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# REPORT

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THE undersigned, acting as a committee of the Graduate School, have read the accompanying thesis submitted by Kenneth F. Warner for the degree of Master of Science. They approve it as a thesis meeting the requirements of the Graduate School of the University of Minnesota, and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science.

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# A STUDY OF THE INFLUENCE OF THE POPULARLY ACCEPTED CONFORMATION OF LAMBS UPON THEIR SLAUGHTER AND BLOCK YIELDS

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BY

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# A STUDY OF THE INFLUENCE OF THE POPULARLY ACCEPTED CONFORMATION OF LAMBS UPON THEIR SLAUGHTER AND BLOCK YIELDS

PURPOSE:

The judging of fat meat animals consists of estimating the relative individual value of each animal. A judge selects as winners those individuals which he thinks will yield the greatest profit on the block. Unfortunately there are few absolute rules by which a judge can guide his placing, and none by which a disappointed exhibitor can prove his entry better than the winner as long as both animals are still on foot. Thus,

the placing is a matter of opinion and it requires, as the name implies, the use of very careful judgment. The above being true, it can be seen that there must be established an ideal type and form towards which the judge can work, a type agreed to and accepted by the breeders, feeders, and packers as a whole. The existence of some uniform standard is absolutely essential and one has long been established by the stockmen.

The exact origin of the existing standard for meat animals is unknown. Its formation probably began with the first attempts to domesticate animals, was given decided impetus about 1750 by Robert Bakewell of England and has been changed and reshaped by all the producers and consumers of killing stock from that time to this. In short, it has grown and developed through the years, moulded by man's ever changing ideas as to what constituted a desirable killing type of meat producing animals, and stands today as the cumulative product of the judgment of many men with their years of experience.

Such a foundation would seem sufficiently firm for the establishment of any principle or law. One must remember, however, that through all this growth there has been little if any effort made to check the standard or to prove or disprove it absolutely. Obviously the records of the packers and of the smaller butchers would have long ago brought to light any serious errors in that standard. However, a study of the records of the carcass contests at the Chicago International Live Stock Exposition illustratesthe fact quite clearly that so little does man know about the relation of form to yield of meat that never in those contests has the placing on foot agreed consistently with the one in the cooler.

The popular judging standard calls for a smooth shoulder in a lamb, stating that a bucky one is heavier not only in whole weight but also in per cent. of bone. That statement is accepted the country over and although it seems plausible it has never been proved. A paunchy lamb will be turned down in favor of a trimmer

one, the reasons being that the roomier one is thought to dress out more offal and cut a higher yield of cheap plate. Again,such a correlation seems reasonable, but it has never been definitely demonstrated and no one knows absolutely whether paunchiness is the prime factor which determines a high yield of plate or not. Again, good judges prefer a lamb with a square, level rump, and a full thigh and twist, giving as the reason the fact that it will cut a higher per cent. of leg. That looks reasonable also and no one would expect an empty twisted fine wool to yield as large a per cent. of leg as a medium wool with a thick, full thigh. Yet, as before, the statement is really an accepted theory rather than a demonstrated fact.

Thus, the judging standard of our score card, schools and judging ring is a standard founded upon what is apparently so rather than upon a proved fact. It is the product of study and observation rather than of definite measurements and checking. Realizing therefore, that many if not all the descriptions in the score card

are probably associated with a higher yield, it was felt that an actual check of those points was needed. Thus, the object of this problem is to definitely determine the influence of the present accepted judging standard of meat animals upon the slaughter and block yields.

The original plan of this experiment was worked out by Professor T. G. Paterson and his ideas and suggestions have formed the foundation of this study throughout. Grateful acknowledgment is hereby given him for his assistance in planning the methods used and in checking the final results.

METHODS:

The planning of a system which would accurately measure the various points to be considered naturally presented many complex problems. Animals vary widely, not only in type and conformation, but also in quality and condition, thus making it hard to find a method which would measure them definitely and accurately. The system finally adopted for the comparisons in conforma-

tion consisted of four distinct records of both the live animal and carcass. First, the animals were measured in as many places as could be definitely located, thus giving the actual and proportionate size of each part. Second, lead forms were made in a number of places over the top to determine the actual spread and levelness of each individual. Third, detailed notes were taken of each animal in an endeavor to record those points not included in the first two records, the whole being checked by pictures taken both on foot and in the carcass.

The slaughter records consisted of weighing separately all the products of the animal. The per cent. of each part to the live weight was determined thus giving a basis upon which to compare each animal with the others and with the recorded points of conformation. The carcasses were cut into the regular wholesale cuts as will be explained hereafter, those cuts being boned and the total and boned weights reduced to a percentage basis for the purpose of comparison. In addition the

internal volume of each carcass was determined by means of water, the result being used in the comparison with the per cent. of offal.

Thus, there resulted from these methods four detailed records of the characteristics of the animals on foot, another set of four recording the characteristics of each carcass and a complete record of each animal's yield, the three sets being in such shape as to permit comparison of outward appearance with actual value.

