---	.15	.05	1.80	1.75	1.28	---	---	.37	.91
16	2.35	---	.20	---	2.15	2.15	1.64	.05	.11	.37	1.02
18	2.20	---	.20	---	2.00	2.02	1.60	.05	.15	.36	.99
8	2.50	---	.20	---	2.30	2.26	1.74	.05	.20	.39	1.09
10	2.30	---	.15	.15	2.00	2.01	1.56	.10	.23	.28	.98
24	2.15	---	.15	.05	1.95	1.99	1.52	.04	.15	.29	.99
2	2.80	---	.10	.15	2.50	2.50	1.93	.12	.30	.35	1.15
9	2.25	---	.20	.05	2.00	1.97	1.44	.08	.22	.22	.85
13	2.40	---	.15	.15	2.10	2.10	1.72	.07	.23	.29	1.08
7	3.00	---	.30	.10	2.60	2.61	2.22	.17	.28	.40	1.38
14	2.60	---	.20	.05	2.35	2.36	1.86	.08	.25	.37	1.12
23	2.65	---	.20	---	2.45	2.46	1.91	.02	.21	.39	1.22

*weight immediately before cooking.



Appendix Table XV

Club steak

Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	#Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	1.25	--	.05	.05	1.15	1.16	.87	.05	.03	.25	.53
25	1.10	--	.10	---	1.00	1.01	.72	.04	.02	.14	.51
26	1.40	--	.10	.10	1.20	1.22	.99	.09	.04	.19	.63
3	1.40	--	.20	---	1.20	1.19	.87	.04	---	.19	.62
19	1.30	--	.10	---	1.20	1.21	.95	.06	---	.25	.60
20	1.40	--	.15	---	1.25	1.28	1.01	.06	---	.21	.71
21	1.70	--	.15	---	1.55	1.56	1.28	.08	.08	.31	.77
15	1.90	--	.20	---	1.70	1.73	1.32	.10	.10	.33	.73
5	1.90	--	.10	.15	1.65	1.64	1.30	.07	---	.32	.87
12	1.40	--	.10	.10	1.20	1.19	.99	.09	.08	.24	.62
27	1.30	--	.05	---	1.25	1.23	.96	.06	.03	.14	.69
28	1.60	--	.10	.05	1.45	1.49	1.17	.05	.10	.24	.73
6	1.80	--	.10	.20	1.50	1.49	1.30	.16	.07	.31	.79
11	1.65	--	.10	.15	1.40	1.38	1.20	.08	.04	.24	.69
17	1.70	--	.10	.15	1.45	1.46	1.15	.03	---	.29	.79
1	1.95	--	.15	.30	1.50	1.43	1.12	.17	---	.30	.68
16	1.85	--	.20	---	1.65	1.65	1.26	.06	---	.32	.82
18	1.75	--	.15	.05	1.55	1.54	1.23	.04	.08	.30	.74
8	1.70	--	.10	.15	1.45	1.43	1.03	.04	.04	.15	.72
10	1.95	--	.10	.40	1.45	1.47	1.03	.06	.05	.24	.67
24	2.05	--	.15	.15	1.75	1.77	1.28	.07	.05	.22	.86
2	2.70	--	.05	.50	2.10	2.04	1.39	.06	.24	.20	.80
9	1.85	--	.20	.20	1.45	1.47	1.05	.10	---	.14	.78
13	2.20	--	.15	.30	1.75	1.75	1.40	.04	.11	.35	.80
7	2.60	--	.20	.50	2.00	1.98	1.53	.16	---	.37	1.00
14	2.40	--	.15	.35	1.90	1.91	1.40	.10	.05	.33	.90
23	2.10	--	.15	.15	1.80	1.86	1.40	.04	.04	.32	.93

#weight immediately before cooking.

