T H E S I S

on

QUALITY AND PALATABILITY OF CHEVON

Submitted to the

OREGON STATE AGRICULTURAL COLLEGE

In partial fulfillment of
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Degree of

MASTER OF SCIENCE

by

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APPROVED:

Redacted for Privacy

Professor of Animal Husbandry

In Charge of Major

Redacted for Privacy

Chairman of Committee on Graduate Study.

I N D E X

QUALITY AND PALATABILITY OF CHEVON

The State of Oregon is credited with 121,193 goats according to the "Census of Agriculture: 1925,- Oregon." Practically all of these are of Angora breeding. There are but few milk goats or straight haired goats in the State. Most of the goats are found in the western half of the state, where there are large areas of land too brushy to be suitable for cattle and sheep grazing, but suitable for goat grazing. There are also approximately five million acres of brushy and logged off land in western Oregon that appears to be suitable for goat grazing but which is not now being utilized for any purpose. The Angora goat, therefore, is not only of economic importance at present but may become much more important in the future.

The Angora goat is valuable both as a brush clearing animal and as a producer of mohair. In 1924 101,101 Angora goats were shorn and produced 413,441 pounds of mohair, or an average of 4.08 pounds per head. The value of this clip was $196,916.00, or an average of $1.96 per head.

The fact that Oregon already has a large number of Angora goats in these brushy and logged off sections and

a possibility of much larger numbers raises the question of the value of the goat as a producer of meat.

The term "chevon" was adopted as the official name for "goat meat" by the Sheep and Goat Raisers Association of Texas in the spring of 1922 and was immediately adopted by all Angora breed associations. On September 8, 1924, the name was officially adopted by the Secretary of Agriculture, the late Henry C. Wallace.

The reason for adopting the name chevon was to get away from the prejudice of the American public against "goat meat".

Prior to 1918 the meat packers were buying a large number of goats at one-half to two-thirds the value of sheep of the same class and were selling the meat as mutton at regular mutton prices. The committee of goat men asked the Department of Agriculture to have the packers stamp or tag each carcass of the goat "goat meat" and enforce the pure food law. The order was passed and the people refused to buy "goat meat" when they had been buying it and eating it as mutton prior to this time.

So later on to get away from this prejudice the term chevon was adopted as the official name for goat meat.

In 1913 a law was passed in Oregon requiring all goat meat to be labeled "goat meat" before being sold.

This law caused a certain amount of prejudice against goat and kid meat. In 1921 this law was repealed and at the present time the only law regarding the sale of goat meat is that all wethers that are sold must be castrated prior to three months of age.

Therefore, three questions concerning the goat business of Oregon have come up in the last few years.

First: The cost of production of goats.

Second: The grazing possibilities of goats both to maintain brushy areas used for goat grazing year after year, and also to kill brush on certain areas.

Third: The value of ~~goat meat~~ chevon.

An economic survey of the goat industry in Oregon together with grazing experiments at Corvallis are taking care of the first two phases of this work. The latter phase is the subject of this study in "Quality and Palatability of Chevon".

The object of this work was, therefore, to determine whether chevon is a palatable product; to compare the chevon with lamb and mutton of a similar age and degree of finish; to study the influence of age, sex and degree of finish on the meat; and to gather information on dressing percentage and methods of slaughter.

Review of Literature on Chevon Studies

Very little, if any, information concerning the study of goat meat can be found. In going through the Experiment Station Records and the U. S. D. A. Year Books no information concerning the study of chevon can be found.

Mr. W. H. Tomhave states in his text, "Meat and Meat Products", "Goat meat or chevon is usually quite free from fat and the color is not so red as that of lamb or mutton. The meat has a characteristic odor." - Lippincotts Farm Manuals, page 11.

Mr. M. D. Helser states in his text, "Farm Meats" that about 150,000 goats are killed each year under federal inspection, and that goats are dressed and the careasses are cut into cuts the same manner as sheep. He also states that the Angora careass is not so heavily fleshed as the mutton carcass and the meat is somewhat sweeter. - MacMillan Publishing Co., 1923 Edition, page 172.

System of Grading Chevon

At the beginning it was decided that there should be some system of grading both the live animals and the carcasses. The system that was finally agreed upon was to use five grades, numbered from one to five. The number one grade was a carcass that would be exceptionally well finished, well filled out in the loins, in the leg, over the shoulder, and over the back, showing plenty of condition in all of these places, and showing plenty of symmetry. The number two grade would be slightly inferior to the number one grade, not carrying quite as much condition and be not quite as good as far as conformation was concerned. Number three was inferior both in conformation and slightly inferior in condition to the number two grade. Number four would be a carcass that lacks in condition and lacks in filling in the leg, width and thickness of the loin, thickness and smoothness over the shoulder, and an animal that was lacking in general symmetry. A number five grade, the lowest grade that we give, would be for animals that were very thin, lacking both in conformation and condition.

This system was to be used both for the carcasses and for the live animals.

This system of grading was adopted and carried out as closely to the U. S. D. A. methods of grading lambs as was possible. Since we knew of no method that they had used for grading goats it was thought that following the lamb grading method as closely as possible would be the best method. Animals grading as No. 1 being the same as prime with lambs, No. 2 choice, No. 3 good, No. 4 medium, and No. 5 common.

Slaughter Procedure

All of the goats slaughtered were kept away from feed and water for twenty-four hours before slaughtering. They were weighed in before slaughter.

The goats were slit at the throat and as soon as they were through bleeding the pelt was removed. The method used in removing the pelt was the same as is used in dressing lambs. The hide was opened on the inside of the front legs, to a point about three inches in front of the brisket. The hide was opened on the hind legs from the hocks to the dew claws and then from the hocks to the rectum. The pelt was then fisted loose the same as with lambs. As soon as the pelt was fisted loose the animal was hung up and the pelt split down the center of the underline and the pelt removed. The toes were removed at the break joint the same as with lambs. The offal was then removed and the carcass washed down.

This method of slaughter was used with all of the goats that were killed and is the same method that is suggested by Professor M. D. Helser, Professor of Animal Husbandry, Iowa State College, in his text "Farm Meats", chapter 10, pages 144 to 157.

Immediately after the animals were dressed the carcasses were transferred to a cooler which was held at a

temperature varying between 29° and 35° F. All of the carcasses were held at this temperature until one hour before the legs were cooked. They were then removed and weighed and the dressing percentage was figured from this weight and the shrunk weight.

The goats that were slaughtered that had fairly long growth of mohair were more difficult to dress out than the ones with shorter mohair. It was very hard in practically all cases to keep the mohair away from the body, especially around the legs and also around the places where the hide was cut.

No special methods were used to get away from the odor that so many people think causes the goat meat to have a strong taste. The kidney and kidney fat was left in the carcass.

It was noted that the pelt was much harder to remove from goat carcasses than it is from lamb and mutton carcasses. It was much more difficult to remove the pelt without tearing the fell especially around the flank and front quarters. Also it was more difficult to skin out the legs. The best method of slaughter was to fist off the pelt, the same as with lambs.

Summary of Killing Data

The following table gives the entire slaughter data regarding all the goats that were killed. It will be noticed that most of the kids had a higher dressing percentage than the older animals, also the animals of the higher grades dressed out somewhat higher.

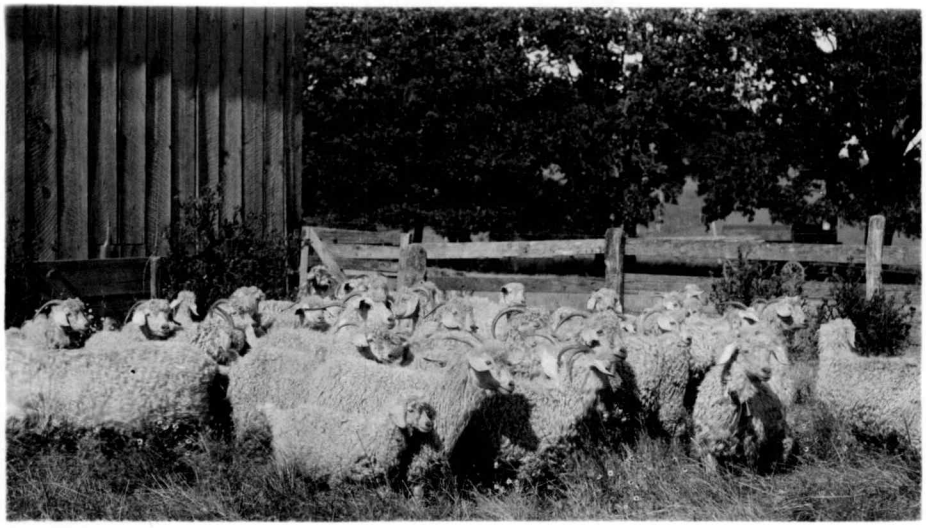
Kid No. 22 was dressed out by a young man who had had very little experience dressing lambs and no experience with goats. Consequently the fell was badly torn and removed with the pelt, as will be noticed in the picture. No apparent difference was noticed in the palatability of the meat of this carcass and the other kids.

The average dressing percentage of the 16 head of all ages was 47.49, the average dressing percentage for four kids was 50.06, for eight yearlings 46.45, three two-year olds 46.16, and one aged wether 47.7. The kids that were killed seemed to carry a little more fat than the animals of the various other ages. The aged wether that was killed was quite fat and graded No. 2 both on foot and dressed.

Pictures were taken of all of the carcasses used in this experiment. The chart used as a background for the carcasses was divided into four inch squares. The camera

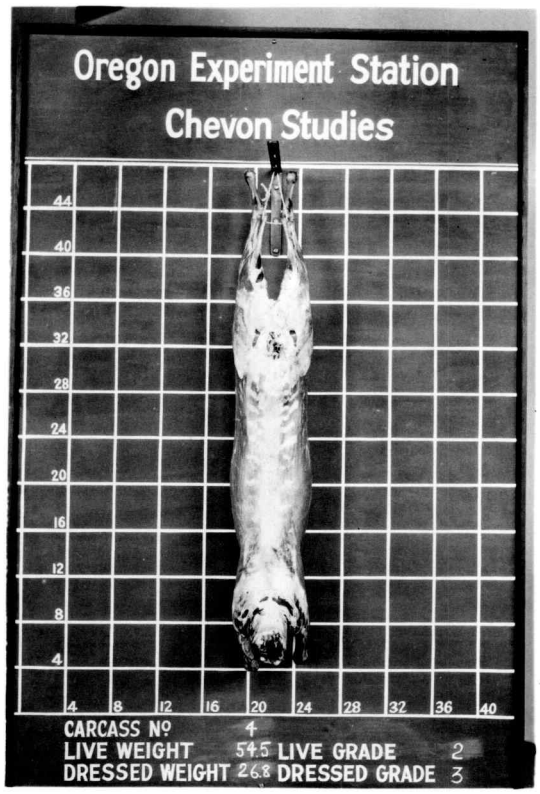
was placed approximately eight feet from the chart when the pictures were taken.

Pictures of all of the carcasses used in the test will be noted on the following pages.