The animals selected for this work were fat lambs. Lambs were finally chosen because they were smaller, because more of them could be used and because a number of individuals of nearly the same age were available. It was recognized that the results from sheep would probably not be comparable to cattle and hogs. However, the checking of those three kinds of stock involved a prohibitive amount of work and as the lambs were the only animals available in the Station barn the problem was confined to them. Two types were selected, there being five fine wools and six medium

wools represented in the final records. Preliminary work was done on other sheep to test out the system, the records, however, being discarded. All the lambs were selected because of some special strength or weakness as will be brought out later on. The lambs were numbered in the order in which they were slaughtered and are referred to throughout by these arbitrarily assigned numbers.

Lambs Nos. 1 to 7 were slaughtered during January, February and March of 1914, while Nos. 8 to 11 were killed in January and February of 1915. In both instances the animals were practically the same age, Nos. 1 to 7 having been lambed in the spring of 1913, and Nos. 8 to 11 in the spring of 1914. They were of various breeds, weights and conformation as will be brought out in the detailed note record.

The use of sheep in this work involved one feature which had to be eliminated. The fleece, not only made it impossible to measure and take forms of the lamb's body but it also added additional weight, which

factor disturbed the proper relation of live weight to carcass weight as viewed from the purely conformation standpoint. The lambs were therefore sheared and the record of the fleece eliminated from the main results.

MEASUREMENTS. The system of measurements as used, recorded the principle dimensions of the five main wholesale cuts of lamb, namely, shoulder, plate and flank, rack, loin and leg. The main difficulty encountered throughout was in the determination of points at which to measure which would be definite enough in their location to be comparable in all cases. It can be seen that a thick covering of flesh would so hide a certain rib or vertebra as to make it impossible to locate it accurately, this making the selection of points dependent upon the more prominent joints and body angles.

The measurements of both the lamb and the carcass were taken in practically the same places and were divided among the five general wholesale cuts as indicated. Three measurements of the shoulder were taken, the cal-

ipers being placed at the shoulder point, just behind the elbow and from the top of the shoulder blade to the floor of the brisket. It was recognized that this system omitted the length but the third rib was too thickly covered with meat to make its accurate location possible. The depth also includes the brisket but the same difficulty was encountered here as before, the depth as taken being thus more of an indication than an actual measurement. In the later tables the average width between shoulder points and elbow has been multiplied by the depth and the product used as the measurement for this cut.

The rack was measured in but two places, namely, the end of the last or thirteenth rib and behind the elbow. As with the shoulder the location of the third rib was too indefinite to be relied upon so that length measurement was unfortunately omitted.

The plates and flank were measured in five places. The width at last rib and behind the elbow as explained in the rack, gave a general indication of

the spread of this lower cut. The depth of body taken at brisket last rib and hip gave a good idea as to the length of rib of the lamb and showed any tendency to tuck up or sag in chest, paunch or flank. The average depth and average width were taken as the size indicators for this cut.

The width of the loin both front and rear was taken together with the length from hip to last rib. The average width when multiplied by the length thus gave the surface area of each loin, and this product has been used in the comparisons which follow.

The leg contains many different parts and angles and a total of six measurements were taken of it. The width between both hips and between pin bones was determined the latter measurement, being only fairly accurate owing to the thick covering of fat. In addition the width was measured at the widest bulge of the leg in an endeavor to record the plumpness and fullness of that cut. The length was taken from hip to pin bones and from pin bones to hock, thus giving the total length

of the wholesale leg cut. Depth of twist was the last measurement taken, the calipers being spread from the pin bones to the place where the flesh of the inner thigh began to hollow out and cut under.

It will be appreciated that the measurements as taken above were made from sheep of various weights. An attempt was made to select lambs of nearly the same size, but lack of a sufficient number and lack of lambs of the same weight with sharply contrasting conformations necessitated the using of animals with sheared weights ranging from 64 to 127 pounds. Thus it was felt that the actual measurements for the smaller sheep were not quite comparable to those of the larger ones. To equalize them they were all standardized to the basis of 100 pounds sheared weight. It can be seen that this system would give undue advantage to the lighter fine wools and do an injustice to the heavier lambs. In fact, as it worked out the 64 pound lamb though really smaller, measured larger throughout than any of the others. Nevertheless, the proportionate size would re-

main unchanged and as the majority of lambs weighed around 100 pounds, it seemed the fairest system, everything considered.

FORMS. The second record taken consisted of the forms of the top of the sheep. Strips of sheet lead were pressed over the back of the sheep and the outline taken off on paper. Care was taken to keep the lower ends of the form the proper distance apart when tracing. Forms were taken across the top of the shoulder, across the fore rib just behind the elbow, over the last rib, over the center of the loin and center of the rump.

NOTES. Complete judging notes formed the third check of the conformation. The set taken on the last four sheep were united with those of the first seven thus giving a complete comparison. In making them, especial care was taken to include those points emphasized by the score card and particularly the ones not covered by the measurements. It was realized that notes are inaccurate but being rechecked by Prof. T. G. Paterson it was felt that they were accurate enough to

be of comparable value.

PICTURES. The pictures were taken to recheck the other records and to give greater clearness to the explanation. Each lamb was photographed from a side and rear view on foot and from the side and back when hanging in the carcass. Reference has been made repeatedly to these pictures in the discussion and they illustrate plainly many of the points made in the comparison.