Appendix Table XVI
Sirloin tip steak
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	1.35	--	--	.10	1.25	1.24	.72	.19	.06	--	.56
25	1.70	--	--	.05	1.65	1.70	1.01	.06	.09	--	.83
26	1.50	--	--	---	1.50	1.51	.89	.06	.10	--	.72
3	1.70	--	--	---	1.70	1.70	1.03	.09	.18	--	.76
19	1.95	--	--	.10	1.85	1.88	1.12	.10	.13	--	.88
20	1.55	--	--	---	1.55	1.56	.88	.02	.08	--	.75
21	1.75	--	--	---	1.75	1.77	1.01	.07	.07	--	.87
15	2.05	--	--	.05	2.00	2.00	1.13	.08	.02	--	1.03
5	2.10	--	--	.05	2.05	2.03	1.25	.12	.20	--	.88
12	1.85	--	--	.15	1.70	1.72	1.12	.08	.36	--	.65
27	2.20	--	--	.15	2.05	2.08	1.32	.08	.28	--	.93
28	1.95	--	--	.15	1.80	1.77	1.03	.07	.06	--	.88
6	2.30	--	--	.20	2.10	2.05	1.27	.17	.18	--	.95
11	2.20	--	--	.10	2.10	2.07	1.35	.13	.33	--	.86
17	1.95	--	--	.10	1.85	1.84	1.08	.12	.06	--	.88
1	2.00	--	--	.05	1.95	1.90	1.07	.13	---	--	.90
16	2.10	--	--	.15	1.95	1.98	1.10	.08	.05	--	.96
18	2.10	--	--	.10	2.00	2.04	1.24	.12	.14	--	.94
8	2.10	--	--	.20	1.90	1.91	1.35	.15	.39	--	.80
10	1.80	--	--	.05	1.75	1.75	1.13	.15	.26	--	1.00
24	1.80	--	--	---	1.80	1.78	1.06	.09	.12	--	.84
2	3.95	--	--	---	3.95	3.91	1.67	.07	---	--	1.57
9	2.50	--	--	.30	2.20	2.19	1.26	.07	.10	--	1.04
13	2.00	--	--	.10	1.90	1.93	1.17	.18	.07	--	.90
7	2.60	--	--	.20	2.40	2.35	1.42	.18	.19	--	1.06
14	2.30	--	--	.10	2.20	2.21	1.29	.17	---	--	1.11
23	2.40	--	--	.05	2.35	2.31	1.44	.11	.23	--	1.06

*weight immediately before cooking.

Appendix Table XVII
Flank steak
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	#Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	1.00	--	--	---	1.00	1.00	.61	.03	---	--	.58
25	.85	--	--	---	.85	.87	.56	---	---	--	.56
26	1.05	--	--	---	1.05	1.04	.62	---	---	--	.62
3	.95	--	--	---	.95	.95	.62	---	---	--	.62
19	1.20	--	--	---	1.20	1.22	.72	.03	---	--	.68
20	1.40	--	--	---	1.40	1.42	.82	---	---	--	.82
21	1.70	--	--	---	1.70	1.68	1.00	---	---	--	1.00
15	1.70	--	--	.10	1.60	1.63	.95	.02	---	--	.90
5	1.50	--	--	---	1.50	1.51	.91	.03	---	--	.88
12	1.45	--	--	---	1.45	1.43	.88	.05	---	--	.83
27	1.10	--	--	---	1.10	1.10	.70	---	---	--	.70
28	1.30	--	--	---	1.30	1.29	.79	---	---	--	.79
6	1.40	--	--	---	1.40	1.45	.93	.08	---	--	.84
11	1.60	--	--	---	1.60	1.61	.99	.04	---	--	.95
17	1.55	--	--	.05	1.50	1.50	.92	---	---	--	.92
1	1.65	--	--	---	1.65	1.61	.93	---	---	--	.93
16	1.70	--	--	.10	1.60	1.63	.97	.06	---	--	.91
18	1.80	--	--	---	1.80	1.78	1.06	---	---	--	1.06
8	1.70	--	--	.10	1.60	1.61	1.00	.08	---	--	.88
10	1.65	--	--	.10	1.55	1.55	.96	.06	---	--	.89
24	1.45	--	--	---	1.45	1.42	.90	---	---	--	.90
2	1.55	--	--	---	1.55	1.54	.98	---	---	--	.98
9	1.80	--	--	.10	1.70	1.71	.88	---	---	--	.88
13	1.70	--	--	---	1.70	1.70	1.08	.08	---	--	.98
7	1.50	--	--	---	1.50	1.54	.97	.05	---	--	.92
14	2.50	--	--	.25	2.25	2.24	1.38	.14	---	--	1.23
23	1.95	--	--	---	1.95	1.96	1.25	.07	---	--	1.17

#weight immediately before cooking.