Part of College Angora Flock

Kid No. 22. Typical of All Kids Killed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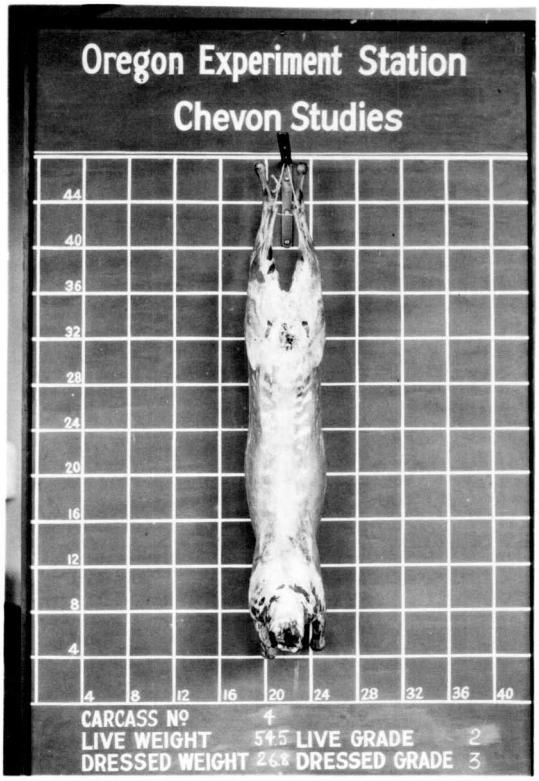
CARCASS Nº 4
LIVE WEIGHT 54.5 LIVE GRADE 2
DRESSED WEIGHT 26.8 DRESSED GRADE 3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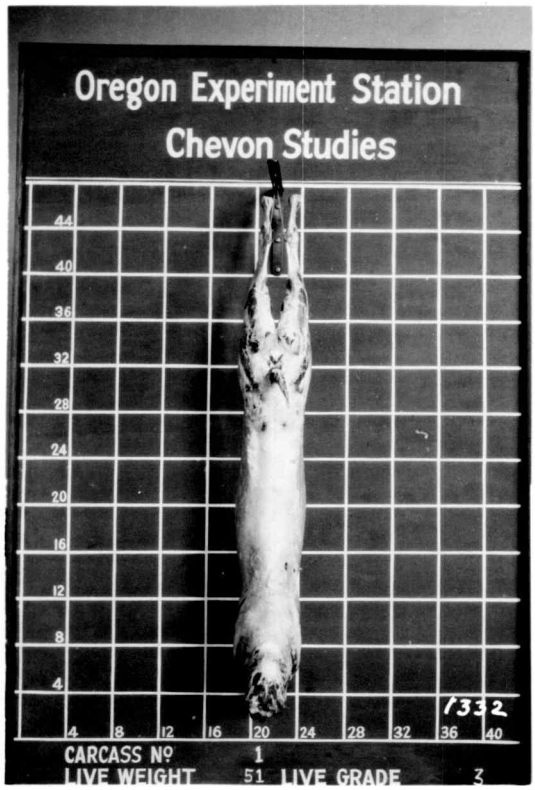
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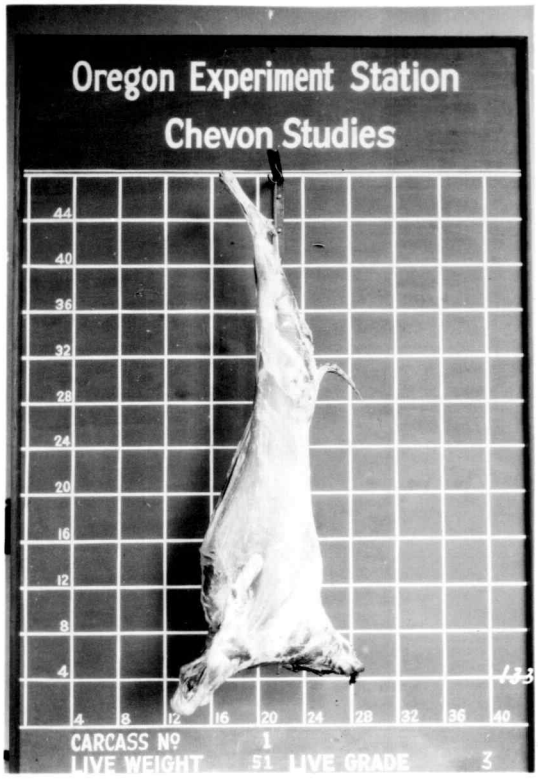
CARCASS Nº 1
LIVE WEIGHT 51 LIVE GRADE 3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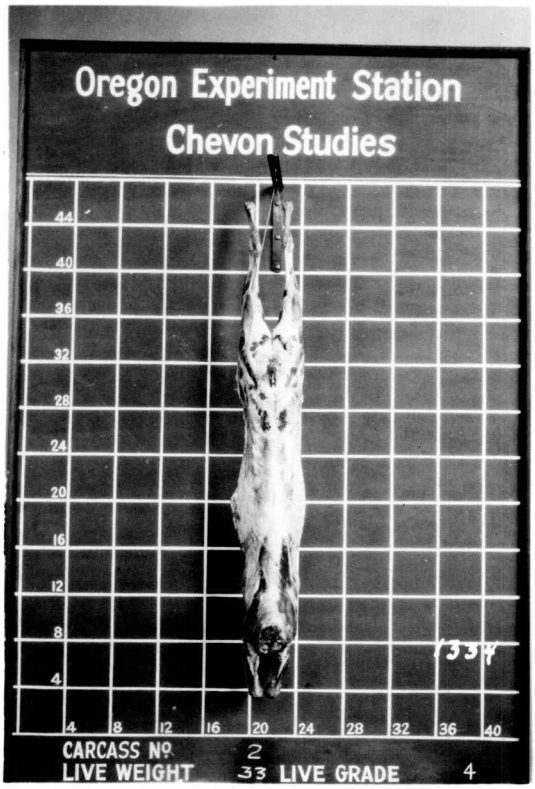
CARCASS Nº 1
LIVE WEIGHT 51 LIVE GRADE 3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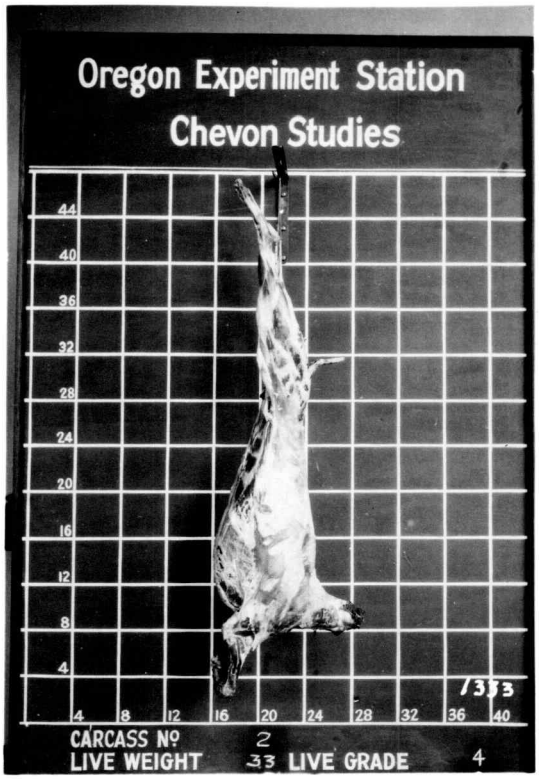
CARCASS Nº 2
LIVE WEIGHT 33 LIVE GRADE 4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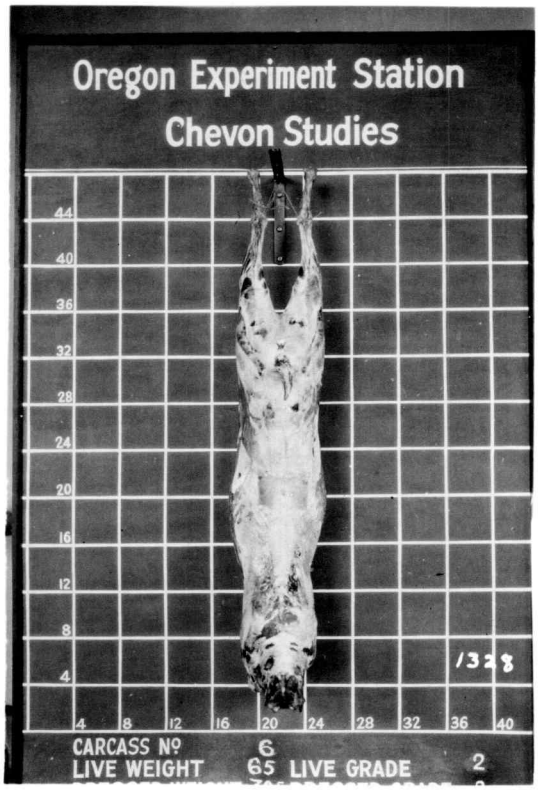
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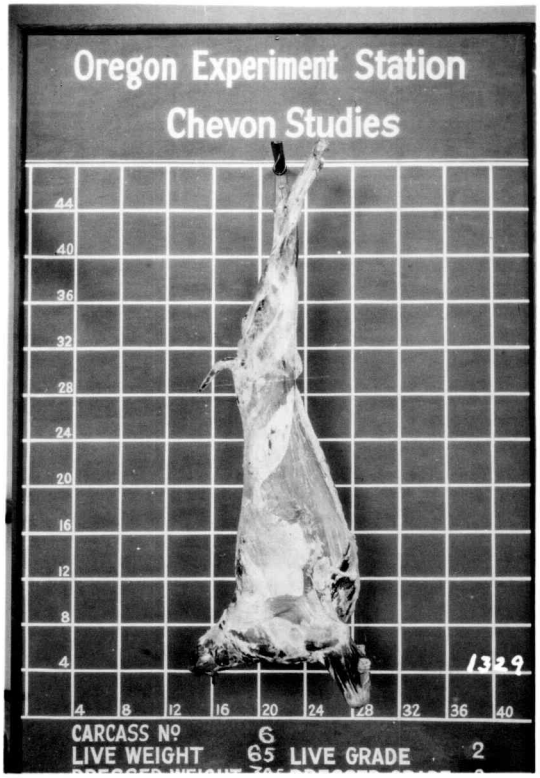
CARCASS Nº 6
LIVE WEIGHT 65 LIVE GRADE 2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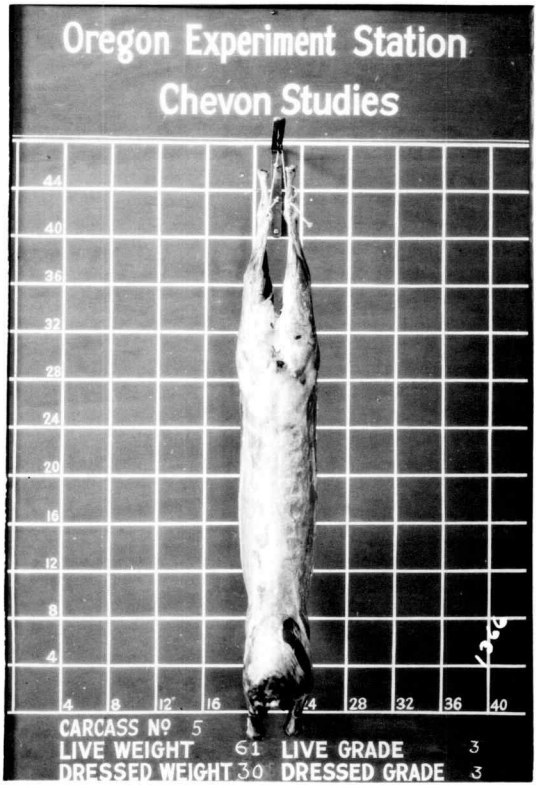
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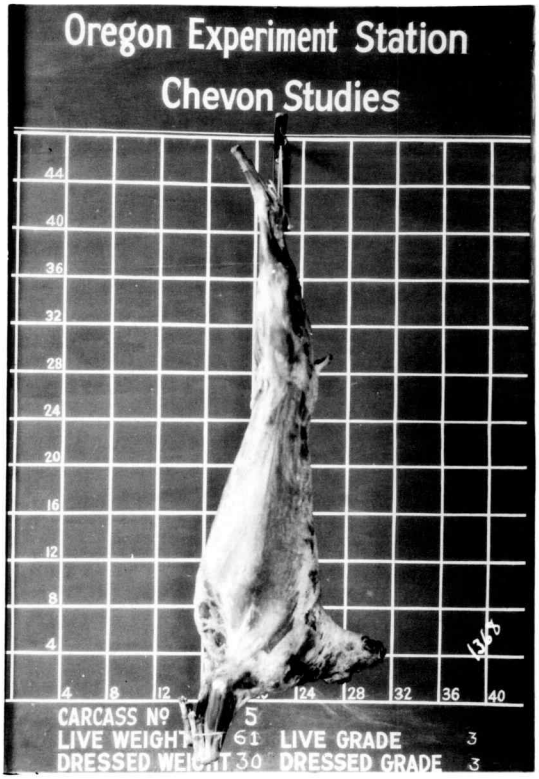
LIVE WEIGHT 61 LIVE GRADE 3
DRESSED WEIGHT 30 DRESSED GRADE 3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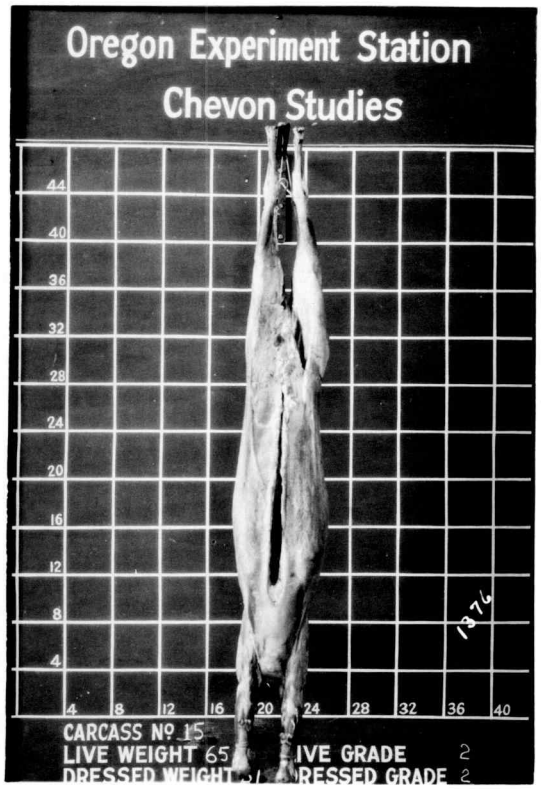
DRESSED WEIGHT 30 DRESSED GRADE 3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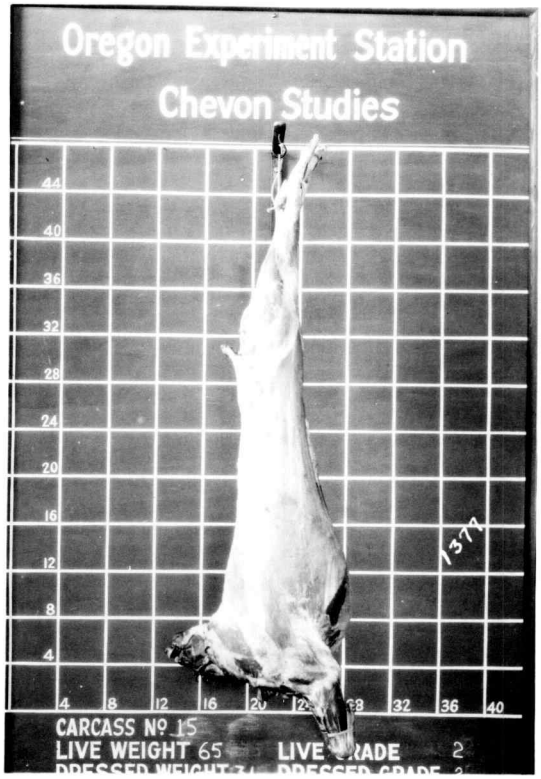
CARCASS Nº 15
LIVE WEIGHT 65
IVE GRADE 2
RESSED GRADE 2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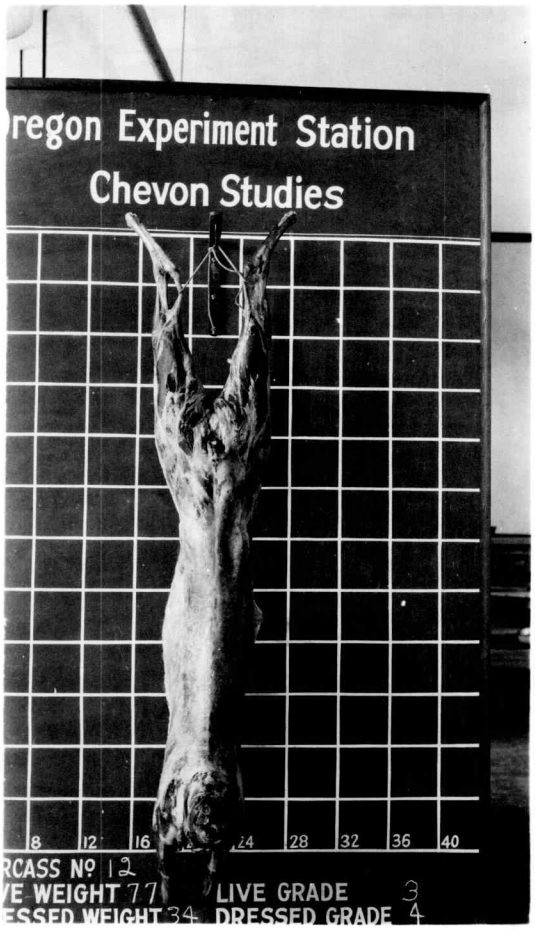
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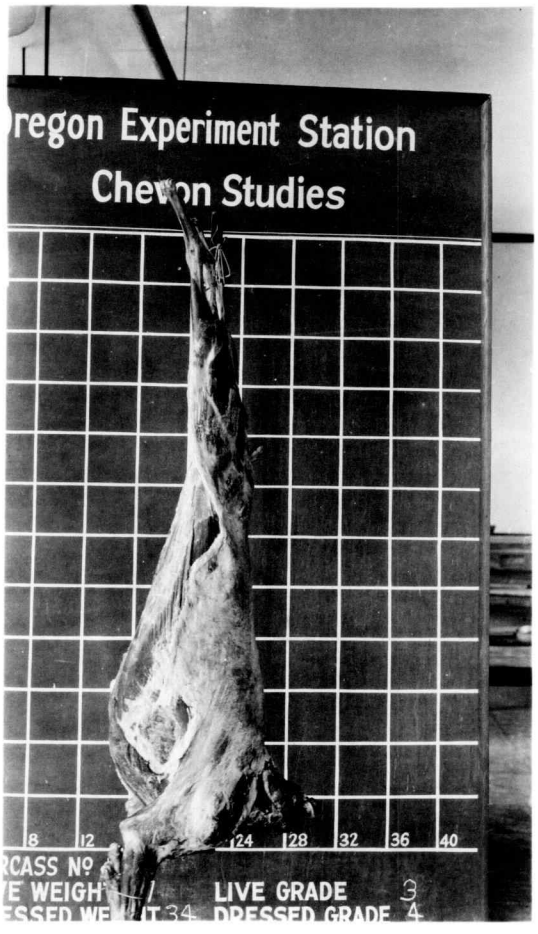