SLAUGHTERING. All eleven lambs were killed in the afternoon. They were fed as usual in the morning and allowed hay during the forenoon. This gave them a bit larger fill than is advisable in regular slaughtering, but it kept them all in a normal condition and was therefore followed.

Each lamb was weighed just before slaughter that being recorded as his "sheared weight" and that plus the weight of his fleece as his "live weight, fleece on." The body was again weighed after sticking the difference between that and the first representing the loss of blood. The pelt was fisted off and cut from the car-

cass at the rear lower pastern and lamb joints. The head was removed at the occipital joint and cut from the pelt behind the ears. All viscera were removed, divided into their separate parts and weighed. The intestines were then run and paunch, intestines and pluck, fatted, emptied, washed and weighed again, the difference in the first and second weights being represented by the weighed fat and the digestive waste. Edible offal included the total internal fat, tongues, hearts and livers. The non-edible included the pluck (heart and fat out), digestive organs and their contents.

All carcasses were round dressed, pluck out. Care was taken to get as little dirt on the carcass as possible, thus reducing the washing to a minimum. The warm weight of the carcass was taken immediately after dressing, after which it was run directly into the cooler. The carcasses hung in the chilling room about one week. Unfortunately the temperature varied with the weather but averaged between 40 and 50 degrees F. During that period the measurements, forms, notes, pic-

tures and body volumes were recorded. Unfortunately, two carcasses, Nos. 6 and 7 were held about twice the length of time of the other lambs, a congestion of other things prohibiting any work from being done on them. Likewise a sudden spell of warm weather raised the temperature of the cooler to such a degree that they dried out more than the others. The difference in the warm weight and cold weight of the carcass represents the shrinkage. Thus those two sheep when weighed out to the cutting table showed a bit larger shrink than normal.

CUTTING. The carcasses were cut as close to the commercial lines as possible, care being taken to make the guides for each cut absolutely definite. The carcasses were halved first, being divided between the twelfth and thirteenth ribs into fores and hinds. The plate was removed from the fore quarter on the line connecting the end of the thirteenth rib and the bony raise on the arm just forward from the elbow. That line cut in above the fore legs, which were later

separated from the plate by cuts parallel to each side of the brisket. The rack was cut off between the third and fourth rib and the neck removed from the shoulder by a continuance of the line along the top of the shoulder.

In the hind quarter the kidney was pulled out, care being taken to leave a small covering of fat over the tenderloin. The loin and leg were separated at a point just in front of the hip bones. The flank was cut off the loin at the edge of the long back muscle and parallel to the back bone.

There was naturally a chance for error in cutting but the lines were located so definitely that that feature was reduced to a minimum. Two of the carcasses were so fat that from a commercial standpoint, some trimming would have been necessary. That was not done, however, as it was felt that both surplus fat and bloody spots were edible products of the lamb and should be included. In addition, the shanks, or fore and hind legs, were included in the cut yields. They belong to

the carcass as bought by the retailer though really unmarketable meat and are listed as such in the later tables.

After halving and weighing the separate cuts, the carcasses were each carefully boned out and the weight of bone and meat recorded. Such then were the methods used and following is a detailed comparison of the records and the yields. All weights have been reduced to a per cent. and all measurements to the basis of 100 pound sheared weight, thus making the figures comparable throughout.

DATA:

The purpose of this work was to compare the conformation of lambs as judged by the accepted standards, to slaughtering and block yields. It was therefore felt that a complete record should be made of each lamb from the standpoint of that standard. There follows therefore, a complete comparison of the animals in the group, a comparison made according to the de-

scription contained in the popular score card, and checked by Prof. T. G. Paterson. The numbers have been arbitrarily assigned in the order in which the lambs were used.

TABLE 1

FLOCK RECORD

| No. | Breed | Sex | Date of Birth | Live Weight. |
|---|---|---|---|---|
| No. 1 | Hampshire | Ewe | Mar. 4, 1913 | 119.5 |
| No. 2 | Rambouillet | Ewe | Apr. 9, 1913 | 91.0 |
| No. 3 | Shrop. Dorset | Wether | Mar. 2, 1913 | 108.5 |
| No. 4 | Hamp. Ox. | Wether | Mar. 5, 1913 | 124.5 |
| No. 5 | Shropshire | Wether | Mar. 4, 1913 | 140.0 |
| No. 6 | Shrop. Ox. | Ewe | Mar.21, 1913 | 133.0 |
| No. 7 | Delaine | Ewe | Apr.18, 1913 | 98.0 |
| No. 8 | Rambouillet | Wether | Mar.11, 1914 | 102.0 |
| No. 9 | Rambouillet | Ewe | Mar.11, 1914 | 69.0 |
| No.10 | Rambouillet | Wether | Mar. 3, 1914 | 93.0 |
| No.11 | Shropshire | Wether | Mar.27, 1914 | 105.0 |

ON FOOT. No. 1 was a very straight lined, broad, deep, smooth and well balanced lamb, but stood a little too high off the ground and carried too much stretch. Her head was fairly coarse, neck, long, thick and fat, shoulder smooth and long but fairly sharp on

top and slack in the fore rib. Her brisket was wide and thick and her middle long, and wide but very trim. She showed a straight, wide spring of rib being wider and flatter at last rib than in front. Her loin was flat and thick joining on to a fairly drooping, narrow and patchy rump. She was well filled in outer thigh but only medium deep in the twist.