Appendix Table XVIII
Bottom round steak
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	.80	---	---	---	.80	.82	.48	.09	---	---	.39
25	1.10	---	---	---	1.10	1.11	.69	---	---	---	.69
26	1.05	---	---	---	1.05	1.01	.59	---	---	---	.59
3	1.60	---	---	---	1.60	1.58	.98	.15	---	---	.84
19	1.15	---	---	---	1.15	1.14	.70	.07	---	---	.62
20	1.20	---	---	---	1.20	1.20	.68	.02	---	---	.66
21	1.35	---	---	---	1.35	1.37	.81	---	---	---	.81
15	1.50	---	---	---	1.50	1.47	.86	.06	---	---	.79
5	1.30	---	---	---	1.30	1.29	.75	.08	---	---	.66
12	1.25	---	---	---	1.25	1.17	.78	.12	---	---	.66
27	1.25	---	---	---	1.25	1.22	.72	---	---	---	.72
28	1.25	---	---	---	1.25	1.20	.71	---	---	---	.71
6	1.10	---	---	.05	1.05	1.07	.62	.07	---	---	.55
11	1.55	---	---	.05	1.50	1.50	.90	.11	---	---	.79
17	1.30	---	---	---	1.30	1.32	.80	.09	---	---	.71
1	1.50	---	---	.10	1.40	1.33	.76	.12	---	---	.64
16	1.50	---	---	---	1.50	1.52	.90	.08	---	---	.80
18	1.40	---	---	---	1.40	1.41	.84	.08	---	---	.75
8	1.30	---	---	.05	1.25	1.31	.78	.10	---	---	.67
10	1.35	---	---	---	1.35	1.36	.85	.16	---	---	.68
24	1.35	---	---	---	1.35	1.34	.82	.12	---	---	.70
2	1.40	---	---	.10	1.30	1.30	.81	.12	---	---	.66
9	1.70	---	---	---	1.70	1.62	.96	.17	---	---	.79
13	1.55	---	---	.05	1.50	1.52	.93	.13	---	---	.80
7	1.90	---	---	.05	1.85	1.86	1.13	.19	---	---	.95
14	1.75	---	---	.05	1.70	1.71	1.04	.12	---	---	.93
23	1.80	---	---	---	1.80	1.79	1.08	.09	---	---	.97

*weight immediately before cooking.

Appendix Table XIX
Top round steak
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking: Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	after cooking: Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	1.00	---	---	---	1.00	1.00	.59	.09	---	---	.49
25	1.25	---	---	---	1.25	1.22	.72	.04	---	---	.67
26	1.15	---	---	---	1.15	1.12	.65	---	---	---	.65
3	1.80	---	---	.15	1.65	1.63	.93	.10	---	---	.84
19	1.20	---	---	.05	1.15	1.14	.65	.03	---	---	.62
20	1.25	---	---	.05	1.20	1.21	.69	.07	---	---	.62
21	1.45	---	---	---	1.45	1.43	.84	.10	---	---	.74
15	1.60	---	---	---	1.60	1.56	.88	.03	---	---	.82
5	1.30	---	---	.05	1.25	1.25	.72	.07	---	---	.63
12	1.35	---	---	---	1.35	1.34	.78	.06	---	---	.72
27	1.30	---	---	---	1.30	1.28	.74	---	---	---	.74
28	1.30	---	---	---	1.30	1.25	.72	.06	---	---	.66
6	1.25	---	---	---	1.25	1.23	.71	.04	---	---	.66
11	1.65	---	---	.05	1.60	1.61	.95	.09	---	---	.86
17	1.75	---	---	.10	1.60	1.58	.93	.05	---	---	.88
1	1.20	---	---	.05	1.15	1.12	.62	.03	---	---	.59
16	1.80	---	---	---	1.80	1.81	1.06	.10	---	---	.92
18	1.55	---	---	.05	1.50	1.51	.87	.05	---	---	.81
8	1.30	---	---	.10	1.20	1.23	.76	.09	---	---	.67
10	1.45	---	---	.05	1.40	1.36	.80	.06	---	---	.73
24	1.50	---	---	.05	1.45	1.43	.84	.06	---	---	.78
2	1.35	---	---	.05	1.30	1.24	.75	.06	---	---	.67
9	1.75	---	---	.05	1.70	1.66	.99	.09	---	---	.88
13	1.55	---	---	.05	1.50	1.50	.88	.10	---	---	.78
7	1.90	---	---	.10	1.80	1.77	1.02	.08	---	---	.93
14	1.75	---	---	.05	1.70	1.72	1.02	.11	---	---	.90
23	1.90	---	---	.10	1.80	1.78	1.04	.06	---	---	.98

*weight immediately before cooking.