ESSED WEIGHT 34 DRESSED GRADE 4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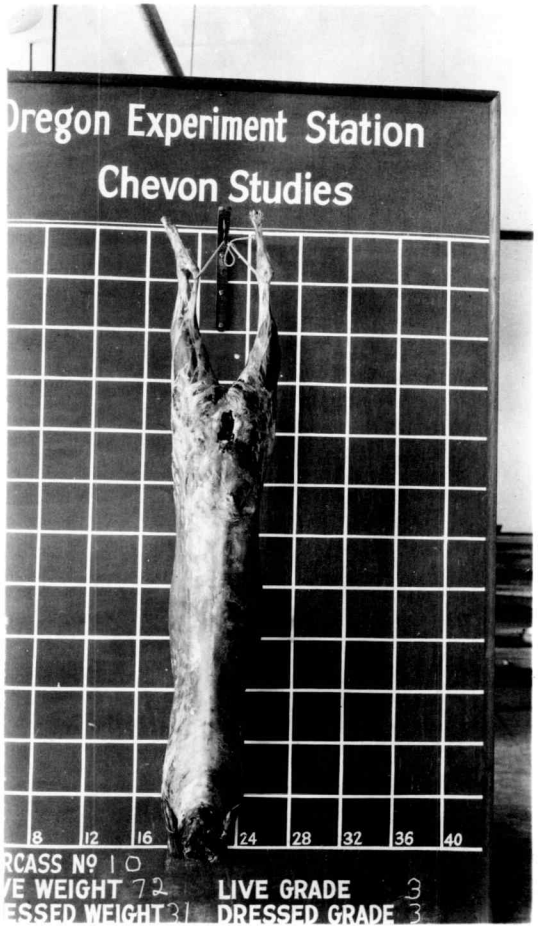
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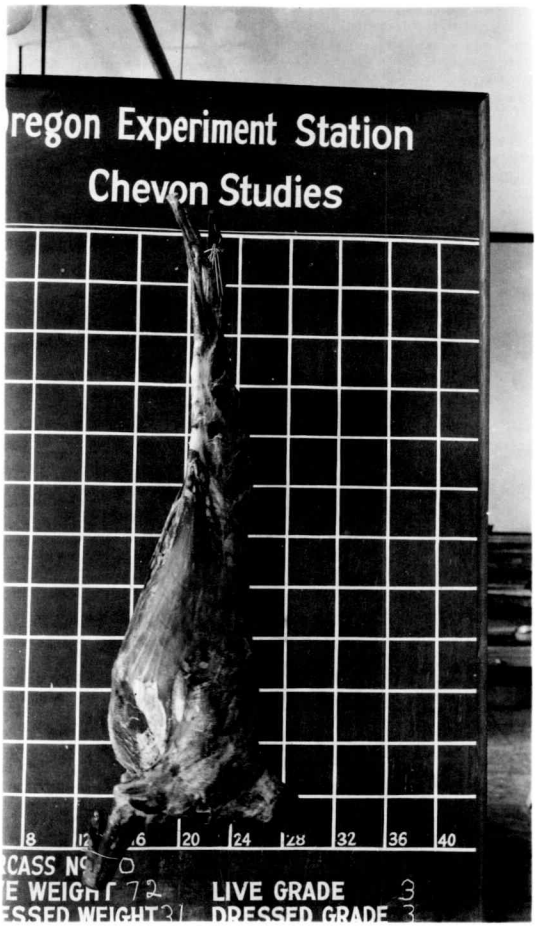
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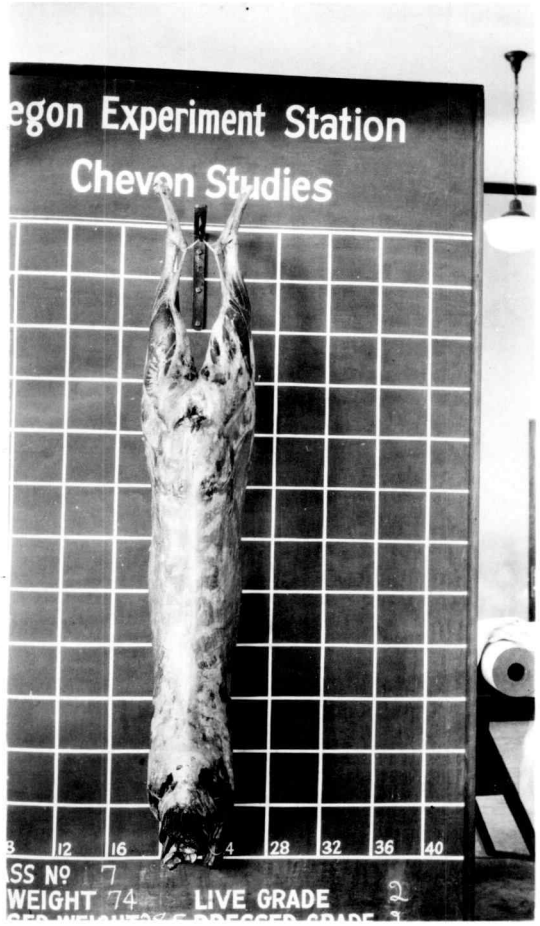
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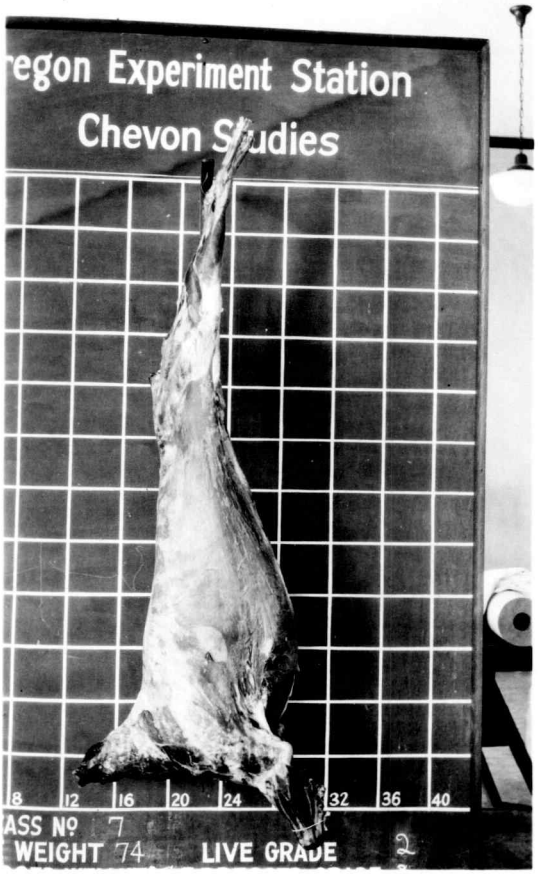
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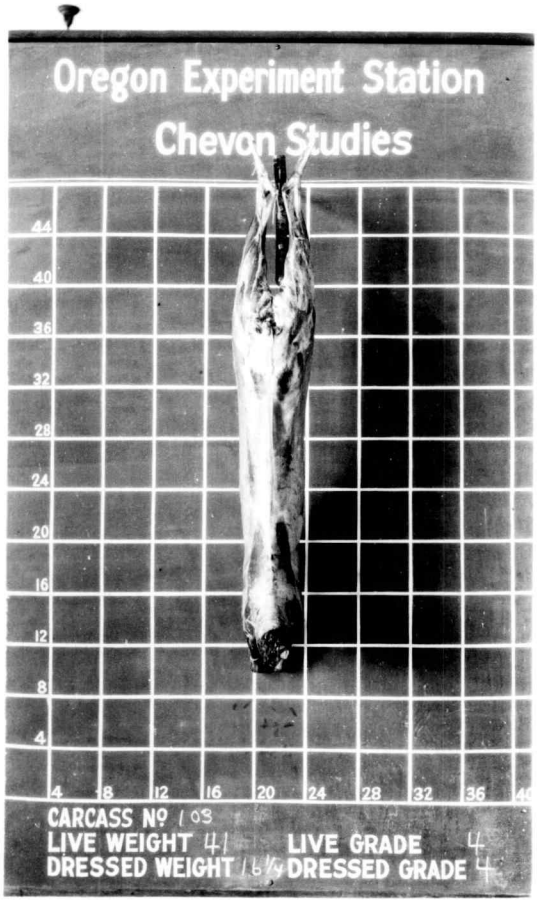
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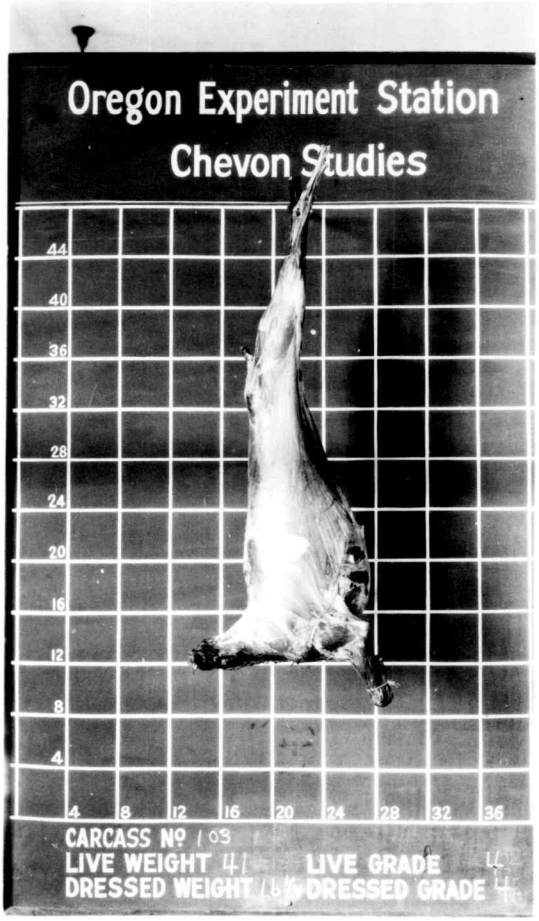
LIVE WEIGHT 41 LIVE GRADE 4
DRESSED WEIGHT 16½ DRESSED GRADE 4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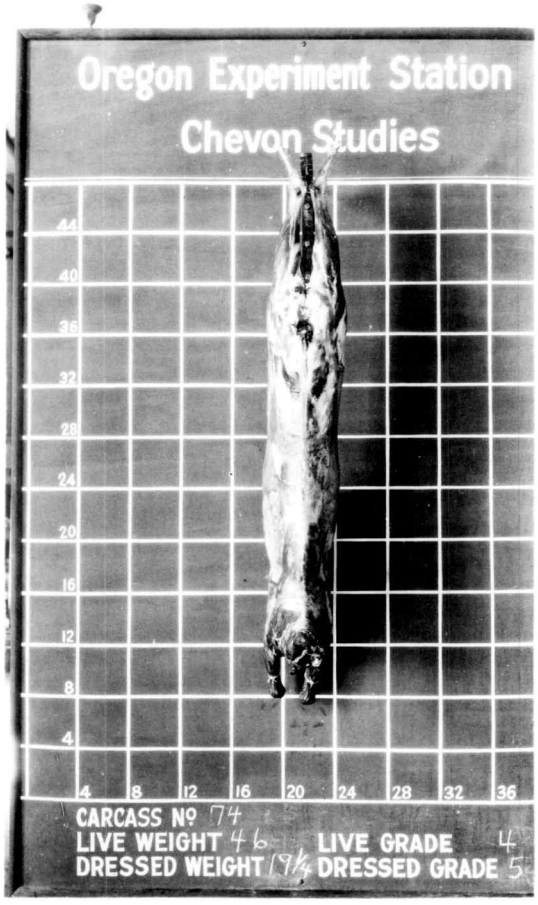
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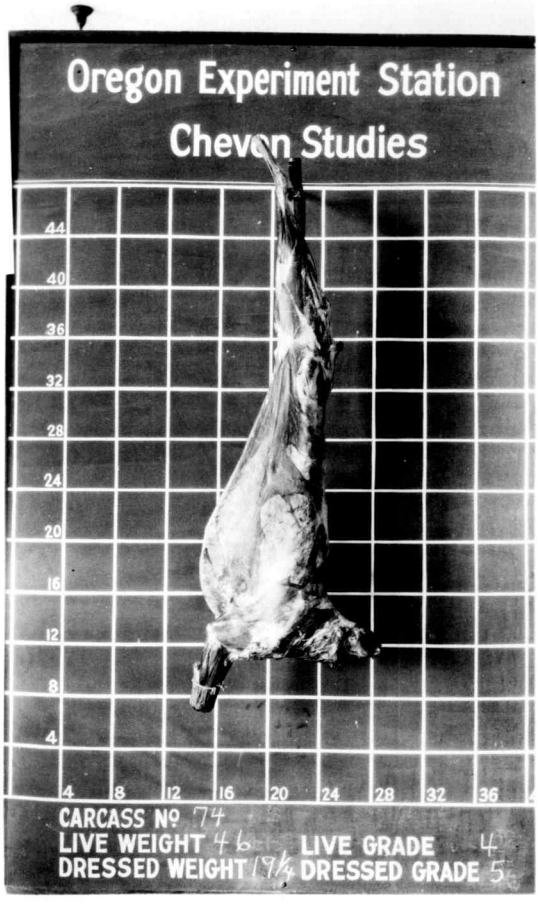
DRESSED WEIGHT 19¼ DRESSED GRADE 5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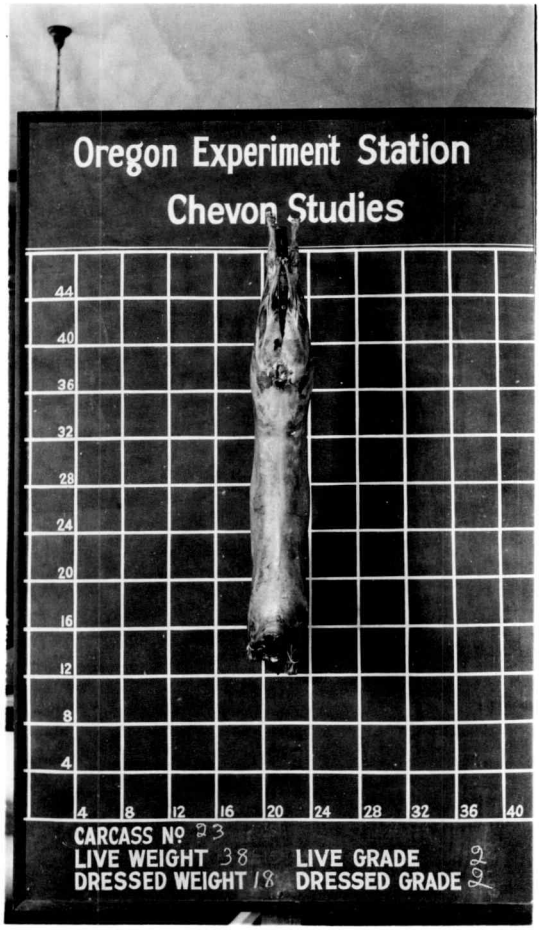
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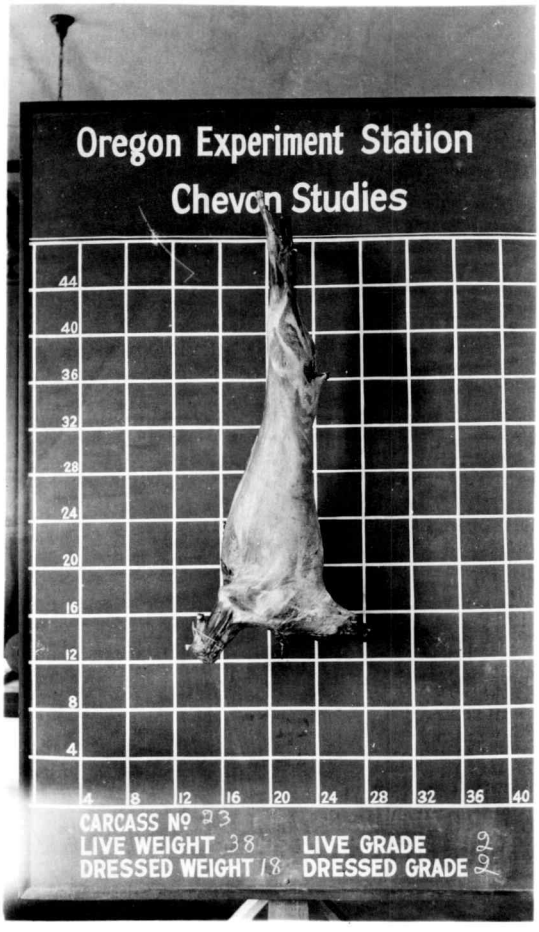
LIVE WEIGHT 38
LIVE GRADE
DRESSED WEIGHT 18
DRESSED GRADE 2.29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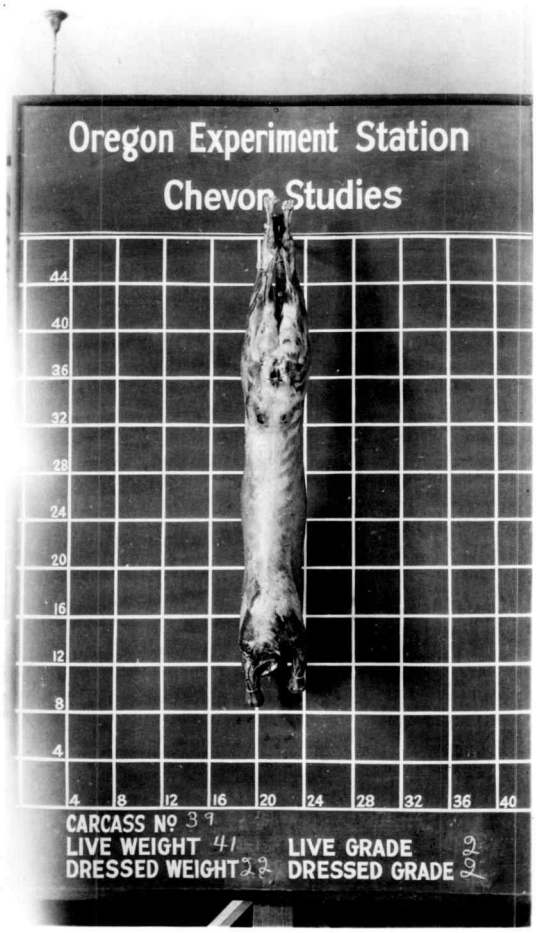
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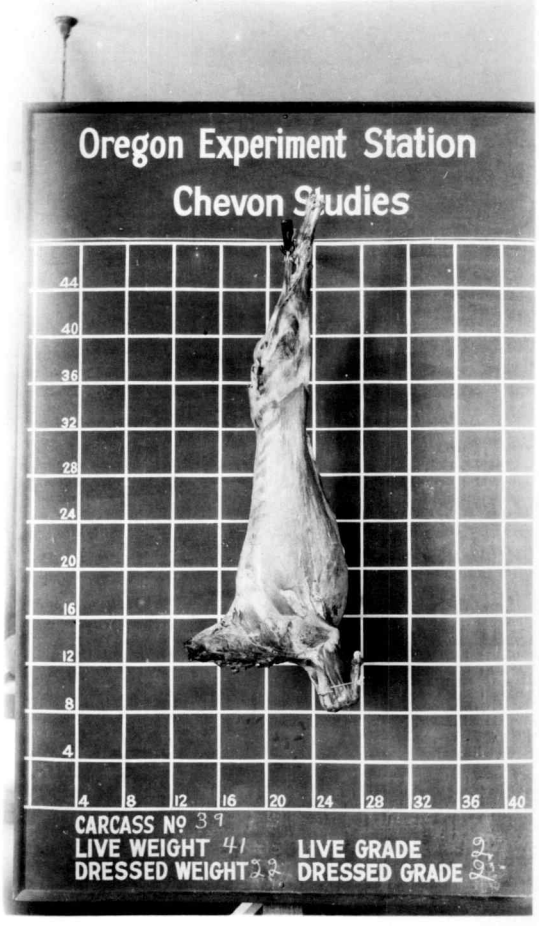
DRESSED GRADE 2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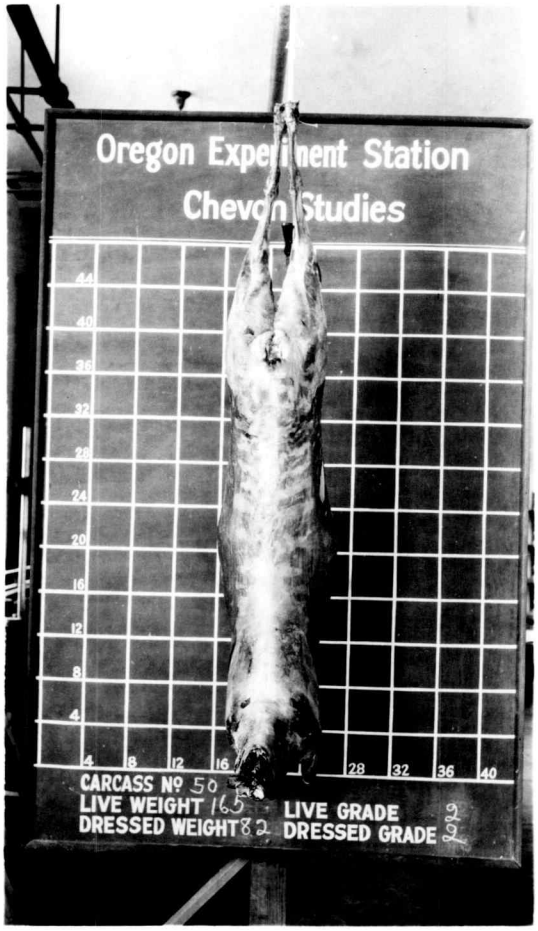
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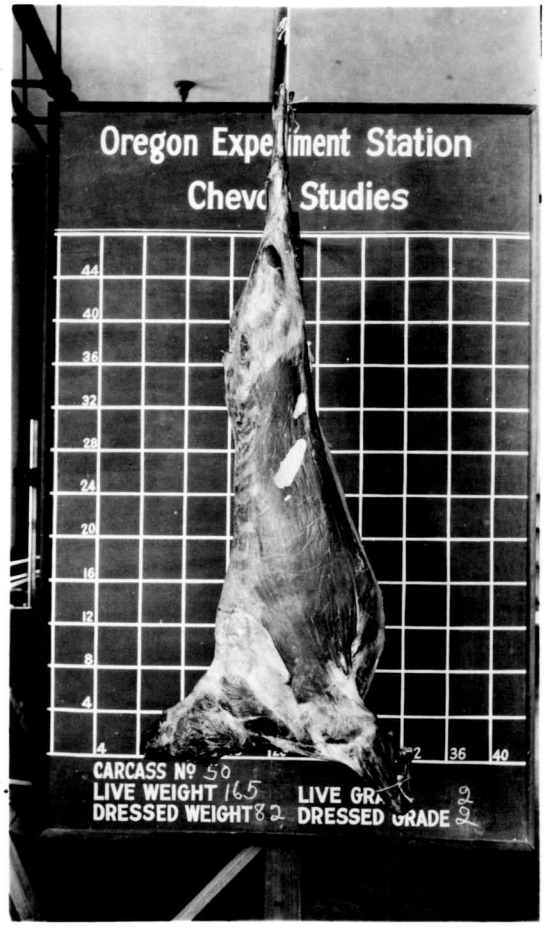
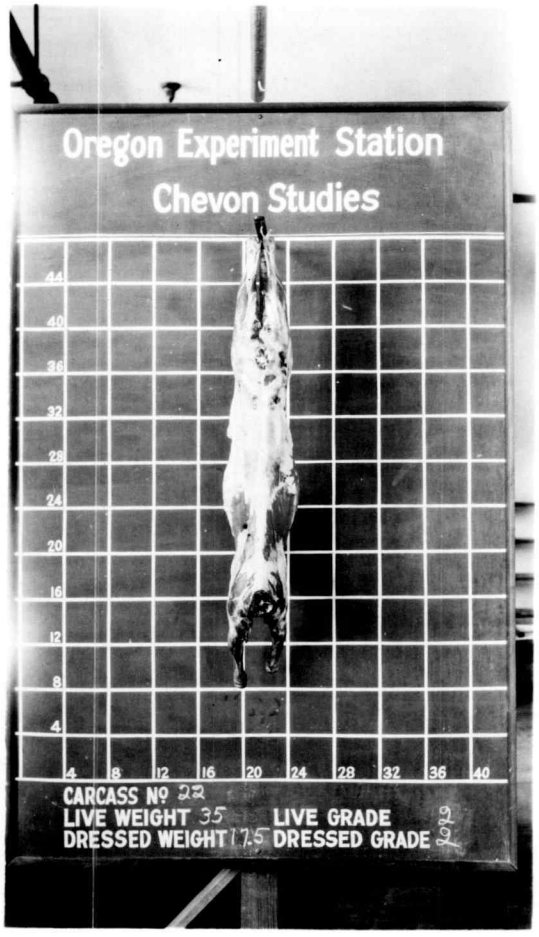
Chevon Studies
CARCASS № 50
LIVE WEIGHT 165
LIVE GRADE
DRESSED WEIGHT 82
DRESSED GRADE 2