Her quality was good although she showed the heavy head and legs of a typical Hampshire. She carried plenty of flesh for a killing lamb but lacked the finish of Nos. 4, 5 and 6 which were killed later.

No. 2 was killed at the same time as No. 1 and as compared to that type showed very narrow, angular, rough and long of leg. She was medium blocky, however, and trim in middle. In detail,she carried a long, thin narrow neck, a sharp, narrow shoulder with blades prominent, low crops, tucked up fore flank, slack fore rib and narrow brisket. Her back was straight but narrow, middle rather long but well held up, loin low behind last rib and sharp, rump drooping, peaked and narrow, outer thigh moderately full but twist empty. In short,

she was a typical, bare, framey fine wool.

Her quality was good for her type and her skin smooth but she carried very little flesh any where later proving to be the thinnest lamb of the group.

No. 3 was a more typical mutton lamb than No. 1 and proved to have the best form of any of the lambs used. He was wide, deep, well balanced, straight lined, smooth and low set, and was extremely blocky. His head was medium coarse, neck short but thick, shoulders wide and full being bucky with blades prominent. His fore-rib was only medium full owing to heavy shoulders. He was straight, flat and wide in rack and loin, wide and full in brisket and chest, and wide and thick in middle though also trim and short. His leg was one of his best features being long and fairly square in rump, bulging widely in thigh and twist.

He showed coarseness in head and shoulder being heavier than No. 1. He was a bit thicker than No. 1 and very smooth throughout. In short, he was selected for his wide, thick, blocky type, his bucky shoulders and his full leg.

No. 4 represented about the poorest mutton type of the medium wools. He was fairly wide and thick but was leggy, narrow behind, and with a top line which drooped badly behind. His Hampshire-Oxford head was coarse and heavy and his neck short and smooth. His shoulders, like No. 5 which was slaughtered at the same time, were sharp on top though wide and thick below. His forerib was a little slack but it widened into a broad level rack which was equally as flat as that of Nos. 3 and 5 and was proportionately wider. His exceptionally wide rack narrowed into a flat but rather pinched loin which was thin enough to be quite characteristically raw. In middle No. 4 was medium heavy and thick in brisket with a wide, slightly paunchy rib and a shallow rear flank. His narrow leg was one of the chief reasons for his selection. He was drooping and narrow in the rump, narrow in outer thigh and only fairly full in the twist. However, he had good length from hips to hocks the meat carrying down well on his legs.

Lack of quality in head, legs and fleece ranked No. 4 as the coarsest of the medium wools used. His

condition was better than that of No. 3 though Nos. 5 and 6 were a little thicker. No. 4 represented then, the leggy, coarse type of lamb with a long but narrow hind quarter.

No. 5 was wide, deep, low set, blocky and symmetrical. He was, in short, a typical mutton type except for a drooping of the top line over the rump and a little too much middle. His head was medium coarse, neck long, thick and fat with a tendency to coarseness, shoulders wide but just a little sharp on top as with No. 4, fore rib full and rather soft, rack wide flat and thick, loin flat but narrower than the back, brisket wide and middle a bit paunchy. The rump was wider, thicker and more square than No. 4 though not as meaty as No. 3. His leg was medium thick and round and carried down farther in the twist than in No. 4.

No. 5 also showed good quality throughout. He and No. 6 which was slaughtered next were the two fattest lambs of the group, No. 5 being very thick on top and in the plate, and soft throughout.

No. 6 was of the same, wide, blocky, low set type as No. 5, carrying, however, a bit more trimness and massiveness. Her head showed the coarseness of a typical Oxford. The neck was long but fine, shoulders fairly broad, and smooth, thick and compact, lower fore-rib a bit slack, back level, broad and thick, loin flat and thick and showing unusual proportionate width. Her plate and flank were thick and medium deep although she lacked the roominess of No. 5 and No. 11 which was slaughtered later. Her rump was thick and smooth but tapered slightly to pin bones and lacked filling in outer thigh. The twist was deep but soft.

No. 6 showed good quality for her breed, and although showing an exceptionally thick covering throughout was very smooth and firmer than No. 5. In short she was a lamb possessing very typical mutton type, with a very broad top and exceptionally thick covering.

No. 7 was low set, deep, blocky and wide considering her type. She was rough and angular as would be expected in a fine wool and showed a large number of characteristic wrinkles in her skin. Her head was

large in proportion to body, neck long but thin, shoulders very narrow on top, short from front to rear, arm short and bare. Her fore rib was full, her back narrow as compared with the medium wools but flat considering her size and proportionately wide. Her loin was long, only medium wide, the lack of covering making it a bit sharp. She was long in rib and thick for a fine wool. Her rump drooped badly, was angular and narrow on top although the pin bones were wide and the outer thigh round and full. The twist was empty but the muscle carried down well on the inner leg.

The quality of No. 7 was excellent for her type, and although she was thin, she showed more covering than any of the other fine wools used. In brief then, she was the blockiest, widest, lowest set fine wool in the group with a narrow, short shoulder, a very wide rack, medium loin, thick though angular leg, and carried the most flesh of any of the five Merinos used.