Appendix Table XX
Heel of round roast
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	2.10	--	--	---	2.10	2.13	1.37	.07	.10	--	1.16
25	2.30	--	--	---	2.30	2.32	1.50	.08	.08	--	1.30
26	2.05	--	--	---	2.05	2.05	1.31	.03	.09	--	1.16
3	3.25	--	--	---	3.25	3.21	2.23	.23	.23	--	1.71
19	2.75	--	--	---	2.75	2.78	1.85	.14	.15	--	1.53
20	2.70	--	--	---	2.70	2.73	1.74	.13	---	--	1.60
21	3.40	--	--	---	3.40	3.37	2.18	.11	.20	--	1.81
15	3.40	--	--	---	3.40	3.38	2.22	.11	.24	--	1.84
5	2.85	--	--	---	2.85	2.83	1.83	.17	.15	--	1.47
12	2.30	--	--	---	2.30	2.31	1.53	.16	.17	--	1.21
27	3.45	--	--	---	3.45	3.47	2.35	.13	.22	--	1.93
28	2.80	--	--	---	2.80	2.84	1.84	.11	.12	--	1.56
6	2.55	--	--	---	2.55	2.56	1.66	.14	.10	--	1.40
11	2.70	--	--	---	2.70	2.67	1.79	.08	.16	--	1.50
17	3.05	--	--	---	3.05	3.03	2.03	.20	.10	--	1.70
1	5.05	--	--	.25	4.80	4.77	2.85	.18	.14	--	2.53
16	4.80	--	--	---	4.80	4.85	3.16	.11	.26	--	2.69
18	3.35	--	--	---	3.35	3.37	2.15	.22	.19	--	1.69
8	2.30	--	--	---	2.30	2.32	1.51	.10	.07	--	1.30
10	4.10	--	--	.05	4.05	4.07	2.88	.43	.03	--	2.10
24	2.85	--	--	---	2.85	2.87	1.87	.10	.12	--	1.59
2	7.00	--	--	.10	6.90	6.90	4.46	.78	.30	--	3.24
9	3.55	--	--	---	3.55	3.54	2.29	.18	.18	--	1.90
13	3.95	--	--	---	3.95	3.99	2.66	.36	.23	--	2.00
7	3.80	--	--	---	3.80	3.84	2.46	.33	.16	--	1.97
14	4.70	--	--	---	4.70	4.68	3.10	.25	.34	--	2.48
23	3.40	--	--	---	3.40	3.41	2.20	.15	.18	--	1.82

*weight immediately before cooking.

Appendix Table XXI
1 in. cubes from neck
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking: Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	after cooking: Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	2.00	--	--	--	2.00	2.00	1.30	--	--	--	1.30
25	2.00	--	--	--	2.00	2.01	1.35	--	--	--	1.35
26	2.00	--	--	--	2.00	2.03	1.32	--	--	--	1.32
3	2.00	--	--	--	2.00	2.00	1.30	--	--	--	1.30
19	2.00	--	--	--	2.00	2.00	1.31	--	--	--	1.31
20	2.00	--	--	--	2.00	2.00	1.24	--	--	--	1.24
21	2.00	--	--	--	2.00	1.99	1.21	--	--	--	1.21
15	2.00	--	--	--	2.00	2.03	1.34	--	--	--	1.34
5	2.00	--	--	--	2.00	1.99	1.26	--	--	--	1.26
12	2.00	--	--	--	2.00	2.00	1.29	--	--	--	1.29
27	2.00	--	--	--	2.00	2.00	1.28	--	--	--	1.28
28	2.00	--	--	--	2.00	2.01	1.24	--	--	--	1.24
6	2.00	--	--	--	2.00	2.00	1.28	--	--	--	1.28
11	2.05	--	--	--	2.05	2.04	1.35	--	--	--	1.35
17	2.00	--	--	--	2.00	2.00	1.22	--	--	--	1.22
1	2.00	--	--	--	2.00	2.00	1.16	--	--	--	1.16
16	2.00	--	--	--	2.00	1.99	1.26	--	--	--	1.26
18	2.00	--	--	--	2.00	2.01	1.21	--	--	--	1.21
8	2.00	--	---	--	2.00	2.00	1.32	--	--	--	1.32
10	2.15	--	--	--	2.15	2.15	1.42	--	--	--	1.42
24	2.00	--	--	--	2.00	1.99	1.27	--	--	--	1.27
2	2.00	--	--	--	2.00	2.00	1.31	--	--	--	1.31
9	2.00	--	--	--	2.00	1.98	1.27	--	--	--	1.27
13	2.05	--	--	--	2.05	2.01	1.32	--	--	--	1.32
7	2.00	--	--	--	2.00	2.02	1.03	--	--	--	1.03
14	2.00	--	--	--	2.00	2.01	1.30	--	--	--	1.30
23	2.00	--	--	--	2.00	2.02	1.39	--	--	--	1.39