Oregon Experiment Station
Chevon Studies
CARCASS № 50
LIVE WEIGHT 165
DRESSED WEIGHT 82
DRESSED GRADE 2


Oregon Experiment Station
Chevon Studies
4 8 12 16 20 24 28 32 36 40
CARCASS Nº 31
LIVE WEIGHT 35 LIVE GRADE
DRESSED WEIGHT 17.25 DRESSED GRADE


Oregon Experiment Station
Chevon Studies
4 8 12 16 20 24 28 32 36 40
CARCASS Nº 31
LIVE WEIGHT 35 LIVE GRADE
DRESSED WEIGHT 17.25 DRESSED GRADE


Oregon Experiment Station
Chevon Studies
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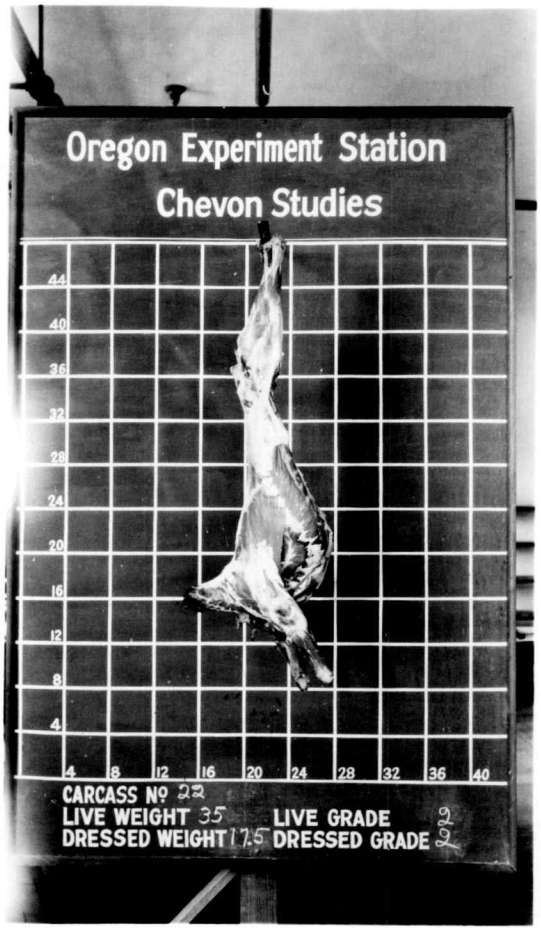
CARCASS Nº 22
LIVE WEIGHT 35 LIVE GRADE
DRESSED WEIGHT 17.5 DRESSED GRADE 2


Oregon Experiment Station
Chevon Studies
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CARCASS Nº 22
LIVE WEIGHT 35 LIVE GRADE
DRESSED WEIGHT 17.5 DRESSED GRADE 2

Summary of Killing Data

Summary Sheet for Killing Data

Animal No.	Sex	Age	Date Killed
4	B	1	March 15, 1928
1	B	1	April 12, 1928
2	[illegible]	1	April 12, 1928
6	W	1	
5	W	1	July 11, 1928
15	W	1	July 13, 1928
12	W	2	June 21, 1929
10	W	2	June 21, 1929
7	W	2	June 27, 1929
103	D	1	July 6, 1929
74	D	1	July 6, 1929
23	B	Kid	July 12, 1929
39	B	Kid	July 12, 1929
50	W	Aged	July 12, 1929
31	B	Kid	July 21, 1929
22	B	Kid	July 21, 1929

Summary of Killing Data

Summary Sheet for Killing Data

(continued)

Live Weight	Live Grade	Dressed Weight	Dressing Per Cent	Dressed Grade
54.5	No. 2	26.8	49.1	No. 3
33.0	4	15.1	45.75	5
51.0	3+	25.2	49.4	3
65.0	2	30.5	48.8	2
61.0	3	30.0	49.2	3
65.0	2-	31.0	47.7	2
77.0	3	34.2	43.4	4
72.0	3	31.0	43.06	3
74.0	3	38.5	52.02	2
41.0	4	16.25	39.6	4
46.0	4	19.25	41.9	5
38.0	2	18.0	47.36	2
41.0	2	22.0	53.65	2
165.0	2	82.0	49.7	2
35.0	2	17.25	49.28	2
35.0	2	17.5	50.0	2

Summary of Killing Data

Summary Sheet for Killing Data

(continued)

Average dressing percentage for 4 kids	56.06
Average dressing percentage for 8 yearlings	46.43
Average dressing percentage for 3 2-year olds	46.16
Average dressing percentage for 1 aged wether	49.7
Average dressing percentage for ave. all ages	47.49

Method of Procedure with Chevon Cooking Tests

In the chevon studies the Department tried to follow out as nearly as possible the method the U. S. D. A. uses in running mutton and lamb tests.

The animals were killed and dressed out much the same as lamb and were killed at least two days before cooking tests were run.

The leg of chevon was used for the test. The legs were properly weighed, dampened with a wet cloth and roasted according to U. S. D. A. standards. The internal thermometers were inserted into the thickest part of the leg and read at ten minute intervals.

The oven was heated to a temperature of 275° centigrade before the roasts were placed in the oven. The oven was held at this temperature for twenty minutes. Since only the one oven was available, the oven was cooled down at the end of twenty minutes by leaving the oven door open for a few minutes.

The oven was held as nearly as possible at a temperature of 125° C. during the remaining roasting time.

As soon as the internal thermometers that were used to record the internal temperature of the legs reached the temperature that was desired, the roasts were removed,

weighed and sampled.

All thermometers were calibrated at the beginning of the work.

A copy of the U. S. D. A. procedure for roasting lamb taken from "A Study of the Factors Which Influence the Quality and Palatability of Meat" supplement of February, 1928, to national cooperative project is given on the following pages.

Directions for Roasting Lamb

According to U. S. D. A. Methods

Revised February 1927

Pages 2, 3, and 4.

For Palatability Tests

"Note. These directions have been developed as a laboratory method of cooking lamb which is to be tested for its flavor, tenderness, etc., as indicated on the grading chart. They are not necessarily the most satisfactory directions for household cooking.

1. Equipment

"Equipment is practically the same as for roasting beef ribs. 1/ Racks should be used to hold the lamb roast out of the drippings while cooking. Straight-tube meat thermometers are somewhat better for lamb than right-angle meat thermometers.

2. Sample

"History - Record on Sheet No. 1

"Cut - Leg or shoulder may be used but leg is preferred for the following reasons:

"a. It is easier to place a meat thermometer so as to avoid striking bone in the leg of lamb than in the shoulder because of the larger amount of fleshy portion

of the leg.

"b. The rate of heat penetration seems to be more rapid for leg than for shoulder.

"c. The leg furnishes a larger amount of cooked meat for uniform sampling than does the shoulder.

"Observations - Sheet No. 2 may be used in part, with remarks suitable to lamb. Note whether the sample is plump, particularly over the fleshiest portion where the meat thermometer is inserted. Note whether the fat covering is heavy, medium, or thin. Note whether there has been slight, moderate, or extensive trimming over the fleshiest portion of the leg. From these observations some correlation may be found with varying rates of heat penetration.

"Preparation of Sample for Roasting - Wipe the piece of meat with a damp cloth. Weigh the meat in grams and record the weight on Sheet No. 3. Do not remove the fell. When the fell has been removed in experiments for the purpose of studying its effect, cooking losses have increased, the rate of heat penetration has decreased, and flavor has not been definitely improved. If the sample is leg of lamb, place it with the skin side down on a rack in a pan, the pan and rack having been previously weighed together. Place a meat thermometer in the leg so that the center of

the bulb rests in the center of the fleshiest portion where slices will be taken for sampling.2/ If the sample is shoulder, place it on a rack in a pan with the skin side up. Place a meat thermometer in the center of the portion where slices will be taken for sampling. Weigh the roast, thermometer, rack, and pan together. Seasoning is not used. Water is not used.

3. Preparation of Ovens for Roasting

"Light the ovens 45 minutes before using them. The cooking directions provide for searing at high temperature for a short time then continuing the cooking at sharply and greatly reduced temperature. Two sets of ovens should be provided, searing ovens and slow cooking ovens. The roasts are transferred from one to the other. Heat the searing oven to 275° C. The temperature is determined by a thermometer placed on the lowest shelf of the oven, in front to the right, so as to stand at the corner of a roasting pan placed lengthwise in the center of the oven. Heat slow-cooking ovens to 125° C. Place an oven thermometer as directed above. It may be found that the oven regulator and the oven thermometer do not check. In this case it will be necessary to set the regulator in a different position so as to give the desired oven temperature as shown by the thermometer. After each change of the

regulator, sufficient time should be allowed for the oven temperature to become constant before making another change. Specific directions for roasting are given below.

4. Roasting the Sample

"Follow the directions for roasting beef ribs, but allow the lamb to cook until the meat thermometer registers 75° C. Then remove from the oven and weigh, following directions for beef. Observe any rise of temperature of the roast after removal from the oven and record observations. Very little, if any, rise of temperature has been noted in several hundred samples cooked according to these directions.

"The time required to roast lamb by this method has been found to vary somewhat around 34 minutes per pound.

"The cooking procedure is as follows: (1) Sear the roast for 20 minutes in an oven heated to 275° C.; (2) cook it slowly in an oven held at least 125° C. until the temperature at the center of the roast reaches 57° C.; (3) remove the roast from the oven and allow it to stand until the temperature of the center reaches its maximum.

"Immediately before placing the roast in the oven read the temperature of the oven through the glass door, and that of the meat, and record as initial temperature

at 0 minutes on the cooking record, Sheet No. 5. Note the time of day, in order to check stop-watch readings. Place the pan containing the roast and meat thermometer lengthwise in the center of the oven on the lowest shelf with rib ends to back of oven. Close the oven door and sear the roast for 20 minutes. During the searing the oven regulator should not be changed. Read the temperature of the oven through the glass doors every 3 or 4 minutes. Transfer the seared roast at the end of 20 minutes to an oven heated to 125° C. Continue the slow cooking of the roast until the meat thermometer registers 57° C. During the slow cooking read the termperature of the oven often enough to control the oven temperature, every ten minutes, or oftener if necessary. Read the temperature of the meat at the end of searing and at intervals of 10 minutes thereafter. The oven regulator will probably require occasional changing to maintain 125° C. Remove the roast from the oven when the meat thermometer registers 57° C. Note the time of day, as well as the stop-watch reading. Weigh at once the pan, roast, thermometer, and drippings, together. Remove the roast to a weighed marked platter or pan. Weigh the platter and roast together. Weigh the pan with the drippings in it. Observe the rise of temper-

ature of the roast after removal from the oven and record observations, every few minutes. When the roast reaches its maximum temperature, weigh the platter and the roast together. Remove the roast from the platter and weigh the platter plus the drippings which have collected while the temperature has been rising.

5. Cooking Losses

"The cooking losses are determined in the form of evaporation losses, and drippings. These losses are divided into those occurring (1) while the roast is in the oven, and (2) while the roast is standing, until it reaches its maximum temperature, after removal from the oven. The total loss is the sum of the losses in the oven and the losses on standing.

"The loss of weight due to evaporation while in the oven is the combined weight of the roast, pan, and thermometer before roasting, minus their combined weight immediately on removal from the oven. The loss of weight as drippings while in the oven is the weight of the pan plus the drippings immediately on removal from the oven minus the weight of the empty pan. Upon removal from the oven immediately place the roast on a weighed platter, and weigh the roast and the platter together. Calculate the weight of the roast alone by subtracting the weight

of the platter plus the meat thermometer from the weight of the platter, meat thermometer and roast. Check the losses in the oven by comparing the weights of the meat before and after roasting.

"The loss of weight by evaporation while the roast is standing on the platter is the weight of the roast plus the platter on removal from the oven minus the weight of the roast and the platter when the maximum temperature is reached at the center of the roast. After weighing the roast and platter remove the roast and weigh the platter plus the drippings which have collected on standing. The loss in drippings outside the oven is the weight of the platter plus the drippings collected minus the weight of the platter alone. Calculate the weight of the roast alone at this stage by subtracting the weight of the platter, drippings, and meat thermometer from the weight of these three plus the meat. Add the evaporation losses in the oven and outside, and the losses in drippings in the oven and outside for total loss on cooking. Check this loss by comparing the weight of the uncooked roast with the weight of the roast when it reaches its maximum temperature.

"Calculate the losses as percentages of the weights

of the uncooked meat. Data should state clearly when the uncooked roast includes flesh and bones and when it includes flesh only.

6. Judging the Cooked Meat

"The meat should be judged while hot and it is ready to be carved when the temperature begins to fall. The slices of meat should be uniform and from 5 to 7 mm. in thickness. All judges should sample the same muscle. When the leg is tested only the biceps femoris muscle is used as the sample for the palatability test. This is the large muscle found in the fleshy portion of the leg. The fat is taken from the fascia near this muscle. Seasoning is not used. Samples are judged according to the grading chart for cooked meat. Averages and deviations from the average are calculated from the opinions rendered for each sample.

"1/ See Directions for the Oven Roasting of Beef Ribs in "A Study of the Factors Which Influence the Quality and Palatability of Meat", revised edition, February, 1927.

"2/ The Bureau of Home Economics uses the following method of locating a meat thermometer in a leg of lamb:

"1. Measure the distance from the outer end of the aitch bone, A, to the center of the hock joint, X.

"2. Lay off on AX one sixth this distance, AB.

"3. Construct an equilateral triangle having AB as its base.

"4. Mark the apex C of the triangle as the place where a small straight thermometer is to be inserted.

"5. Measure the vertical thickness of the fleshiest portion of the leg by means of two rulers held at right angles to each other.

"6. Insert the thermometer to a depth equal to one half the measured thickness of the fleshiest portion of the leg."

Recording Procedure for Chevon Studies

The following blanks are the forms used to record the data for each experiment.

Sheets No. 3, 4, and 7 are exactly the same as the U. S. D. A. uses in their meat cooking tests. Sheet No. 3 was used to record all of the weights of the roasts both before and after cooking. Sheet No. 4 was used to record all cooking losses and the percentages of these cooking losses.

Sheet No. 7 was used for the grading. Each judge was given one of these sheets with each sample and he filled out the sheet, marking the phases as he saw fit.

The summary sheet was used to summarize each experiment.

As will be noticed on Sheet No. 7 each phase is numbered. To get the final score for each factor the grades on each factor were taken from each judge's sheet and averaged, and this result was given for the final grade of the factor.

The bottom part of the sheet was used to record the losses and cooking data.

MEAT COOKING RECORDS

Sheet No. 3 Date_____

Data for Determining Cooking losses

Weights to be determined	Sample No. Grams	Sample No. Grams	Sample No. Grams
A. Before cooking:			
1. Weight of pan			
2. Weight of thermometer			
3. Weight of roast			
4. Weight of pan, roast, and thermometer			
B. On removal from Oven:			
1. Weight of pan, roast, thermometer and drippings			
2. Weight of platter for roast			
3. Weight of platter, roast and thermometer			
4. Weight of pan and drippings			
C. When the roast reaches its maximum temperature:			
1. Weight of platter, roast, thermometer, and drippings collected while standing			
2. Weight of platter and drippings collected while standing			

MEAT COOKING RECORDS

Sheet No. 4 Date _____

Calculation of Cooking Losses from Data on Sheet No. 3

Losses by weight	Sample No.	Sample No.
	Grams	Grams
D. Loss due to evaporation		
1. In the oven, A4 - B1		
2. Outside the oven, B3 - C1		
3. Total, D1 + D2		
E. Loss as drippings		
1. In the oven, B4 - A1		
2. Outside the oven, C2 - B2		
3. Total, E1 + E2		
F. Total loss during cooking		
D3 + E3		
G. Check, A3 - (C1 O C2 - A2)		

MEAT COOKING RECORDS

Sheet No. 4 (continued) Date _____

Calculation of Cooking Losses from Data on Sheet No. 3

Losses as per cents of weights of uncooked roast	Sample No.	Sample No.
	Percent	Percent
H. Loss due to evaporation		
1. In the oven, D1 ÷ A3		
2. Outside the oven, D2 ÷ A3		
3. Total, E3 ÷ A3		
I. Loss as drippings		
1. In the oven, E1 ÷ A3		
2. Outside the oven, D2 ÷ A3		
3. Total, E3 ÷ A3		
J. Total loss during cooking		
F ÷ A3		
K. Check, G ÷ A3		

Meat Cooking Record

Grading Chart for Cooked Meat

Sheet No. 7 Cooking Laboratory No._____ Sample No.__

Factor	Phase	7	6
Aroma	Intensity	Very pronounced	Pronounced
	Desirability	Very desirable	Desirable
Texture	Intensity	Very fine	Fine
Flavor of fat	Intensity	Very pronounced	Pronounced
	Desirability	Very desirable	Desirable
Flavor of lean	Intensity	Very pronounced	Pronounced
	Desirability	Very desirable	Desirable
Tenderness	Intensity	Very tender	Tender
Quality of juice	Intensity	Very rich	Rich
	Desirability	Very desirable	Desirable
Quantity of juice	Intensity	Very large	Large
	Desirability	Very desirable	Desirable

Meat Cooking Record

Grading Chart for Cooked Meat

Kind_____ Date_____

5	4	3	2	1
Moderately pronounced	Slightly pronounced	Perceptible	Slightly perceptible	Imperceptible
Moderately desirable	Slightly desirable	Neutral	Slightly undesirable	Undesirable
Moderately fine	Slightly coarse	Coarse	Very coarse	Extremely coarse
Moderately pronounced	Slightly pronounced	Perceptible	Slightly perceptible	Imperceptible
Moderately desirable	Slightly desirable	Neutral	Slightly undesirable	Undesirable
Moderately pronounced	Slightly pronounced	Perceptible	Slightly perceptible	Imperceptible
Moderately desirable	Slightly desirable	Neutral	Slightly undesirable	Undesirable
Moderately tender	Slightly tough	Tough	Very tough	Extremely tough
Moderately rich	Slightly rich	Perceptible	Slightly perceptible	Imperceptible
Moderately desirable	Slightly desirable	Neutral	Slightly undesirable	Undesirable
Moderately large	Slightly large	Small	Very Small	Negligible
Moderately desirable	Slightly desirable	Neutral	Slightly undesirable	Undesirable

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

		Sample No.	Sample No.	Sample No.
Days after killing				
Internal temperature of roasts				
Aroma	Intensity			
	Desirability			
Texture	Intensity			
Flavor of fat	Intensity			
	Desirability			
Flavor of lean	Intensity			
	Desirability			
Tenderness	Intensity			
Quality of juice	Intensity			
	Desirability			
Quantity of juice	Intensity			
	Desirability			

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

(Continued)

Cooking Data	Sample No.	Sample No.	Sample No.
Weight of raw Roast			
Average Roasting Temperature			
Minutes Required per Pound for Roasting			
Shrinkage Due to Evaporation			
Shrinkage Due to Volatile Losses			
Total Shrinkage			

Cooking Test No. 1

Comparison of Lamb with Chevon

The first goat was killed March 15, 1928. He was a billy weighing 54.5 pounds, live weight and dressed out 26.8 pounds with a dressing percentage of 59.1%. This goat was in fair condition at time of slaughter, grading a No. 2 live weight and a No. 3 dressed carcass. The carcass was quite uniform, being symmetrical, well rounded out, and a carcass that was very much like that of a lamb. A cooking test was run on this animal. A leg of chevon was roasted according to the U. S. D. A. methods of roasting lamb, the lamb and chevon roasts being made in the same oven under similar conditions.