No. 8 was narrow, leggy, rough and lacked symmetry. His head was large and coarse, neck longer and

coarser than Nos. 9 and 10, shoulders narrow and compact on top but very heavy and bucky lower down, fore rib slack, crops low and rack sharper and barer on top than either Nos. 9 or 10. His loin was fairly long but, as with his rack, sharper and barer than either Nos. 9 or 10. His chest was cut up but he showed a deeper, fuller middle than the other two fine wools. His rump was drooping and bare but longer than No. 10 and carried down into a thigh and twist much fuller than No. 9 although lacking the meat of No. 10.

No. 8 was about the coarsest of the lambs killed, showing a heavy head, shoulder, leg and a heavy, badly wrinkled hide. He carried more flesh than either Nos. 9 or 2 but less than No. 10 or fat No. 7. He represented, then, a rough, poorly balanced lamb with bucky shoulders, sharp back, wasty middle and peaked rump -- a lamb of poor quality and thin.

No. 9 was leggier, stretchier, and shallower than any of the fine wools, but straighter lined and smoother. She showed, however, equally good width considering her size. Her head was heavy but less coarse than either

No. 8 or No. 10, neck almost as long as No. 8 but very narrow, shoulders medium narrow on top and smoother, shallower and more compact than either Nos. 8 or 10. Her back was straight, fairly flat and as wide proportionately as Nos. 8 and 10, although thinner. Her loin was fairly wide and flat though bare. Her middle was trim but long and roomy. Behind she showed a longer, more level rump than No. 10 and about equal squareness carrying down into a long, full outer thigh and empty twist.

No. 9 showed good quality throughout but with the exception of No. 2 was the barest of the entire group. Thus, she was a leggy, stretchy, smooth bodied, smooth skinned lamb without much condition.

No. 10 was a lower set, deeper, squarer sheep than either Nos. 8 or 9, but showed the drooping topline and roughness of No. 8. His head was heavy though not as coarse as No. 8, neck long but shorter than No. 9, shoulders very bucky and open on top, fore rib slack, back straight and broader, flatter and thicker than Nos. 8 or 9, loin thicker and a bit flatter than the others,

and middle thick but shorter and trimmer. He carried a very drooping, cramped, peaked rump this being one of his outstanding faults. His leg, however, was long and comparatively well filled in outer thigh and twist.

No. 10 carried less quality than No. 9 but more than No. 8. His hide was badly wrinkled. He showed more condition than Nos. 2, 8 or 9, No. 7 being the only fine wool with a thicker covering. Thus, No. 10 was a typical Merino with a little more flesh than the average.

No. 11 was a low set, blocky lamb but lacked straightness in both top and bottom lines and was very unsymmetrical. His head showed average refinement, his neck was short and medium thick, shoulders fairly flat and wide in proportion to the rest of the body, making them appear fairly strong. His forerib was slack, rack straight, but narrow, sharp and raw, this being one of his worst faults. His loin was wide and flat in proportion to the rest of the body and thick. His brisket was only medium heavy but he was the paunchiest lamb

of the group, carrying a very wide, deep middle and flank. His leg was also of poor conformation being drooping, narrow and peaked in the rump although fairly well filled in the outer thigh and deep in the twist.

No. 11 showed good quality and as much condition as No. 1. As a whole, however, he was poorly balanced throughout, his raw and narrow rack, paunchy middle and narrow rump being the chief reasons for his selection.

CARCASS. The carcass of No. 1 showed the same type as on foot being fairly wide, smooth and symmetrical but lacking compactness. Her neck was long and thickly covered, shoulders fairly wide and thick, although sharp both in front and at fore rib, brisket wide and thick, middle trim but long, back wide, flat and thick, loin wide and thick but hanging a bit weak. The rump was short, rather narrow and rough at the tail head. The leg was thick and well covered but slack in the twist. In general the carcass was thick and meaty, but a little too long and rather patchy.

No. 2 in carcass was narrow, stretchy, roomy in forequarter and thin. Her neck was long, narrow and lean, shoulder thin and open on top, arm unusually long, back low behind the shoulder as on foot, forerib slack, rack sharp but flared widely towards the bulky middle. The loin was narrow, raised towards the last rib and thin. The rump was long and narrow, joining a long, smooth leg with a shallow twist. She was heavy boned, soft and dark in flesh but very bare, later proving to be the thinnest lamb of the group.

No. 3 showed the same form in the carcass as on foot being wide, thick and smooth, and excelling all the others in compactness, uniformity and fullness. His neck was short, fine and thick. The shoulders, as on foot, were prominent though broad and well covered, their heaviness making the forerib appear a little slack. The rack and loin were wide, level and smooth. The brisket broad and fat and the middle and flank trim and thick. The leg stood out more prominently than on foot, the rump being very broad, flat and smooth and the thigh

thick, well rounded and full in the twist. Excepting his type this was his strong point.

The quality of No. 3's carcass was good notwithstanding his heavy shoulders. His covering was smooth and though thick was not wasty. No. 3 showed the blocky, low set type called for by the score card, carrying in addition bucky shoulders and a well rounded leg.