*weight immediately before cooking.

Appendix Table XXII

9th, 10th, 11th, 12th short ribs from plate

Summary of weights before and after cooking (lb.)

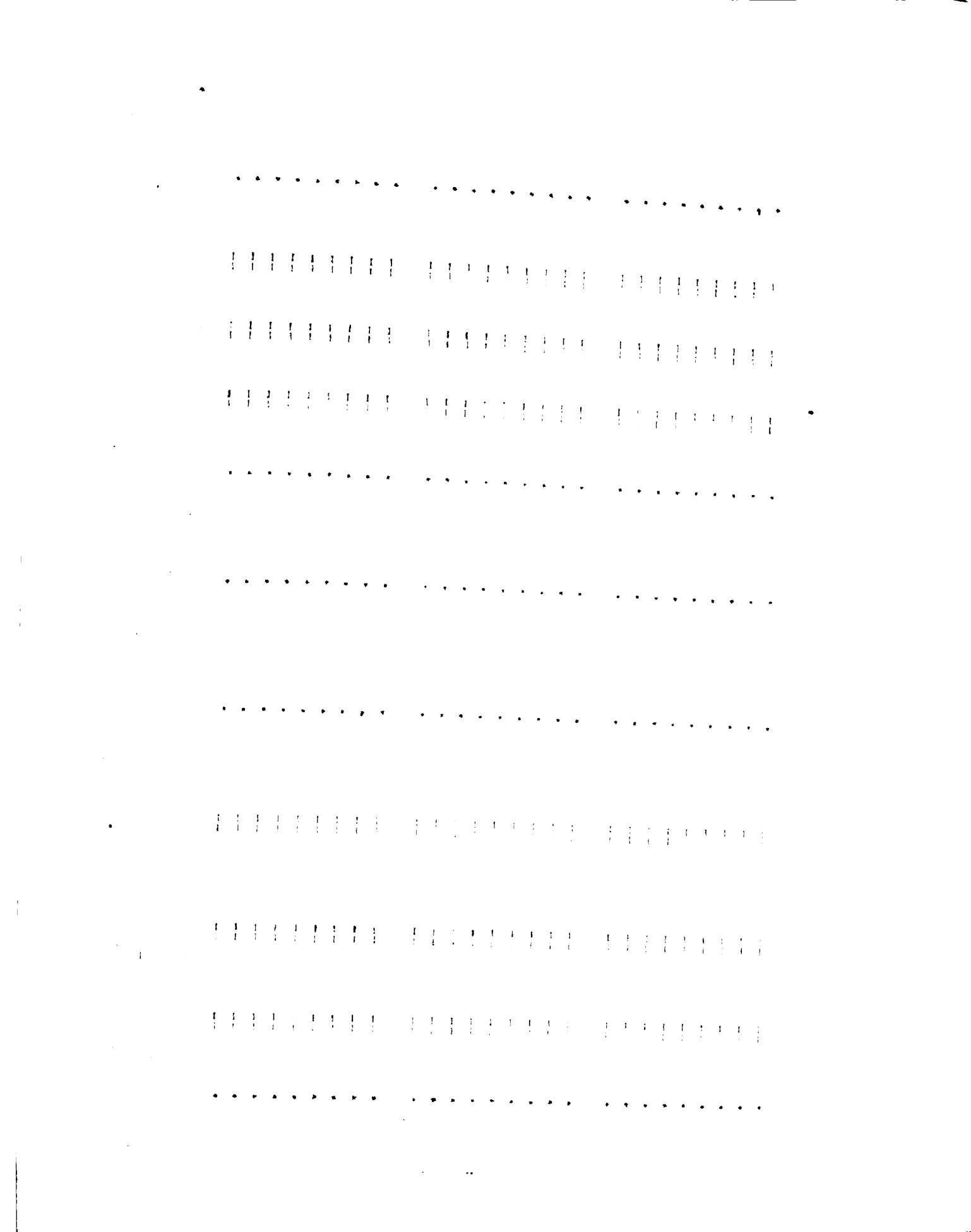
	before cooking						after cooking				
Cattle No.	Un-trimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Inter-muscular fat	Bone	Edible portion (lean)
4	1.35	---	---	---	1.35	1.35	1.03	.13	.32	.22	.36
25	1.55	---	---	---	1.55	1.54	1.20	.04	.28	.24	.62
26	1.55	---	---	---	1.55	1.56	1.19	---	.37	.20	.62
3	1.85	---	---	.10	1.75	1.72	1.32	.42	.21	.26	.42
19	1.60	---	---	---	1.60	1.63	1.22	---	.28	.23	.66
20	1.25	---	---	---	1.25	1.23	.96	.14	.08	.23	.46
21	1.50	---	---	---	1.50	1.49	1.15	---	.30	.25	.58
15	1.75	---	---	---	1.75	1.75	1.33	.24	.16	.33	.59
5	2.00	---	---	---	2.00	2.00	1.46	.08	.24	.32	.82
12	1.75	---	---	.05	1.70	1.70	1.39	.44	.18	.25	.54
27	1.60	---	---	---	1.60	1.64	1.32	.05	.29	.23	.71
28	1.55	---	---	---	1.55	1.59	1.29	.06	.26	.24	.70
6	1.90	---	---	.10	1.80	1.80	1.37	.27	.35	.30	.51
11	1.90	---	---	.10	1.80	1.83	1.39	.42	.23	.25	.48
17	1.90	---	---	---	1.90	1.89	1.42	.38	.16	.29	.53
1	2.15	---	---	.40	1.75	1.71	1.12	---	.37	.23	.52
16	1.75	---	---	---	1.75	1.74	1.34	.26	.20	.25	.59
18	1.95	---	---	---	1.95	1.95	1.45	.07	.31	.25	.80
8	2.40	---	---	---	2.40	2.40	1.82	.33	.31	.32	.83
10	2.40	---	---	.40	2.00	1.98	1.57	.43	.27	.23	.61
24	2.05	---	---	---	2.05	2.07	1.61	.10	.48	.22	.78
2	2.70	---	---	.60	2.10	2.08	1.55	.26	.30	.30	.66
9	2.00	---	---	.10	1.90	1.86	1.42	.41	.18	.28	.55
13	2.60	---	---	.20	2.40	2.39	1.94	.42	.35	.28	.80
7	2.60	---	---	.20	2.40	2.39	1.94	.48	.35	.36	.73
14	2.30	---	---	.05	2.25	2.24	1.77	.58	.14	.31	.72
23	2.15	---	---	---	2.15	2.19	1.73	.25	.33	.37	.72