A committee was called in to judge the roasts, the committee being made up of the Animal Husbandry faculty, the Veterinary faculty, and one Senior student. Each was given a sample of lamb and chevon, not knowing which was which. Only two out of the group of ten guessed correctly which was the chevon. The other eight thought the chevon was lamb and vice versa.

There were some important things brought out, however. All agreed that the chevon was slightly tough and the mutton varied between tender and very tender. All

agreed on the flavor, saying that both were desirable in flavor and were very much alike. The aroma of the chevon was a trifle more pronounced than that of the lamb. The texture of the chevon was rated as slightly coarse and that of the lamb as fine. The juice in the lamb was a little richer and was more abundant than in the chevon. There was very little difference in these two legs outside of the texture and tenderness and juice.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Test No. 1

Comparison of Lamb and Chevon

		Sample No. 4a	Sample No. Lamb
Days after killing		5	5
Internal temperature of roasts			
Aroma	Intensity	5	5
	Desirability	5	5
Texture	Intensity	4	6
Flavor of fat	Intensity	4	4
	Desirability	4	4
Flavor of lean	Intensity	5	6
	Desirability	6	6
Tenderness	Intensity	4	6.5
Quality of juice	Intensity	5	4
	Desirability	5	5
Quantity of juice	Intensity	4	6
	Desirability	5	5

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Test No. 1

Comparison of Lamb and Chevon

(Continued)

Cooking Data	Sample No. 4a	Sample No. Lamb
Weight of raw roast	3# 1 oz.	
Average Roasting Temperature		
Minutes Required per Pound for Roasting	28	
Shrinkage Due to Evaporation		
Shrinkage Due to Volatile Losses		
Total Shrinkage	24.5	24.5

Cooking Test No. 2

Ageing Study on Chevon 1 and 2

Goats No. 1 and 2 were used for the first ageing test. In this test a leg from each goat was roasted two days after the goats were killed. The other legs were roasted nine days after the goats were killed. The main differences noted in this test were that the chevon was materially improved by holding the legs for a longer period before roasting. This especially was noticed in the flavor of the lean and the tenderness of the meat. Goat No. 2 was materially improved by ageing as far as tenderness of the meat was concerned, while a slight improvement was noted on the tenderness of goat No. 1. The quality and quantity of juice was also somewhat superior with the legs that were roasted at the later date.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Test No. 2

Ageing Test Chevon No. 1 and 2

		Sample No. a	Sample No. 2a	Sample No. 2b	Sample No. 1 b
Days after killing		2	2	9	9
Internal Temperature of Roasts		74.5	76.5	75	75
Aroma	Intensity	5.33	4	6	6
	Desirability	5.33	5	6	5
Texture	Intensity	4.33	3	6	6
Flavor of fat	Intensity	5	5	6	5
	Desirability	5	5	6	6
Flavor of lean	Intensity	5	4.5	5	5
	Desirability	6	6.5	6	7
Tenderness	Intensity	4	1.5	4	5
Quality of juice	Intensity	4.66	3	4	5
	Desirability	5.33	6	4	5
Quantity of juice	Intensity	5	3	4	5
	Desirability	5	5	4	5

Cooking Test No. 3

Temperature Study on Chevon No. 5

Chevon No. 5, a goat that had been killed eight days when the legs were roasted, was used for a temperature study. The two legs of this goat were roasted at the same time, one being carried to the internal temperature of 73° C. and the other to the internal temperature of 85° C.

On grading the legs the committee decided that the leg carried to the 85° C. internal temperature was considerably better than the leg carried to the 73° C. internal temperature. It was graded higher in the flavor of the lean, tenderness, quality and quantity of juice and flavor of fat, the greatest difference being noticed in the tenderness of the meat.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Cooking Test No. 3

Temperature Test on Cheven No. 5

		Sample No. 5a	Sample No. 5b
Days after killing		8	8
Internal Temperature of Roasts		73	85
Aroma	Intensity	4	4.5
	Desirability	5.33	5.5
Texture	Intensity	4	4.5
Flavor of fat	Intensity	3	4
	Desirability	3.5	3
Flavor of lean	Intensity	4.33	5
	Desirability	6	6.5
Tenderness	Intensity	4	5.5
Quality of juice	Intensity	3.66	4.5
	Desirability	5.66	6
Quantity of juice	Intensity	3.33	4.5
	Desirability	5.33	6.5

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Cooking Test No. 5

Temperature Test on Chevon No. 5

(Continued)

Cooking Data	Sample No. 5a	Sample No. 5b
Weight of Raw Roast	3# 8 oz.	3# 4 oz.
Average roasting temperature	125	125
Minutes required per pound for roasting	22.8	27
Shrinkage due to evaporation		
Shrinkage due to volatile losses		
Total shrinkage	19.6	19.3

Cooking Test No. 5

Temperature Study on Chevon No. 12

KEY

- Oven Temperature
- Chevon 12a
- Chevon 12b

Average Temperature 126° C.

Temperature of Oven - Centigrade

Internal Temperature of Meat

Cooking Test No. 5

Temperature Study on Chevon 12

In testing the chevon No. 12 it was decided to continue to try to find out whether or not roasting the leg of chevon to a higher temperature than the U. S. D. A. recommends for lamb would aid in making the leg of chevon more tender.

Miss Belle Lowe, Associate Professor Home Economics at Ames, Iowa, who was teaching in the summer session of 1929, helped with the tests. With her assistance two legs of chevon No. 12 were roasted, one to an internal temperature of 75° C., the other to the internal temperature of 85° C. There was not a great deal of change in carrying the chevon leg to the higher temperature. However, it was thought by the committee that there was a larger amount of juice with the leg that was carried to the higher temperature. The toughness was not changed.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Cooking Test No. 5

Temperature Study on Chevon 12

		Sample No. 12a	Sample No. 12b
Days after killing		5	5
Internal Temperature of roasts		75° C.	85° C.
Aroma	Intensity	5	5
	Desirability	5	5
Texture	Intensity	3.5	4
Flavor of fat	Intensity	3	3
	Desirability	3	3
Flavor of lean	Intensity	5	5
	Desirability	4	4
Tenderness	Intensity	3	2.5
Quality of juice	Intensity	5	5
	Desirability	4	4
Quantity of juice	Intensity	3	3.5
	Desirability	3	3

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Cooking Test No. 5

Temperature Study on Cheven 12

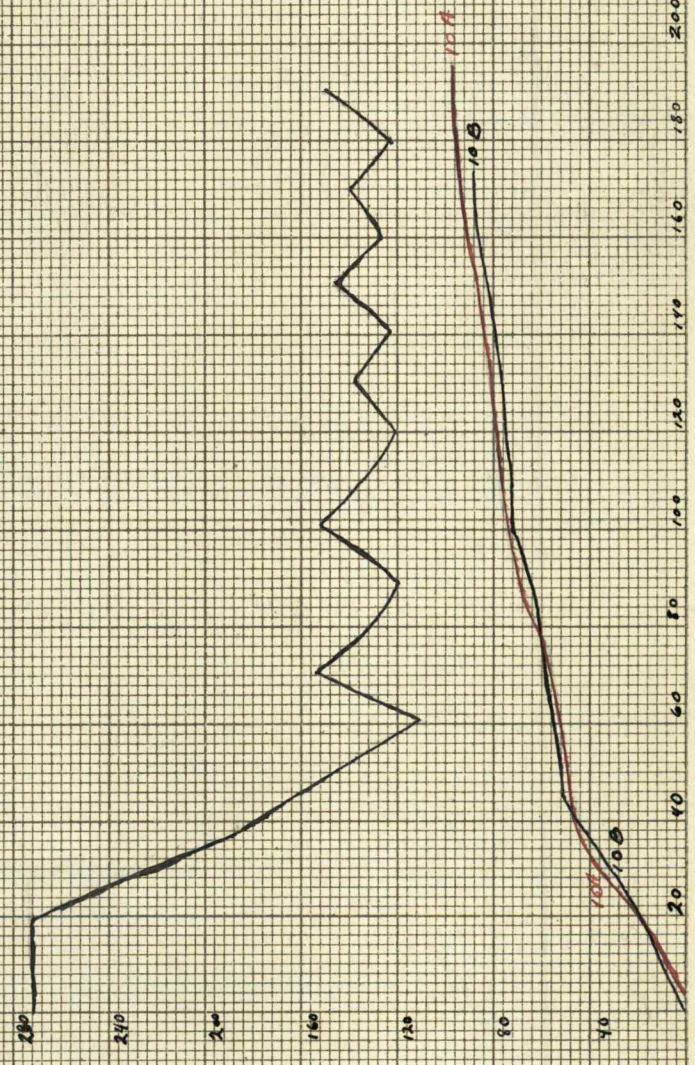
Cooking Data	Sample No. 12a	Sample No. 12b
Weight of raw roast	1915	1955
Average Roasting Temperature	34.2	40.7
Minutes required per pound for roasting	126	126
Shrinkage due to evaporation	7.62	13.73
Shrinkage due to volatile losses	11.09	5.95
Total shrinkage	18.72	19.68

Cooking Test No. 6

Temperature Study on Chevon No. 10

KEY

- Oven Temperature
- Chevon 10a
- Chevon 10b



Cooking Test No. 6

Temperature Study on Chevon No. 10

With the chevon No. 10 it was decided to continue with the temperature test and carry the one leg to the internal temperature of 85° C., the other leg to be carried to 90° C.

In the grading by the committee the entire committee decided that the leg carried to the 85° C. temperature was not quite as tough as the one carried to the 90° C. temperature. It also contained a larger amount of juice and the flavor of the lean and fat was somewhat better, and the general conclusion of the committee was that it was not as dry and was more palatable than the leg carried to the 90° C. temperature. The percentage of loss during cooking was greater with the leg carried to the higher temperature.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Cooking Test No. 6

Temperature Study on Chevon No. 10

		Sample No. 10a	Sample No. 10b
Days after killing		6	6
Internal temperature of roasts		90° C.	85° C.
Aroma	Intensity	4	4
	Desirability	5	5
Texture	Intensity	3	3.33
Flavor of fat	Intensity	3	2.66
	Desirability	5	4
Flavor of lean	Intensity	5	5
	Desirability	5	5
Tenderness	Intensity	3	4
Quality of juice	Intensity	4	4
	Desirability	4	4
Quantity of juice	Intensity	3	4
	Desirability	4	4

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Cooking Test No. 6

Temperature Study on Chevon No. 10

(Continued)

Cooking Data	Sample No. 10a	Sample No. 10b
Weight of Raw Roast	1583 g.	1582 g.
Average Roasting Temperature	137	137
Minutes Required per Pound for Roasting	55.6	50.0
Shrinkage Due to Evaporation	2.90%	4.39%
Shrinkage Due to Volatile Losses	13.60%	8.50%
Total Shrinkage	16.50%	13.10%

Cooking Test No. 7

Study of Loin of Chevon No. 10

The loin of the chevon No. 10 was prepared in a little different manner than the U. S. D. A. recommends in their meat test. The loin was cooked in the pressure cooker for approximately one hour's time at a pressure of between ten to twelve pounds. The right angle thermometer was placed in the loin similarly to the manner that it was placed in the leg of chevon in order that we might check the internal temperature when the roast was finished.

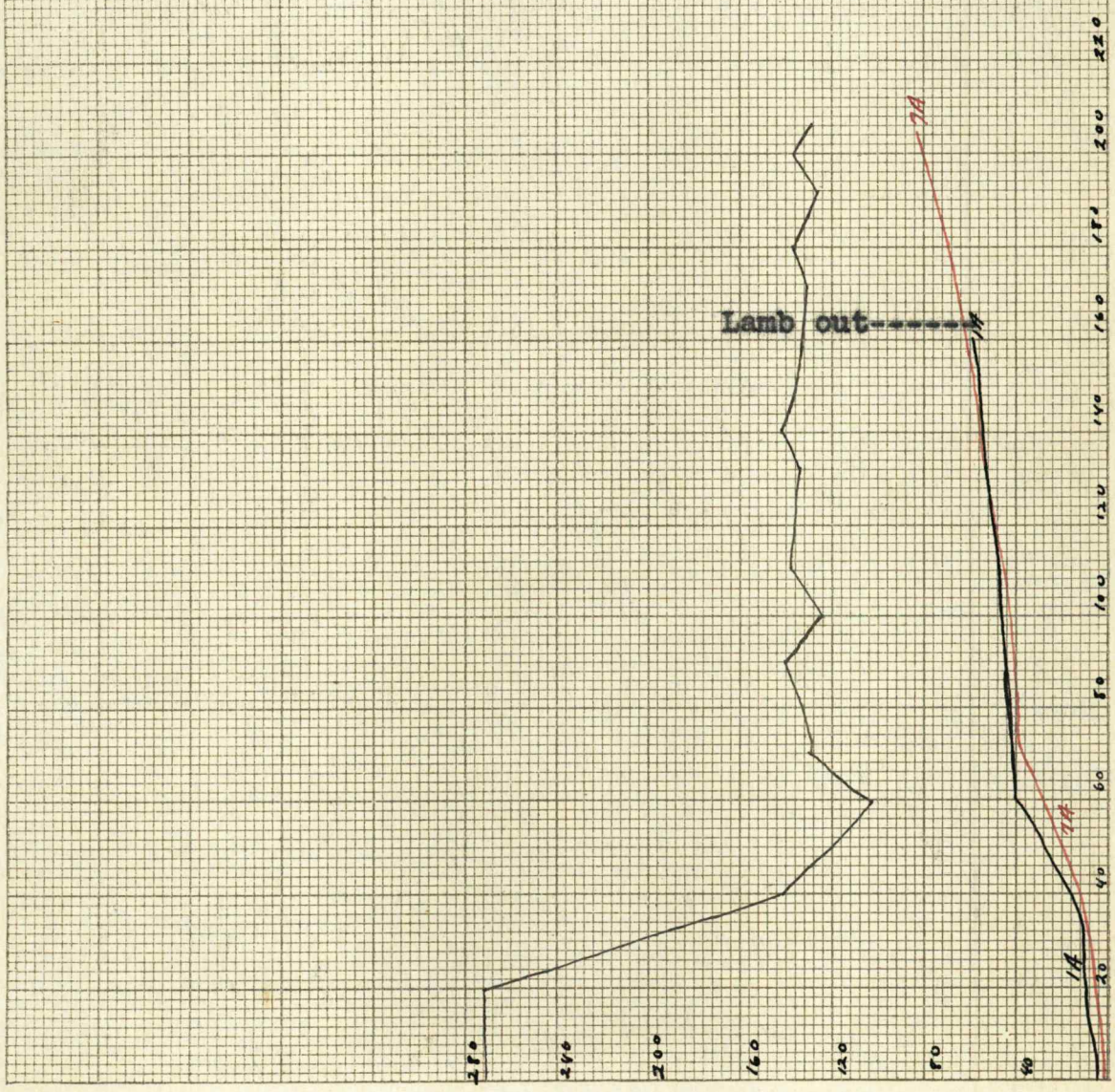
It was thought by the committee that this manner of preparing the chevon meat made it considerably more tender. It was tried in comparison with the leg roast and was considerably more tender than the leg roast of the chevon, but not quite as tender as the leg roast of the lamb.

Cooking Test No. 8 and No. 9

Ageing Study and Comparison with Lamb

KEY

- Oven Temperature
- Lamb 1a
- Chevon 7a



Cooking Test No. 8 and 9

Ageing Study and Comparison with Lamb

Up to this time it seemed that carrying the chevon to the 85° C. internal temperature probably is better than any other temperature we have been able to discover.

A leg of chevon No. 7, which was one of the best carcasses that we have had, was compared with the leg of lamb. The leg of chevon was roasted to the internal temperature of 85° C. and the leg of lamb was roasted to the internal temperature of 75° C. as suggested by the U. S. D. A.

In comparing the two roasts the leg of lamb graded higher as to the aroma and as to the tenderness. Also, it contained a larger and more desirable quantity of juice and it seemed that the quality of the juice was slightly better. However, the committee graded the flavor of the lean in both cases as "Desirable".

Continuation of Cooking Tests No. 8 and No. 9

Ageing Study and Comparison with Lamb

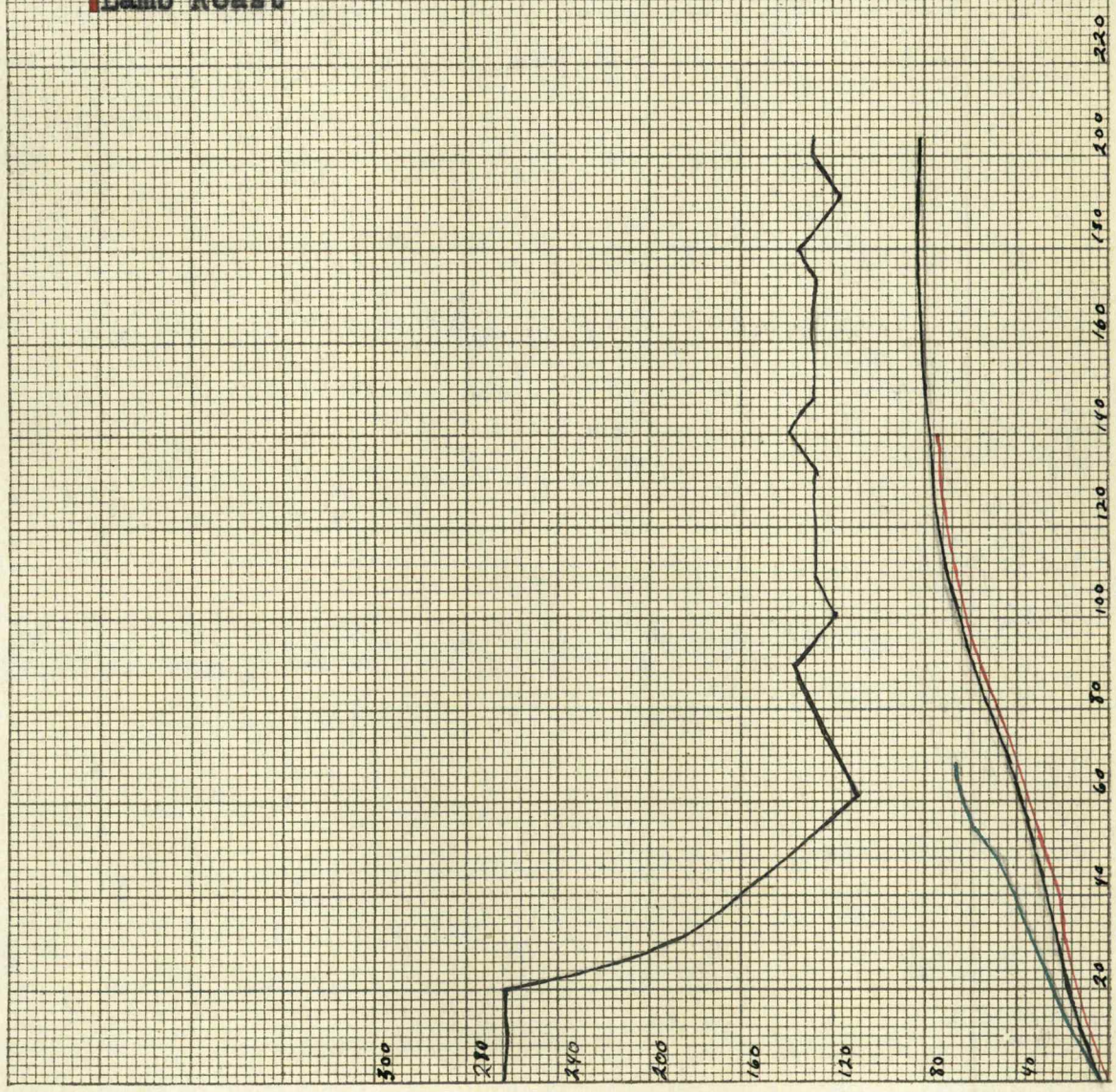
KEY

Oven Temperature

Loin Roast

Cheven Roast

Lamb Roast



Continuation of Cooking Tests 8 and 9

Ageing Study and Comparison with Lamb

In this test the leg of chevon No. 7, a goat that had been killed since June 27, was again tested with leg of lamb. The legs of both the chevon and the lamb were the mates to the legs that were tested July 2. The idea of this test was to see whether or not ageing the chevon would improve it especially in tenderness. The chevon and the lamb were roasted in exactly the same manner that they had been roasted in 7a and 7b, the lamb being carried to the 75° C. internal temperature and the chevon to the 85° C. internal temperature. In scoring the cuts the committee found that there had been very little change in the aroma, texture, the flavor of the fat and the flavor of the lean, but the chevon had improved as far as tenderness was concerned, being graded as moderately tender in the 7b test as against tough in the 7a test. The quantity and quality of juice were also improved.