No. 4 as on foot, was leggy, stretchy and unsymmetrical due to his lightness behind. In detail, he carried a short, smooth neck, medium sharp shoulders, a straight lined, wide, flat back which joined onto a level but narrow and raw topped loin. No. 4's brisket was wide and thick and his rib rather long, thick and framey. No. 4's rump was long but narrow and sharp and not as thick or plump as either No. 3 or No. 5. His thigh was also long but narrow, twist shallow and rather poorly covered.

No. 4 showed good quality in meat and fat but was coarse in bone. He had a fair amount of covering but lacked the thickness in loin and leg of Nos. 3 and 5. As a whole, No. 4 was leggy, stretchy, wide in rack,

narrow in loin, long and narrow in leg and medium coarse.

No. 5 in the carcass showed good width, blockiness and symmetry. He lacked the short fullness of No. 3 but was more compact than No. 4. His neck was fat and medium bucky, shoulders broad and full though lacking the strength of Nos. 3 and 4. His rack was very thick and straight and broader than No. 3 but not as wide as No. 4. The loin was wide and fat but proportionately narrower than No. 3. His plate was a bit heavy and thick. The rump was square and thick though not as full and smooth as No. 3 and carried down into a leg and twist which showed more fullness and depth than that of No. 4. His leg lacked, however, the plumpness and meatiness of No. 3.

No. 5 showed about the same quality as No. 3, but lacked the coarseness of head and leg found in No. 4. He and No. 6 were the fattest lambs used, his covering being very thick, white and uniform.

No. 6 was wide, blocky, smooth and uniform except for a slight lightness in leg. Her neck was long

and fat but fine, the shoulders wide and thick but medium sharp on top, forerib a bit slack, rack wide, level, straight and thick and loin flat and exceptionally wide and thick,bulging out almost to the rack. Her plate and flank were thick and wide but showed rather small beside her wide, well covered top. The leg was the lighter part of the carcass being medium short, ridged at tail head and slack in outer thigh. The twist was very full.

No. 6 showed good quality in bone and carried a smooth, firm, white covering of fat. She showed more condition than any of the other carcasses being even a trifle thicker than No. 5.

No. 7 was rather rough and lacking in uniformity throughout although carrying considerable width and depth. Her neck was long, narrow and bare, shoulders, narrow on top, angular, short and thin, foreribs medium full, rack wide, flat and thick considering type and flaring widely to the thirteenth rib. The loin was rather narrow and sharp but long, plate medium heavy and thick considering

the general covering of the lamb. The rump was long, more level than the other fine wools, joining a leg with long, rather plump thighs.

The meat was dark and soft, but she was a fatter lamb than No. 2 and later proved to carry the most condition of any of the fine wools used. Rather blocky, with small shoulder, wide rack, medium sized leg and fair condition, No. 7 was the best fine wool slaughtered.

No. 8, as on foot, showed a form on the hooks which was long, narrow, rough and lacking in uniformity. He was very long and heavy in the neck, bucky and coarse in the shoulders, although fairly narrow on top, slack in the forerib, fairly thick in rack but sharper than either Nos. 9 or 10. He was long in the loin but sharp and raw. His middle was wastier than Nos. 9 and 10, and showed good thickness, considering his general covering. His rump and leg were long and smooth and filled better in the lower thigh than No. 9 though lacking the plumpness of rump and stifle of Nos. 9 and 10.

No. 8 was coarse and heavy in his bone and showed a thin, soft covering that went well with his

general roughness and lack of symmetry.

No. 9 hung up a shorter, trimmer and smoother carcass than Nos. 8 or 10. She lacked, however, the covering of the other two. Her neck was long but very thin, shoulders narrow on top and smoother than the others though lack of flesh made the blades prominent. Her back was fairly wide and flat considering her size but was thinner than the others. The loin was not as peaked as No. 8 but lacked length and thickness. The middle was trim and thin but proportionately longer than Nos. 8 or 10 with a lower rear flank. Behind she carried out more evenly and showed a fuller, meatier thigh. This latter, in spite of the shallow twist which she showed on foot.

The whole carcass of No. 9 was dark and soft but showed a good refinement of bone. She was the thinnest lamb of these three fine wools, and No. 2 alone of the entire group carried less condition. In short, she was a leggy, long bodied lamb with a fairly uniform body and very poor condition.

No. 10 in the carcass showed the same angular stretchy form that he did on foot, but carried fair width, flatness and covering. His neck was shorter than either Nos. 8 or 9, shoulders stronger, and more open on top, back flat, proportionately wider than the others and thicker. His loin was thicker and more level than the others, and his middle trim but deeper than No. 8. His cramped rump straightened out in the carcass into a long, wide and fairly even cut, his full thighs and fuller twist giving him the apparent advantage over Nos. 8 and 9.

No. 10 showed more refinement than No. 8 but less than No. 9 and carried a thicker, whiter covering than either. He was, in short, a rather long, angular, roomy lamb, but showing at the same time fair uniformity and condition.