*weight immediately before cooking.

Appendix Table XXIII
Tenderloin steak
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking: Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	after cooking: Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	.20	--	--	--	.20	.19	.16	--	--	--	.16
25	.30	--	--	--	.30	.25	.22	--	--	--	.22
26	.25	--	--	--	.25	.21	.18	--	--	--	.18
3	.40	--	--	--	.40	.40	.30	--	--	--	.30
19	.35	--	--	--	.35	.32	.26	--	--	--	.26
20	.35	--	--	--	.35	.36	.28	--	--	--	.28
21	.35	--	--	--	.35	.29	.24	--	--	--	.24
15	.45	--	--	--	.45	.42	.33	--	--	--	.33
5	.30	--	--	--	.30	.31	.24	--	--	--	.24
12	.35	--	--	--	.35	.35	.31	--	--	--	.31
27	.25	--	--	--	.25	.25	.19	--	--	--	.19
28	.35	--	--	--	.35	.35	.27	--	--	--	.27
6	.40	--	--	--	.40	.35	.30	--	--	--	.30
11	.45	--	--	--	.45	.41	.33	--	--	--	.33
17	.35	--	--	--	.35	.31	.25	--	--	--	.25
1	.45	--	--	--	.45	.41	.34	--	--	--	.34
16	.50	--	--	--	.50	.49	.38	--	--	--	.38
18	.35	--	--	--	.35	.34	.26	--	--	--	.26
8	.40	--	--	--	.40	.37	.31	--	--	--	.31
10	.45	--	--	--	.45	.42	.32	--	--	--	.32
24	.35	--	--	--	.35	.37	.28	--	--	--	.28
2	.40	--	--	--	.40	.37	.24	--	--	--	.24
9	.50	--	--	--	.50	.46	.38	--	--	--	.38
13	.45	--	--	--	.45	.44	.34	--	--	--	.34
7	.50	--	--	--	.50	.49	.41	--	--	--	.41
14	.50	--	--	--	.50	.47	.40	--	--	--	.40
23	.45	--	--	--	.45	.44	.32	--	--	--	.32