It was noted that the leg of lamb had improved in practically the same manner as had the leg of chevon.

In regard to percentage of loss with test 7a against 7b, there was very little change in volatile loss and also very little change in the loss of drippings, there being only one per cent more loss on the chevon that had

aged against the chevon that had not.

In making the comparison between the leg of lamb and the leg of chevon it was found that the leg of lamb graded "very desirable" against "desirable" for the leg of chevon as far as the flavor of lean was concerned. As for tenderness the leg of lamb graded very tender against tender for the chevon, and also the quantity and quality of juice graded higher with the lamb than with the chevon.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Cooking Test No. 8 and No. 9

Comparing Lamb and Cheven

		Sample No. L1a	Sample No. 7a	Sample No. L1b	Sample No. 7b
Days after killing		6	5	11	10
Internal temperature of roasts		75	85	75	85
Aroma	Intensity	4	4	3	4
	Desirability	6	5	5	5
Texture	Intensity	5	3	5	3
Flavor of fat	Intensity	5	4	3.66	4
	Desirability	4	4	5	4
Flavor of lean	Intensity	4	5.5	4	5
	Desirability	6	6	7	6
Tenderness	Intensity	6	3.5	6.36	5
Quality of juice	Intensity	4	4	6	5
	Desirability	6	5	6	5
Quantity of juice	Intensity	5	3	5	5
	Desirability	6	4	6.33	6

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Cooking Test No. 8 and No. 9

Comparing Lamb and Chevon

(Continued)

Cooking Data	Sample No. L1a	Sample No. 7a	Sample No. L1b	Sample No. 7b
Weight of raw roast	1639.0	1841.0	1690	1735
Average Roasting Temperature	130	130	138	138
Minutes required per pound for roasting	40	52	37.5	53.6
Shrinkage due to evaporation	8.04%	18.84%	12.36%	18.4%
Shrinkage due to volatile losses	12.61%	5.32%	7.07%	7.01%
Total shrinkage	20.65%	24.16%	19.43%	25.41%

Cooking Test No. 10

Study on Loin of Chevon No. 7

The loin of chevon No. 7 was roasted as near as possible according to the U. S. D. A. method. However, it was noted that the oven that the loin was roasted in was rather erratic and was probably carried to a higher temperature than the oven that the leg was roasted in. The loin was carried to the internal temperature of 75° C. and was compared with the leg of lamb and leg of Chevon No. 7C and 7D. The committee graded the loin in nearly all cases a little higher than they did the leg of chevon. The committee agreed that the flavor of lean was "desirable" and that the meat was tender, these being the main factors that were improved upon that were better than on the leg of the chevon. It was also interesting to note that the volatile loss and drippings during the process of roasting were six per cent less with the loin than with the leg.

In comparing the loin of chevon with the leg of lamb the loin compared very favorably with the leg except that the leg of lamb was graded as "very desirable" in the flavor of lean against "desirable" in flavor of lean of the loin, and was also graded a trifle higher in

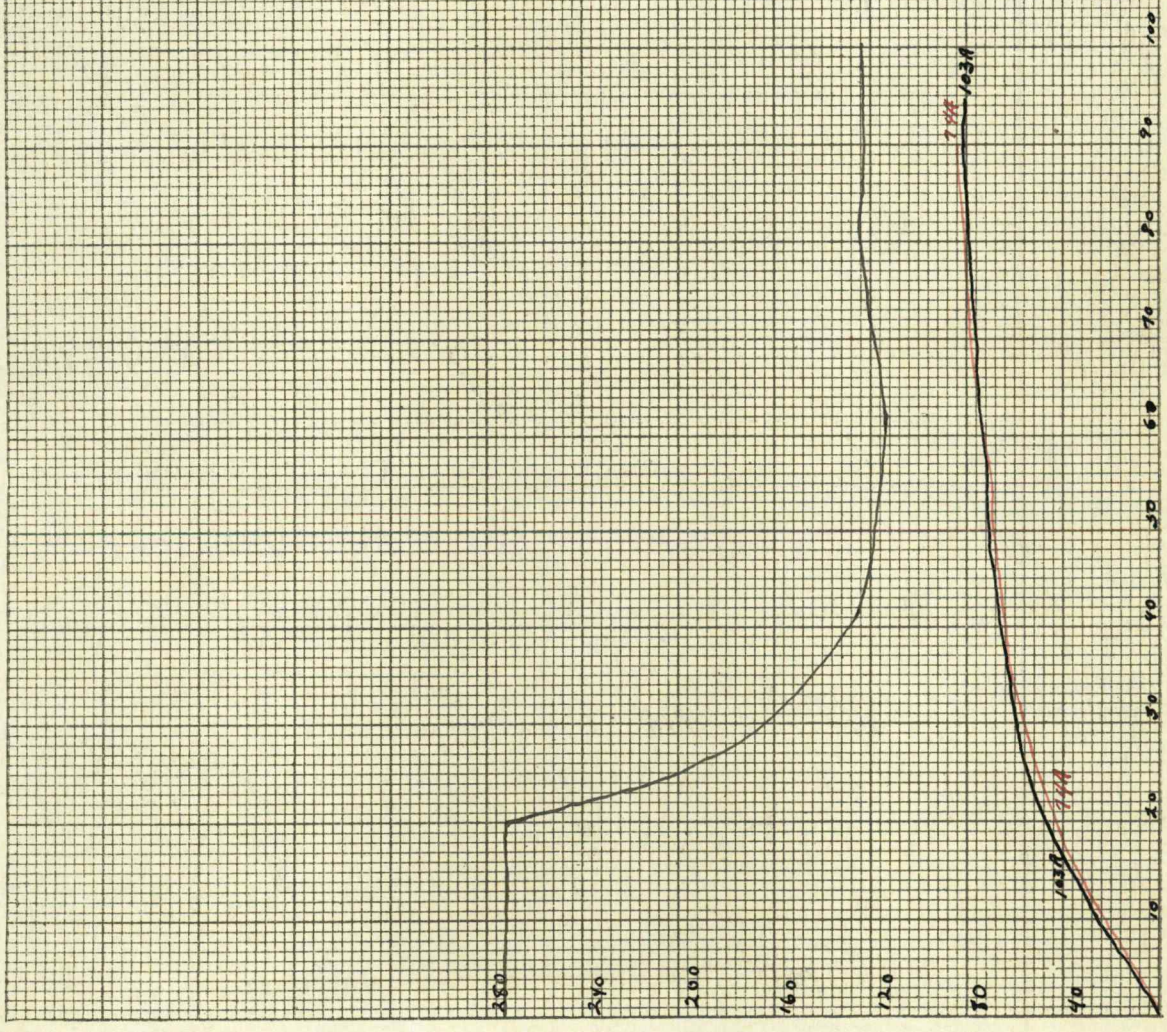
tenderness. It was thought, also, by the committee that the quantity and quality of juice was somewhat better with the lamb than with the loin of chevon.

Cooking Test No. 11 and 12

Study on Chevon 74a and 103a

KEY

- Oven Temperature
- Roast 74a
- Roast 103a



Cooking Test No. 11 and No. 12

Ageing Study of Chevon No. 74 and No. 103

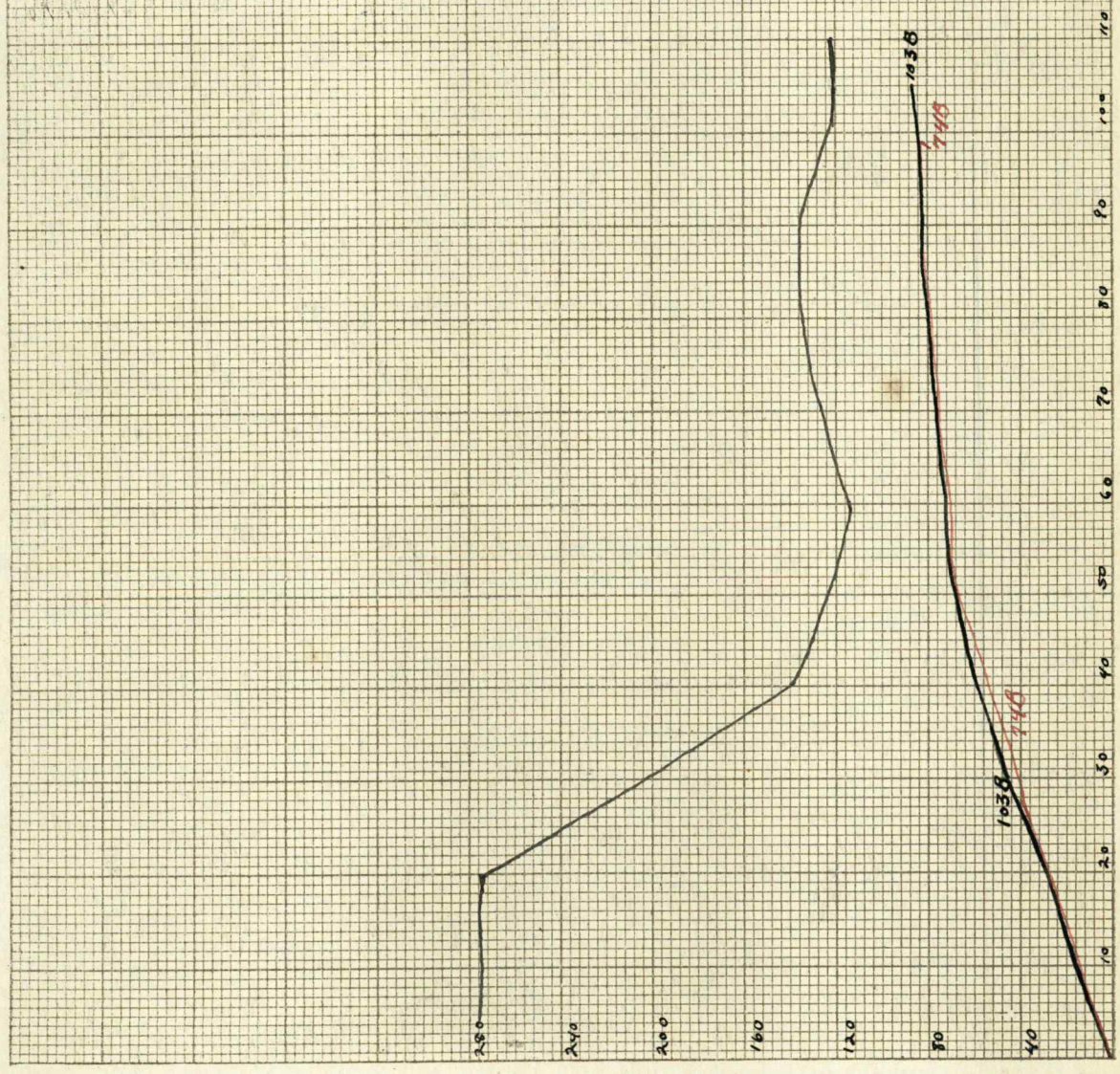
In this study it was decided to follow up with the ageing test. The Angora goats No. 74 and No. 103 were killed on July 6 and a leg of each was roasted on July 11. The mates to these two legs are to be roasted a week later, or on July 18, to see whether or not ageing of the chevon will make any material difference in the quality and palatability of the meat. Summaries for this test will be given when the last roasts are finished.

Continuation of Cooking Test No. 11 and No. 12

Ageing Study of Chevon 74 and 103

KEY

- Oven Temperature
- Chevon No. 74b
- Chevon No. 103b



Continuation of Cooking Test No. 11 and No. 12

Ageing Study of Chevon No. 74 and No. 103

The legs of the goat 74 and 103 were used in the continuation of the ageing test. Goats No. 74 and 103 were killed on July 6 and a leg of each was roasted on July 11. The other legs were roasted on July 16. In this test the legs were cooked in exactly the same manner and it was found that there was very little change in volatile loss and loss from drippings with the two tests. The committee found that the flavor in both legs was improved upon by ageing the legs a week longer and also the legs were somewhat more tender. The quality and quantity of juice was unchanged.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Ageing Study on Chevons No. 74 and No. 103

		Sample No.74a	Sample No.103a	Sample No.74b	Sample No.103b
Days after killing		5	5	10	10
Internal temperature of roasts		85	85	85	85
Aroma	Intensity	4.33	4	3	4
	Desirability	4.66	4.33	5	3.66
Texture	Intensity	4	4	4	4.33
Flavor of fat	Intensity	4	4	4	5
	Desirability	5	5	6	3
Flavor of lean	Intensity	5	5	4	4
	Desirability	5.33	5	6	6
Tenderness	Intensity	4.66	4.33	5	5
Quality of juice	Intensity	4.66	4.66	5	4
	Desirability	4.66	4.66	6	4
Quantity of juice	Intensity	3.66	4	3.66	3
	Desirability	4.66	4.66	5	5

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Ageing Study Chevons No. 74 and No. 103

(Continued)

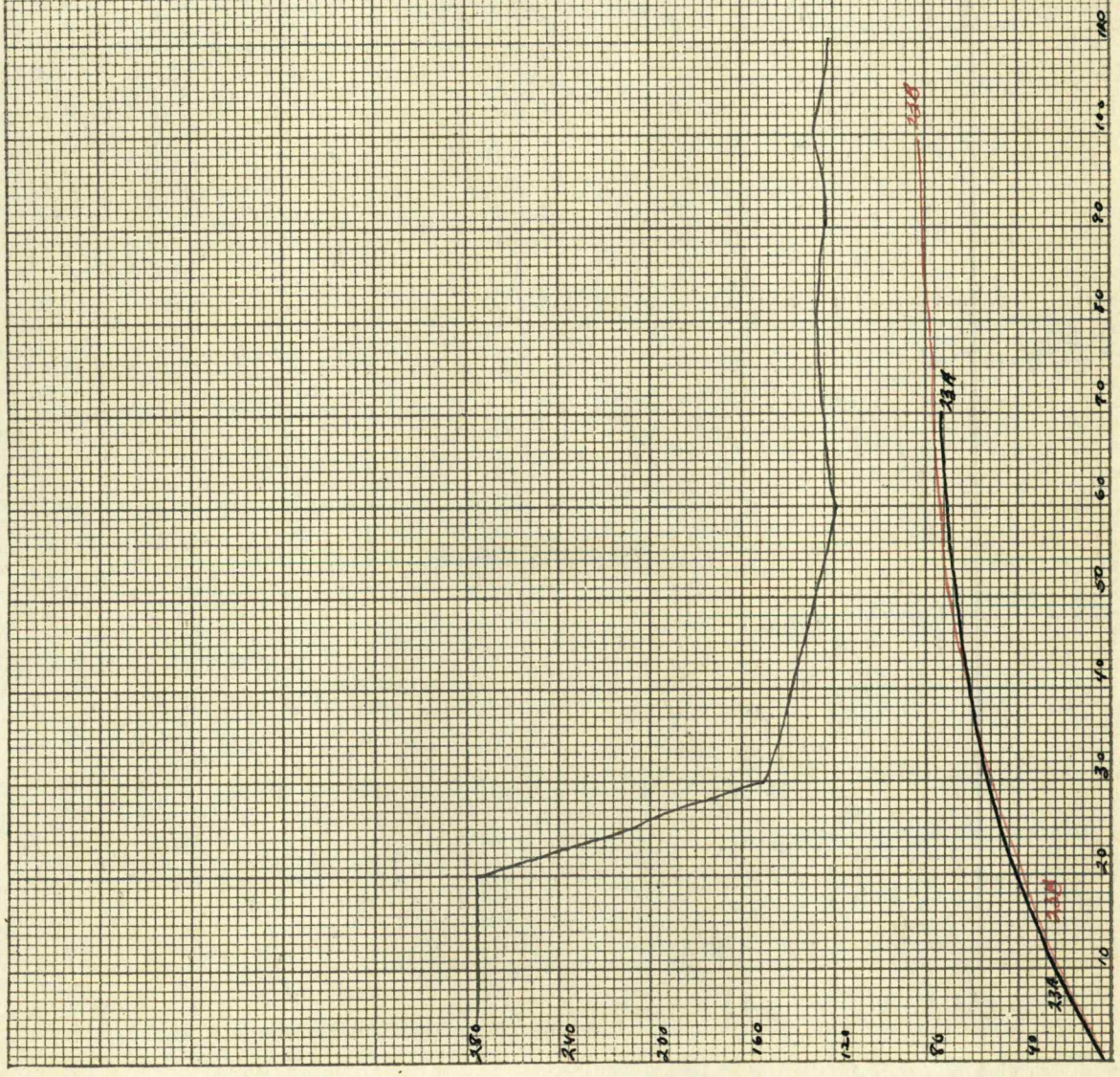
Cooking Data	Sample No.74a	Sample No.103a	Sample No.74b	Sample No.103b
Weight of Raw Roast	1002	871	884.5	881
Average Roasting Temperature	127	127	127	127
Minutes required per Pound for Roasting	38.4	48.4	49.7	56.1
Shrinkage due to evaporation	16.26	20.03	17.08	19.69
Shrinkage due to volatile losses	4.44	2.87	3.68	3.74
Total shrinkage	20.70	22.90	20.97	23.43

Cooking Test No. 13

Temperature Study on $C_h$even No. 23

KEY

- Oven Temperature
- Chevon 23a
- Chevon 23b



Cooking Test No. 13

Temperature Study on Cheven No. 23

Up to this time no work had been done with kids. Two kids were killed on July 12. It was decided at this time to use one of them for the ageing test and the other to be used to find out which would be the better cooking temperature for the leg. These kids both were taken right from their mothers and had been fed no grain. The goat flock at this time was being held on a brush pasture. Both kids graded No. 2 on the foot and No. 2 in the carcass.