No. 11 on the hooks showed fairly short, wide, deep, thick and white. As a whole, however, he was unsymmetrical as on foot. His neck was medium short and thin, his shoulders full, wide and strong, fore rib a

little slack, rack narrow, sharp and raw, loin fairly flat and thick showing good proportionate width. His brisket was broad and his middle very heavy, roomy and thick. His leg showed the same faults as on foot being narrow and peaked in rump, though fairly full in outer thigh and twist.

He showed a good quality of bone and with the exception of his rack, a good, thick covering. No. 11 thus showed a fairly blocky type of carcass but lacked in uniformity, being narrow in rack, heavy in plate and narrow in the rump.

SUMMARY OF JUDGING NOTES. The preceding notes on the eleven sheep used in this study contain so many details that there follows a short summary which indicates more clearly the chief characteristics of each individual.

Eleven lambs were used, Nos. 1, 3, 4, 5, 6 and 11 being medium wools and Nos. 2, 7, 8, 9 and 10 fine wools. In the medium wools, No. 1 was a rather leggy, stretchy lamb, carrying excellent width, smoothness and

uniformity, with quality and condition about equal to Nos. 3 and 11. No. 3 was the blockiest, most extreme mutton typed lamb of the group showing open, bucky shoulders, a very full, meaty leg and good quality and condition. No. 4 was leggy and stretchy with a wide back and narrow loin and leg. He was fairly coarse and carried almost as much flesh as Nos. 5 and 6. No. 5 was a very broad, low set lamb but lacked the blockiness of No. 3. He was a bit heavy in middle but elsewhere was very uniform. His quality was good and he showed , with No. 6, the most condition of the group being, however, softer in flesh than No. 6. No. 6 was very similar to No. 5 although a bit blocker and trimmer in middle and firmer in flesh. No. 11 was blocky and low set but unsymmetrical. He was slack in forerib, narrow and raw in rack, wide in loin, very paunchy in middle and narrow in the rump. His quality was equal to Nos. 5 and 6 but he was no fatter than either No. 1 or No. 3.

Among the fine wools No. 2 was rather leggy and rough. She was open in shoulder and the narrowest of the group in rack and loin, carrying also a light

thigh and empty twist. Her skin was heavily wrinkled, her quality poor and she carried less condition than any of the eleven. No. 7 was wide, deep and blocky for a fine wool. Her shoulder was short, her back very wide and flat, her thigh thick and her twist shallow. Her skin was also wrinkled, but her quality was good and she was the fattest of the fine wools. No. 8 was rough and unsymmetrical. His shoulders were coarse, back and loin narrow but sharp and leg fairly full. He carried a wrinkled hide, the poorest quality of the group and ranked third among the fine wools in condition. No. 9 was light, leggy and stretchy, showed a very uniform top, was smooth in hide, good in quality, but was, with the exception of No. 2, the thinnest of the eleven lambs. No. 10 was of much the same rough type as No. 8 but more symmetrical. He was bucky in his shoulders, fairly broad and level on top and fuller in the leg. His hide was wrinkled, his quality almost as poor as that of No. 8 and his covering, with the exception of No. 7, thicker than the other fine wools.

MEASUREMENTS. The following measurements were taken as previously indicated and corrected to 100 pounds sheared weight. The carcass measurements have been used but little in the results, serving mainly as a check upon the ones taken of the lambs on foot. Some interesting facts, however, are brought out by the comparison of those two sets of figures, illustrating clearly the fact that the lamb body lengthens and that the rack and loin widen when the carcass is hung upon the hook. (See Tables 2 and 3.)

PICTURES. The pictures of the different individuals used in this work formed the third method of recording the conformation. Photographs were taken of each lamb from a side and rear view on foot and from a side and back view in the carcass. In the latter pictures two or more carcasses were hung together for the sake of comparison. Thus, the same lamb may appear more than once in the same set. Those duplicates have been included, however, as it was felt that such an arrangement would bring out the contrasts more strikingly.