*weight immediately before cooking.



Appendix Table XXIV
2 rib English corner
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking: Untrimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	after cooking: Drained cut	External fat	Intermuscular fat	Bone	Edible portion (lean)
4	2.00	---	---	---	2.00	2.00	1.38	.23	.24	.17	.75
25	2.20	---	---	---	2.20	2.22	1.54	.06	.35	.17	.90
26	2.00	---	---	---	2.00	2.06	1.51	.03	.33	.23	.89
3	3.30	---	---	---	3.30	3.27	2.31	.11	.62	.27	1.32
19	2.40	---	---	---	2.40	2.39	1.74	.10	.37	.24	.98
20	2.25	---	---	---	2.25	2.23	1.68	.07	.37	.32	.88
21	2.50	---	---	---	2.50	2.48	1.82	.03	.33	.42	.98
15	2.85	---	---	---	2.85	2.84	2.00	.24	.34	.36	1.01
5	2.75	---	---	---	2.75	2.76	2.21	.26	.50	.36	1.06
12	3.00	---	---	.05	2.95	2.98	2.21	.20	.38	.51	1.09
27	2.80	---	---	---	2.80	2.85	2.28	.04	.60	.45	1.20
28	2.70	---	---	---	2.70	2.73	1.93	.09	.42	.27	1.06
6	2.90	---	---	---	2.90	2.90	2.18	.46	.38	.30	1.04
11	3.05	---	---	---	3.05	3.04	2.15	.30	.46	.31	1.06
17	3.30	---	---	---	3.30	3.30	2.20	.10	.52	.36	1.16
1	4.05	---	---	.05	4.00	3.99	2.49	.10	.76	.21	1.41
16	3.40	---	---	---	3.40	3.39	2.42	.33	.34	.35	1.33
18	4.35	---	---	---	4.35	4.32	2.84	.10	.67	.44	1.50
8	3.40	---	---	---	3.40	3.42	2.40	.38	.59	.33	1.13
10	3.50	---	---	.10	3.40	3.43	2.39	.14	.79	.42	1.08
24	3.60	---	---	---	3.60	3.60	2.48	.10	.67	.26	1.36
2	5.60	---	---	---	5.60	5.55	3.81	.15	1.42	.37	1.87
9	3.30	---	---	---	3.30	3.28	2.22	.03	.48	.31	1.33
13	3.75	---	---	.05	3.70	3.71	2.75	.57	.66	.33	1.23
7	4.40	---	---	.10	4.30	4.31	3.01	.09	.83	.40	1.60
14	4.70	---	---	---	4.70	4.69	3.26	.44	.79	.33	1.80
23	3.50	---	---	---	3.50	3.50	2.45	.10	.57	.41	1.29

*weight immediately before cooking.