Goat No. 23 was used in the temperature test. This kid was in very good finish and the fat seemed to be somewhat whiter than had been noted on the older goats. The legs were carried to the internal temperature of 75° and 85° C.

It was found by the committee that the leg that was carried to the internal temperature of 75° was the more desirable leg, the big difference being noticed in the tenderness of the meat and the quantity of juice. Leg 23A, which was carried to the 75° temperature, graded "tender" while leg 23B, which was carried to the 85°

temperature, graded between "moderately tender" and "slightly tough". On the quantity of juice leg 23A graded "slightly large" and 23B graded "small". No other change was noted by the committee.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Temperature Study on Chevon No. 23

		Sample No. 23a	Sample No. 23b
Days after killing		6	6
Internal temperature of roasts		75°C.	85°C.
Aroma	Intensity	5	4
	Desirability	5	5
Texture	Intensity	4.5	4
Flavor of fat	Intensity	5	5
	Desirability	4	4
Flavor of lean	Intensity	4	3
	Desirability	4	5
Tenderness	Intensity	6	4.75
Quality of juice	Intensity	4	4.5
	Desirability	5	5
Quantity of juice	Intensity	4	3
	Desirability	4.25	4

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Temperature Study on Chevon No. 23

(Continued)

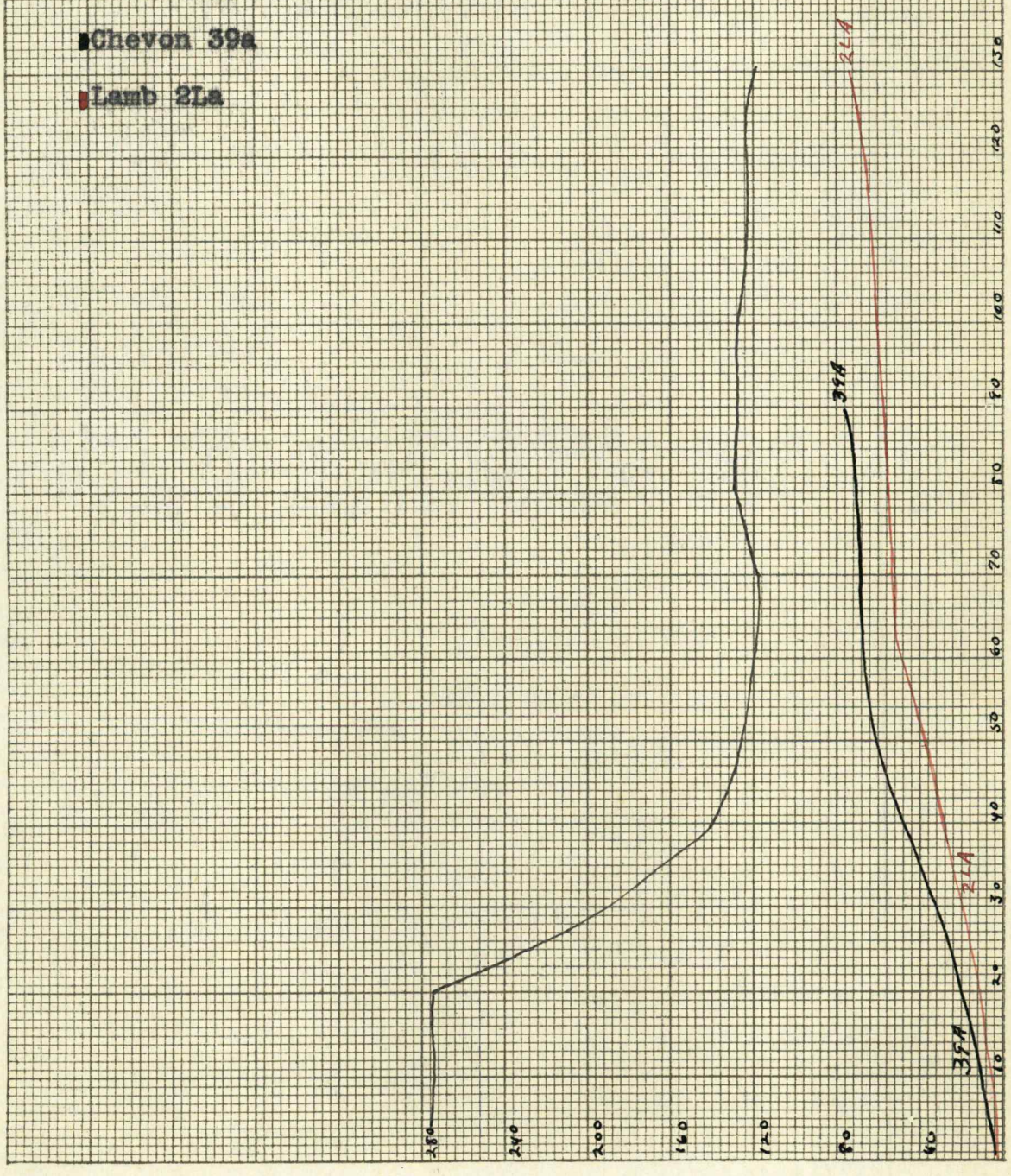
Cooking Data	Sample No. 23a	Sample No. 23b
Weight of raw roast	914	915
Average roasting temperature	130	130
Minutes required per pound for roasting	36.5	50.0
Shrinkage due to evaporation	12.04	14.74
Shrinkage due to volatile losses	4.93	6.89
Total shrinkage	16.97	21.63

Cooking Tests No. 14 and No. 15

Ageing Study and Comparison with Lamb of Chevon

KEY

- Oven Temperature
- Chevon 39a
- Lamb 21a



Cooking Tests No. 14 and No. 15

Ageing Study and Comparison with Lamb of Cheven No. 39

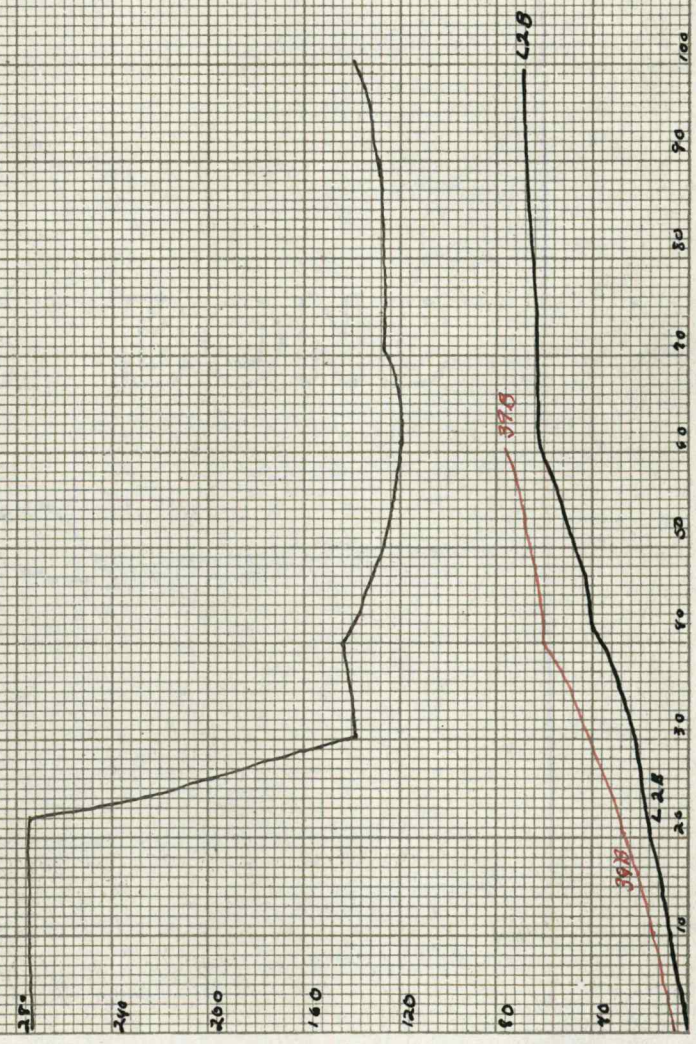
Two legs of lamb were purchased from the Nebergall Meat Company from a carcass that had been dressed practically the same time that the cheven No. 39 was dressed. These legs of lamb were to be compared with the legs of cheven No. 39 in the ageing test. Cheven No. 39 was killed July 12 and the first cooking was tried on July 22. At this time the leg of the lamb and the leg of the cheven were roasted in the same oven and carried to the same temperature--75° C. There was very little difference in these two in the loss due to evaporation and the loss due to dripping while cooking. The loss on the lamb leg was 14.62 per cent while that on the cheven was 13.89 per cent. In grading the legs from the lamb and the cheven the committee agreed that the cheven leg was better than the leg of lamb in three respects. The leg of cheven was graded as "tender" while the leg of the lamb was graded as "moderately tender". The quantity of juice was larger in the leg of lamb but was graded "moderately desirable" against "desirable" for the leg of cheven. The quality of juice was thought to be slightly superior with the leg of cheven.

Continuation of Cooking Test No. 14 and No. 15

Ageing Test and Comparison with Lamb of Chevon

KEY

- Oven Temperature
- Chevon 39b
- Lamb L2b



Continuation of Cooking Test No. 14 and No. 15

Ageing Test and Comparison with Lamb of Chevon No. 39

On July 29 the other leg of chevon No. 39 and the leg of the lamb No. 2 were roasted in the same manner that the other legs from lamb No. 2 and chevon No. 39 had been roasted on July 22, both legs being carried to the internal temperature of 75° C.

The committee found that the leg of chevon in this case graded between "tender" and "very tender" against "tender" for the leg of lamb. The quality of juice was slightly more desirable and the quantity of juice was graded as "slightly large" against "moderately large" for the leg of lamb. It was also noted by the committee that the leg cooked on July 27 was slightly more tender than the one cooked on July 22. The quantity and quality of juice was not changed except that it was thought that the quality of juice was slightly more desirable on the leg cooked on July 22. No other changes were noted.

At the same time the leg of lamb was also graded higher on July 27 than the one that was cooked on July 22.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Ageing Test and Comparison of Chevon with Lamb

		Sample No.L8a	Sample No.39a	Sample No.L8b	Sample No.39b
Days after killing		10	10	17	17
Internal Temperature of Roasts		75°C.	75°C.	75°C.	75° C.
Aroma	Intensity	3	3	3	3
	Desirability	4	4	4	4
Texture	Intensity	5	5	4.5	5
Flavor of fat	Intensity	4	3	4	3
	Desirability	4	4.33	5	4
Flavor of lean	Intensity	4.33	4	5.5	4
	Desirability	5	5	5	5.25
Tender-ness	Intensity	5	6	6	6.5
Quality of juice	Intensity	4	4	5	4
	Desirability	5.66	5.66	4.5	5
Quantity of juice	Intensity	5.66	5	5	4
	Desirability	5	6	5	5

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Ageing Test and Comparison With

Lamb of Cheven

(Continued)

Cooking Data	Sample No.L2a	Sample No.39a	Sample No.L2b	Sample No.39b
Weight of Raw Roast	1600	1148	1195	990
Average Roasting Temperature	127.5	127.5	130	130
Minutes Required per Pound for Roasting	36.2	35.6	38.0	27.5
Shrinkage due to Evaporation	10.51	11.14	13.58	9.18
Shrinkage due to Volatile Losses	4.11	1.75	3.36	3.53
Total Shrinkage	14.62	13.90	16.90	12.66

Cooking Test No. 16

Comparison of Mutton and Chevon

KEY

- Oven Temperature
- Chevon 50a
- Mutton 1a

Cooking Test No. 16

Comparison of Mutton and Chevon

Up to this time nothing had been done on aged goats. An Angora aged wether weighing 165 pounds and in quite high condition was killed July 12 and was to be compared with a leg of mutton. Mr. Darnall of Swift and Company, Portland, sent a leg from a Cotswold three year old wether that was in practically the same condition, to the department to be used in comparison with the leg of chevon.

The cooking test was carried out on July 22. Both the leg of chevon and the leg of mutton were carried to the same internal temperature of 75° C. The committee found very little difference in the two legs. The flavor of the fat on the mutton was graded as "slightly desirable" while that on the chevon was graded as "neutral". The flavor of lean on both were graded as "slightly desirable". The mutton was graded as "slightly tough" while the chevon was graded as "tough". The mutton was also somewhat superior in the quantity of juice and as to the quality of juice graded "moderately desirable" against "neutral" for the chevon.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Test on Aged Wether

		Sample No. 80a	Sample No. 81a
Days after killing		8	11
Internal Temperature of Roasts		75° C.	75° C.
Aroma	Intensity	3	4
	Desirability	4	4
Texture	Intensity	4	4
Flavor of fat	Intensity	3	3
	Desirability	3	4
Flavor of lean	Intensity	3.66	4
	Desirability	4	4
Tenderness	Intensity	3	4
Quality of juice	Intensity	3.66	4
	Desirability	3.66	4
Quantity of juice	Intensity	3.	3.33
	Desirability	3	4

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Test on Aged Wether

(Continued)

Cooking Data	Sample No. 50a	Sample No. 51a
Weight of raw roast	3093	3230
Average roasting temperature	137.2	137.2
Minutes required per pound for roasting	36.7	37.4
Shrinkage due to evaporation	15.26	13.31
Shrinkage due to volatile losses	9.87	10.76
Total Shrinkage	25.13	24.07

Cooking Test No. 17

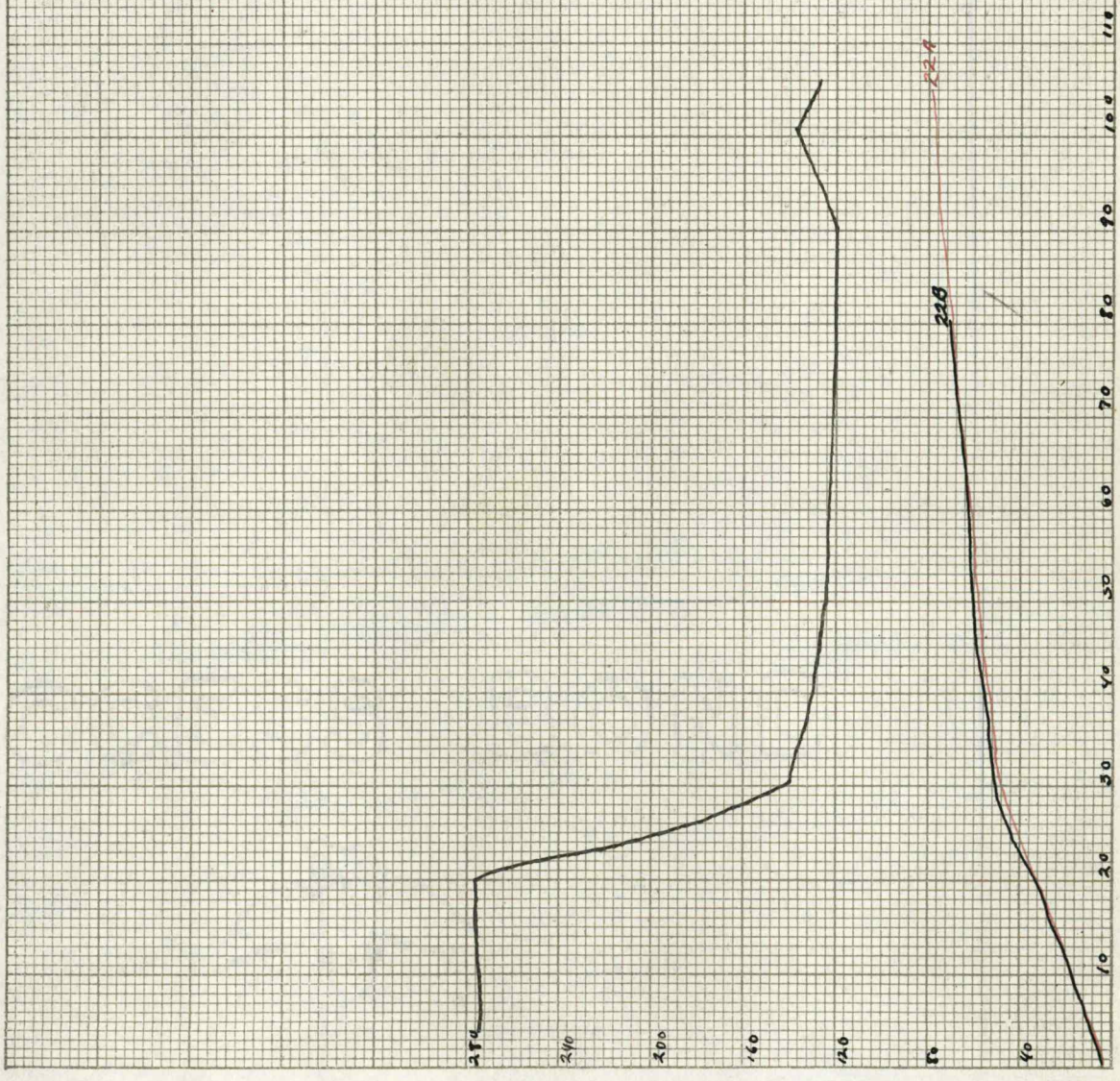
Temperature Study on Chevon No. 22

KEY

Oven Temperature

Chevon 22a

Chevon 22b



Cooking Test No. 17

Temperature Study on Chevon No. 22

Chevon No. 22, a kid that was killed on July 21, was used to check on the temperature test. This kid graded No. 2 on foot and in the carcass. The legs from the kid were cooked July 24. One leg was carried to the internal temperature of 75° C. and the other to the internal temperature of 80° C.