Appendix Table XXV
Cross-cut foreshank
Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Un-trimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Inter-muscular fat	Bone	Edible portion (lean)
4	.70	---	---	---	.70	.70	.50	---	.05	.13	.31
25	.80	---	---	---	.80	.78	.58	---	.03	.15	.39
26	.80	---	---	---	.80	.78	.57	---	.03	.13	.40
3	.85	---	---	---	.85	.85	.53	---	.02	.14	.35
19	.90	---	---	---	.90	.88	.64	.03	.07	.16	.39
20	.90	---	---	---	.90	.89	.64	.02	.05	.18	.36
21	1.05	---	---	---	1.05	1.06	.80	.04	.07	.23	.44
15	.95	---	---	---	.95	.96	.69	---	.09	.19	.39
5	.95	---	---	---	.95	.95	.68	.02	.05	.17	.42
12	.90	---	---	---	.90	.91	.68	.05	.02	.21	.39
27	1.05	---	---	---	1.05	1.03	.76	.05	.05	.19	.47
28	.95	---	---	---	.95	.96	.73	---	.07	.20	.46
6	1.05	---	---	---	1.05	1.06	.74	---	.06	.17	.48
11	1.05	---	---	---	1.05	1.06	.77	.05	.04	.19	.48
17	1.15	---	---	---	1.15	1.14	.82	.09	---	.20	.52
1	1.10	---	---	---	1.10	1.10	.75	---	.13	.18	.43
16	1.35	---	---	---	1.35	1.34	.98	---	.14	.25	.58
18	1.15	---	---	---	1.15	1.13	.83	.06	.04	.23	.48
8	1.05	---	---	---	1.05	1.05	.73	.06	---	.17	.47
10	1.15	---	---	---	1.15	1.15	.83	.09	.06	.21	.47
24	1.10	---	---	---	1.10	1.11	.80	---	.04	.17	.55
2	1.10	---	---	---	1.10	1.10	.83	.11	---	.21	.52
9	1.35	---	---	---	1.35	1.31	.97	---	.10	.12	.63
13	1.40	---	---	---	1.40	1.41	1.02	.03	.07	.23	.66
7	1.20	---	---	---	1.20	1.19	.78	---	.10	.20	.48
14	1.50	---	---	---	1.50	1.47	1.08	.06	.02	.27	.68
23	1.35	---	---	---	1.35	1.33	1.05	.03	.06	.28	.66

*weight immediately before cooking.

Appendix Table XXVI

Boneless strip steak

Summary of weights before and after cooking (lb.)

Cattle No.	before cooking						after cooking				
	Un-trimmed cut	Lean trim	Bone trim	Fat trim	Trimmed cut	*Trimmed cut before cooking	Drained cut	External fat	Inter-muscular fat	Bone	Edible portion (lean)
4	.50	--	--	--	.50	.48	.36	.06	--	--	.29
25	.85	--	--	.10	.75	.74	.54	.09	--	--	.43
26	.70	--	--	.05	.65	.65	.47	.05	--	--	.42
3	.75	--	--	.05	.70	.68	.62	.04	--	--	.56
19	.85	--	--	.05	.80	.81	.60	.07	--	--	.53
20	.80	--	--	.05	.75	.74	.56	.08	--	--	.48
21	.70	--	--	.05	.65	.67	.54	.08	--	--	.43
15	.85	--	--	.05	.80	.78	.58	.07	--	--	.50
5	.85	--	--	.05	.80	.83	.63	.08	--	--	.53
12	.75	--	--	.10	.65	.66	.52	.10	--	--	.42
27	.75	--	--	.05	.70	.71	.54	.05	--	--	.48
28	.80	--	--	--	.80	.80	.55	.06	--	--	.49
6	.70	--	--	--	.70	.67	.60	.08	--	--	.53
11	.85	--	--	.10	.75	.72	.55	.07	--	--	.48
17	1.05	--	--	.15	.90	.90	.69	.05	--	--	.64
1	1.15	--	--	.15	1.00	.91	.62	.06	--	--	.56
16	1.00	--	--	.05	.95	.94	.66	.08	--	--	.57
18	.95	--	--	.10	.85	.85	.62	.04	--	--	.57
8	.90	--	--	.10	.80	.84	.57	.04	--	--	.51
10	1.05	--	--	.30	.75	.74	.55	.06	--	--	.48
24	.95	--	--	.15	.80	.83	.60	.04	--	--	.55
2	1.10	--	--	--	1.10	1.06	.75	.10	--	--	.64
9	1.05	--	--	.25	.80	.81	.56	.07	--	--	.49
13	1.25	--	--	.30	.95	.97	.66	.02	--	--	.60
7	1.20	--	--	.30	.90	.92	.66	.10	--	--	.57
14	1.30	--	--	.20	1.10	1.08	.82	.11	--	--	.72
23	1.00	--	--	.10	.90	.90	.63	.05	--	--	.57

*weight immediately before cooking.