The committee found that the leg of the chevon that was carried to the 75° C. temperature was slightly more desirable than the one carried to the 80° C. temperature. This 22b, the leg carried to the 75° C. temperature, was graded by the committee as "moderately tender" against "slightly tough" for leg 22a, which was carried to the higher temperature. Also the quantity of juice was graded by the committee as "moderately large" for 22b against "small" for 22a, and was also graded "moderately desirable" for 22b against "slightly desirable" for 22a. The quality of juice was graded "moderately rich" for 22b against "slightly rich" for 22a, and was also slightly more desirable. No other changes were noted.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Cooking Test No. 17

Temperature Study on Chevon No. 22

		Sample No. 22b	Sample No. 22a
Days after killing		4	4
Internal temperature of roasts		75	85
Aroma	Intensity	3	2.63
	Desirability	4	3.66
Texture	Intensity	4.66	5
Flavor of fat	Intensity	5	4
	Desirability	4	4.33
Flavor of lean	Intensity	5.66	4
	Desirability	4.66	5
Tenderness	Intensity	4.66	3.66
Quality of juice	Intensity	4.66	4
	Desirability	5.66	5
Quantity of juice	Intensity	5	3
	Desirability	5	4

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Cooking Test No. 17

Temperature Study on Chevon No. 22

(Continued)

Cooking Data	Sample No. 22b	Sample No. 22a
Weight of raw roast	805	825
Average roasting temperature	128	128
Minutes required per pound for roasting	59.3	44.4
Shrinkage due to evaporation	17.42	19.15
Shrinkage due to volatile losses	3.10	2.42
Total Shrinkage	20.36	21.57

Cooking Tests No. 18 and No. 19

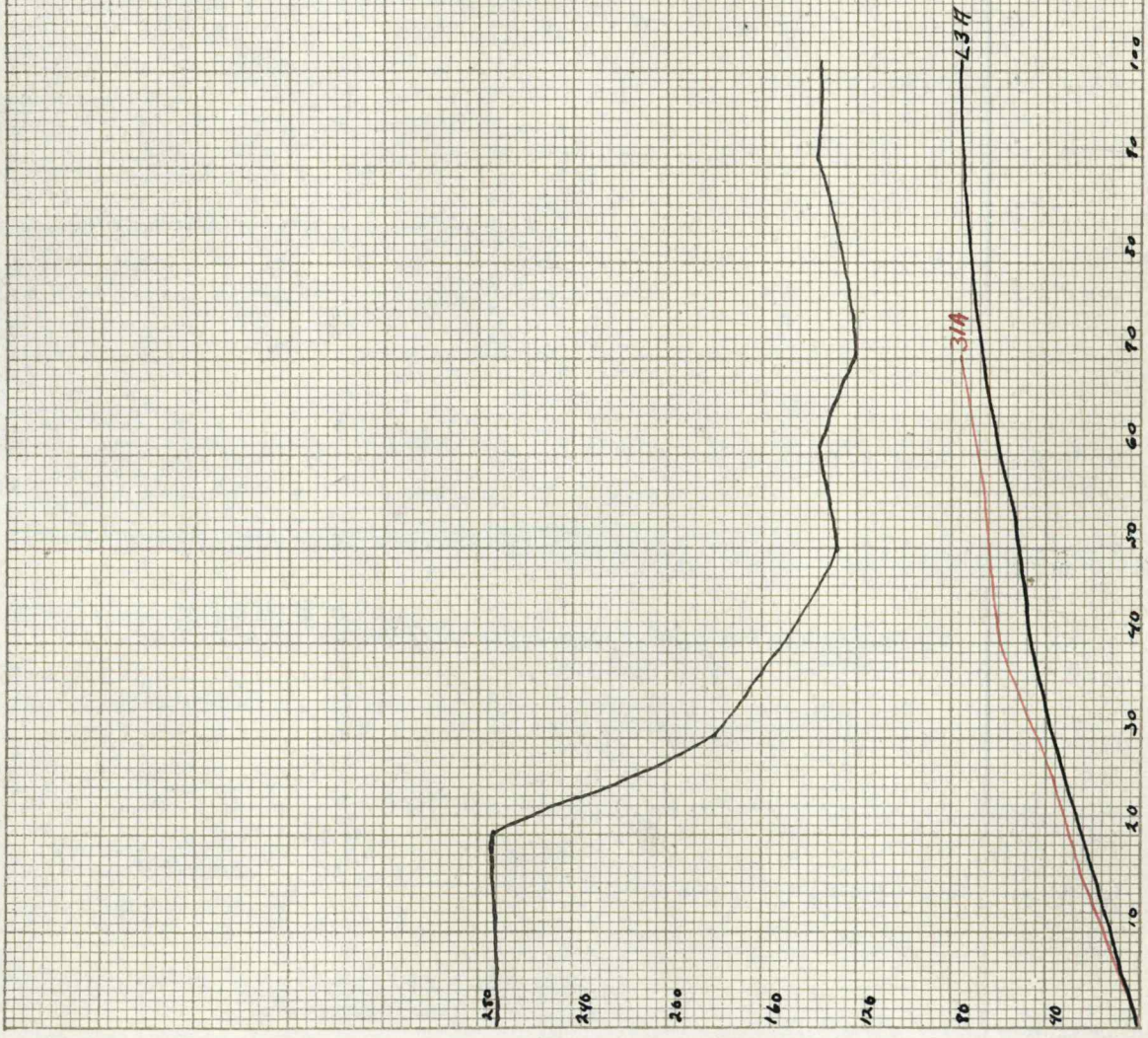
Ageing Study and Comparison with Lamb on Chevon No. 31

KEY

Oven Temperature

Chevon No. 31a

Lamb No. 3a



Cooking Tests No. 18 and No. 19

Ageing Study and Comparison with Lamb on Chevon No. 31

Chevon No. 31, another kid, was killed July 21 and was compared with the leg of lamb and also used in the ageing test. A leg of lamb and a leg from Chevon No. 31 were cooked on July 27. Both legs were carried to the same internal temperature of 75° C.

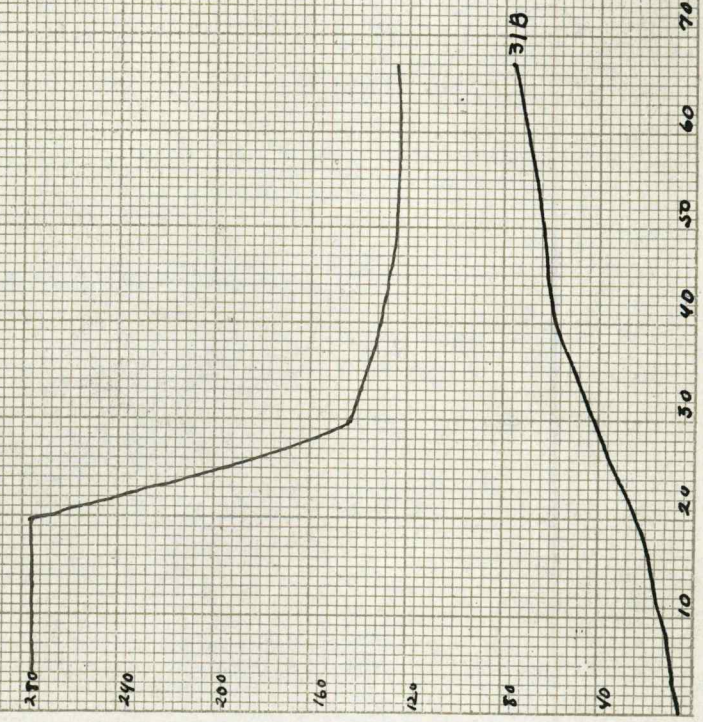
It was noted by the committee that the leg of the chevon was superior in quality and quantity of juice but was not quite as tender as the leg of lamb, the difference being very small. The leg of chevon was graded as slightly more tender, both legs grading between "tender" and "very tender". It was thought that the flavor of the lean was slightly more desirable on the leg of chevon and also the texture of the meat was graded as "fine" on the chevon against "moderately fine" on the lamb. The results for the ageing will be given later.

Ageing Test for Chevon No. 31

KEY

Oven temperature

Chevon 31b



Ageing Test for Chevon No. 31

The second leg of the chevon No. 31, a kid that was killed July 14, was roasted on July 27, seven days later than the first leg had been roasted. In comparing the score sheets after the summary of the records had been made it was found that the leg of chevon that had been aged 13 days was superior to the one aged six days in intensity and desirability of flavor of the fat, was inferior in intensity and desirability of lean, was the same in tenderness, but in quality and quantity of juice graded higher. However, both these legs were quite close in all respects.

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Ageing Test for Chevon No. 31 Compared with Lamb

		Sample No.13a	Sample No.31a	Sample No.31b
Days after killing		7	8	13
Internal temperature of roasts		75	75	75
Aroma	Intensity	3.33	3.33	3.6
	Desirability	4	5	3.8
Texture	Intensity	5	5.66	4.8
Flavor of fat	Intensity	4	3	3.8
	Desirability	4	3	6
Flavor of lean	Intensity	4	5	4.6
	Desirability	6	6.33	5.6
Tenderness	Intensity	6.33	6.66	6.6
Quality of juice	Intensity	5	5	4.8
	Desirability	5	5	5.4
Quantity of juice	Intensity	5	5	5.4
	Desirability	5	5	6

SUMMARY OF RECORDS FROM COOKED MEAT GRADING CHART

Ageing Test for Chevon No. 31 Compared with Lamb

(Continued)

Cooking Data	Sample No. L3a	Sample No. 31a	Sample No. 31b
Weight of raw roast	1220	882	861
Average roasting temperature	136	136	130
Minutes required per pound for roasting	37.2	36	34.2
Shrinkage due to evaporation	13.53	12.68	8.82
Shrinkage due to volatile losses	2.96	2.16	5.22
Total Shrinkage	16.49	14.84	14.05

Results of Chevon Studies

Some very interesting results have been brought out in the preceding studies. The primary purpose in the first part of the study was to try to find out the best methods to use in the preparations of the roasts. With the U. S. D. A. lamb cooking procedure as a guide studies were made as to the best internal temperature to use to make the meat most palatable. The two legs from a carcass were roasted in the same manner and in the same oven, but were carried to different internal temperatures and then graded. It was assumed that chevon was very similar to mutton, so since the U. S. D. A. recommends 75° C. as the best internal temperature for lamb and mutton leg roasts, this temperature was used as a guide. Legs of chevon were roasted to various internal temperatures varying from 73° C. to 90° C. The results of these tests showed an excellent consistency. For the kids 75° C. was found to be the best internal temperature for the roast, but for the older animals such as yearlings and two year olds the legs roasted to the 85° C. were graded higher as to flavor of lean and tenderness.

Another study was made regarding the best length of time to age the carcasses before the meat was roasted.

The results of this test were also very consistent. The study showed that the meat in all cases improved with ageing up to the time when it began to spoil. The carcasses were held at temperatures between 29° F. and 35° F. and under these conditions the carcasses would not begin to spoil until they were more than three weeks old. After twenty-one days the carcasses were liable to start spoiling at any time.

The big improvement that was noticed was that the meat was considerably more tender and the flavor of the lean was also improved.

The most interesting part of this study was the comparisons made between lamb and chevon kids. In this part of the experiment spring lambs and spring kids of similar condition were compared, and the committee of judges were unable to consistently distinguish between the lamb and the chevon. In all cases the kid was just as tender or more tender than the lamb and the flavor of the lean of the chevon was graded as high or higher than that of the lamb. The flavor of lean was identical and the committee could not distinguish any differences between the two. The odor of chevon was slightly more pronounced but was the same kind of odor.

Summary Sheet for Chevon Cooking Tests, 1928

No.	Time Seared	Ave. Searing Temp.	Ave. Roasting Temp.	Wt. of Raw Roast	Min. Required for Roasting
4	20 Min.	245	135	3# 1 oz.	1 Hr. 25 Min.
1	20 Min.	278	125	3# 1 oz.	1 Hr. 39 Min.
2	20 Min.	278	125	2#	1 Hr. 10 Min.
5a	20 Min.	270	125	3# 8 oz.	1 Hr. 20 Min.
5b	20 Min.	270	125	3# 4 oz.	1 Hr. 35 Min.
15a	20 Min.	275	125	3# 12 oz.	2 Hr.
15b	20 Min.	275	125	3# 10 oz.	1 Hr. 35 Min.

(Continued)

Required Minutes Per. Lb.	Wt. of Roast When Done	Temp. of Roast when Removed	Maximum Temp.	Per cent lost in Roasting
28 Min.	2# 5 oz.	70½	74	24.5%
32.2 Min.	2# 7 oz.	74½	77	20.4%
35 Min.	2# 4 oz.	76½	78	21.9%
22.8 Min.	2# 13 oz.	73	75	19.6%
27.1 Min.	2# 10 oz.	85	86	19.3%
32 Min.	2# 8 oz.	90	91	33.3%
26.2 Min.	2# 14 oz.	89	90	20.7%

Summary Sheet for Cheven Cooking Tests, 1929

No.	Time Seared	Ave. Searing Temp.	Ave. Roasting Temp.	Wt. of Raw Roast	Min. Required for Roasting
12a	20 Min.	275	126	1915	145 Min.
12b	20 Min.	275	126	1955	165 Min.
10a	20 Min.	275	137	1583	195 Min.
10b	20 Min.	275	137	1582	175 Min.
*L1a	20 Min.	275	130	1839	160 Min.
7a	20 Min.	275	130	1841	210 Min.
*L1b	20 Min.	275	138	1690	140 Min.
7b	20 Min.	275	138	1733	205 Min.
7c	20 Min.	275	-	902	-
74a	20 Min.	275	127	1002	85 Min.
103a	20 Min.	275	127	871	93 Min.
74b	20 Min.	275	127	884.5	97 Min.
103b	20 Min.	275	127	851	105 Min.
23a	20 Min.	275	130	914	73 Min.
23b	20 Min.	275	130	915	100 Min.
39a	20 Min.	275	127.5	1148	90 Min.
*L2a	20 Min.	275	127.5	1600	130 Min.
50a	20 Min.	275	137.2	3093	250 Min.
♦1Ma	20 Min.	275	137.2	3230	267 Min.
22b	20 Min.	275	128	805	105 Min.
22a	20 Min.	275	128	825	80 Min.
*L3a	20 Min.	275	136	1220	100 Min.
31a	20 Min.	275	136	882	70 Min.
*L2b	20 Min.	275	130	1195	100 Min.
39b	20 Min.	275	130	990	60 Min.
31b	20 Min.	275	130	861	65 Min.

* Lamb Leg
♦ Mutton Leg

Summary Sheet for Chevon Cooking Tests, 1929

(Continued)

Required Minutes Per Lb.	Wt. of Roast When Done	Temp. of Roast when Removed	Maximum Temp.	Per cent lost in Roasting
34.2 Min.	1557	75	76	18.72%
40.[illegible] Min.	1572	85	85	19.68%
55.6 Min.	1312	90	90	16.50%
50.0 Min.	1374.5	85	85	13.10%
40.0 Min.	1459.5	75	76	20.65%
52.0 Min.	1396	85	85	24.16%
37.5 Min.	1360.5	75	78	19.43%
53.6 Min.	1292.5	85	85	25.41%
-	755	75	76	19.23%
38.4 Min.	795.5	85	86	20.70%
48.4 Min.	671.5	85	85	22.90%
49.7 Min.	724	85	85	20.97%
56.1 Min.	692.5	85	85	23.43%
36.5 Min.	787	75	75	13.78%
50.3 Min.	745	85	85	21.63%
35.6 Min.	878.5	75	75	13.90%
36.2 Min.	1366	75	75	14.62%
36.7 Min.	2342	75	76	24.28%
37.4 Min.	2441	75	77	24.43%
59.3 Min.	633	80	80	20.38%
44.4 Min.	637	75	75	21.57%
37.2 Min.	1018	75	75	16.56%
36.0 Min.	760	75	75	14.84%
38.0 Min.	993	75	75	16.90%
27.5 Min.	868	75	75	12.66%
34.2 Min.	740	75	75	14.05%

Summary Sheet for Cheven Cooking Tests, 1929

(Continued)

1. Six legs from Kids average required Minutes per Pound - 35.60
2. Six legs from Kids average total loss in roasting - 15.70%
3. Seven legs from yearlings and two-year olds required Minutes per Pound - 49.7
4. Seven legs from yearlings and two-year olds total loss in roasting - 21.6%

Discussion of Chevon Studies

Up to this time I have dealt entirely with the bare facts of the study. At this place I wish to give some of the things that were noted but heretofore have had no recognition.

The meat from these animals when roasted had no strong odor. During the time the roast was being prepared a strong odor was noted that was somewhat undesirable. This was noted especially while the roasts were searing. The carcass had no strong odors even where the mohair touched the carcass. If the mohair had caused a strong oder or taste it would have been noticed because it was practically impossible to keep the mohair away from the carcass while the animal was being dressed.

A few yearling billies were used in the study and no strong odor was detected from these carcasses.

Mr. M. D. Helser states in his text "Farm Meats" that goat meat is somewhat sweeter than mutton. This was not detected at any time in this study.

It was the concensus of opinion by all the members of the committee that kid meat could be served to them for lamb and that they would not know the difference.

With the older goats, however, the meat was graded tougher and somewhat more dry than the meat from the lamb. Where the aged mutton was compared with the aged goat very little difference was detected by the judges except the mutton was slightly more tender.

The following summary sheet for chevon cooking tests gives the cooking data for all of the roasts. It shows minutes required per pound for each roast, temperature of roast when removed, percentage of loss during roasting, average roasting temperature and average searing temperature.

Six kid legs roasted to 75° C. required from 27.5 minutes per pound to 44.4 minutes per pound to cook the roast. The average was 35.69 minutes per pound.

The loss during roasting was very consistent, the average being 15.7 per cent loss.

For seven legs from yearlings and two-year olds roasted to 85° C. internal temperature, the required minutes per pound to cook the roast varied from 38.4 minutes to 53.6 minutes per pound, or an average of 49.7 minutes per pound.

The average loss during roasting was 21.5 per cent.

A number of cuts of the carcasses were given away to families connected with this college and all of these families brought back favorable reports for the meat and all said that it was very good. Some of them noticed a strong odor during the time the meat was cooking. This was especially true of the meat was boiled.

The chevon meat was a little coarser texture than lamb and the carcasses were more angular in form. They were not as full in the legs, were more bare over the ribs, and are not capable of putting on fat nearly as easily and readily as lamb. It was noted that the legs of lamb carried a whiter and thicker finish than the legs of chevon and were larger and not as plump as lamb legs. The loin of chevon was not as thick as the loins of lamb.

Summary of Chevon Studies

1. The average dressing per cent of goats for all ages was 47.49 per cent.

2. Chevon should be roasted to the internal temperature of 75° C. for kids and to the internal temperature of 85° C. for yearlings, two-year olds, or older animals.

3. Ageing of chevon meat up to 21 to 23 days improves the meat both as to tenderness and flavor of lean.

4. The flavor of chevon is the same as mutton.

5. Chevon kid meat is as tender or more tender than lamb and is as desirable as to flavor as lamb.

6. Chevon meat does not have an undesirable odor after the meat is roasted, but does have a slightly undesirable oder during the time it is being seared.

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