TABLE 2

MEASUREMENTS OF LAMBS ON FOOT, CORRECTED TO 100 POUNDS SHEARED WEIGHT

| Measurements | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Width Shoulder Points | 7.5 | 9.2 | 8.1 | 7.8 | 6.8 | 6.7 | 8.7 | 7.9 | 10.7 | 9.2 | 7.4 |
| Width Behind Elbow | 7.5 | 6.4 | 8.2 | 7.3 | 6.3 | 6.9 | 7.8 | 6.6 | 7.8 | 7.3 | 6.8 |
| Width Last Rib | 10.5 | 11.2 | 10.2 | 10.8 | 10.1 | 9.7 | 11.3 | 8.8 | 12.5 | 9.5 | 9.7 |
| Width Loin, Front | 5.7 | 6.1 | 5.7 | 5.7 | 4.8 | 6.4 | 6.4 | 4.8 | 6.6 | 5.5 | 5.1 |
| Width Loin, Rear | 5.7 | 6.1 | 6.3 | 5.9 | 5.9 | 6.6 | 6.6 | 5.4 | 7.0 | 5.8 | 5.5 |
| Width Hooks | 6.4 | 7.6 | 6.7 | 6.5 | 6.1 | 6.6 | 7.8 | 6.6 | 9.1 | 7.3 | 6.5 |
| Width Pin Bones | 2.7 | 3.1 | 1.9 | 1.6 | 2.3 | 2.2 | 3.2 | 2.3 | 3.1 | 2.5 | 1.6 |
| Width leg (Widest bulge) | 8.8 | 10.9 | 8.9 | 6.8 | 7.8 | 9.0 | 10.4 | 9.1 | 13.0 | 10.9 | 8.7 |
| Depth Chest | 10.7 | 12.6 | 9.4 | 9.8 | 9.8 | 9.7 | 12.6 | 12.2 | 16.6 | 13.3 | 11.7 |
| Depth Naval | 11.7 | 14.2 | 11.1 | 10.7 | 11.1 | 11.3 | 14.1 | 14.2 | 16.2 | 14.2 | 14.5 |
| Depth Rear Flank | 11.2 | 14.1 | 10.9 | 10.5 | 10.5 | 10.4 | 14.8 | 14.5 | 17.2 | 14.1 | 14.1 |
| Depth Twist | 3.9 | 0.0 | 3.5 | 3.0 | 3.8 | 3.9 | 0.0 | 3.1 | 0.0 | 3.0 | 4.6 |
| Length Shoulder Blade to Pin Bone | 22.7 | 26.6 | 22.2 | 20.5 | 19.1 | 20.7 | 26.7 | 28.5 | 32.8 | 28.7 | 25.3 |
| Length Loin | 5.6 | 8.2 | 5.9 | 6.2 | 5.0 | 5.8 | 7.7 | 6.5 | 9.2 | 7.4 | 5.6 |
| Length Hook to Pin Bone | 8.2 | 10.0 | 8.0 | 8.0 | 7.7 | 7.4 | 9.6 | 10.0 | 12.5 | 9.7 | 9.2 |
| Length Pin Bone to Hook | 10.6 | 12.1 | 8.0 | 10.1 | 8.0 | 9.2 | 10.5 | 11.4 | 16.7 | 11.1 | 9.7 |

TABLE 3

MEASUREMENTS OF LAMB CARCASSES, CORRECTED TO 100 POUNDS SHEARED WEIGHT

| Measurements | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Width Shoulder Points | 6.7 | 7.6 | 7.0 | 7.3 | 5.4 | 6.0 | 6.9 | 6.8 | 8.9 | 8.1 | 6.7 |
| Width Behind Elbow | 6.7 | 6.2 | 6.3 | 6.5 | 5.6 | 5.7 | 7.3 | 6.0 | 7.8 | 6.1 | 5.7 |
| Width Last Rib | 9.6 | 10.8 | 9.2 | 9.0 | 9.1 | 8.7 | 11.9 | 9.2 | 12.7 | 10.1 | 9.8 |
| Width Loin, Front | 6.5 | 8.3 | 8.1 | 8.6 | 8.1 | 7.7 | 8.2 | 6.1 | 6.7 | 6.8 | 6.8 |
| Width Loin, Rear | 7.3 | 7.4 | 7.2 | 6.4 | 6.8 | 7.3 | 7.7 | 5.6 | 7.0 | 6.3 | 6.3 |
| Width Hooks | 6.7 | 8.3 | 7.1 | 6.6 | 6.3 | 6.9 | 8.2 | 6.4 | 7.7 | 6.2 | 6.1 |
| Width Pin Bones | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Width Leg (Widest Bulge) | 8.7 | 10.3 | 8.5 | 7.4 | 7.4 | 7.7 | 10.0 | 8.8 | 11.4 | 9.4 | 8.7 |
| Depth Chest | 10.3 | 12.5 | 9.0 | 9.4 | 9.5 | 9.4 | 11.7 | 12.1 | 15.0 | 12.4 | 11.3 |
| Depth Naval | 7.8 | 9.3 | 6.7 | 6.7 | 6.3 | 7.1 | 8.7 | 8.8 | 12.6 | 8.5 | 8.4 |
| Depth Rear Flank | 5.3 | 6.1 | 4.3 | 3.6 | 4.5 | 4.2 | 6.2 | 5.9 | 6.6 | 5.7 | 6.1 |
| Depth Twist | 3.5 | 2.2 | 3.1 | 2.5 | 2.6 | 2.6 | 2.0 | 1.1 | 1.0 | 1.5 | 2.4 |
| Length Shoulder Blade to Pin Bones | 23.9 | 28.8 | 22.6 | 22.4 | 20.7 | 21.2 | 28.0 | 29.0 | 37.8 | 30.2 | 26.3 |
| Length Loin | 7.5 | 10.4 | 7.7 | 7.7 | 7.7 | 7.8 | 9.9 | 10.0 | 13.1 | 10.0 | 8.5 |
| Length Hook to Pin Bone | 7.3 | 8.2 | 6.4 | 6.1 | 6.0 | 5.8 | 8.8 | 8.5 | 11.6 | 9.6 | 7.5 |
| Length Pin Bone to Hook | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

Unfortunately a few of the lambs were slaughtered before it was discovered that some of the negatives were spoiled. As a result the rear view of No. 1 is missing entirely and those of some of the others are very poor. All prints have been included, however, which help in the least, to identify the lambs.

No. 1

No. 2

No. 3

No. 4

No. 5

No. 6

No. 7

No. 8

No. 9

No. 10

No. 11

No. 2

No. 3

No. 4

No. 5

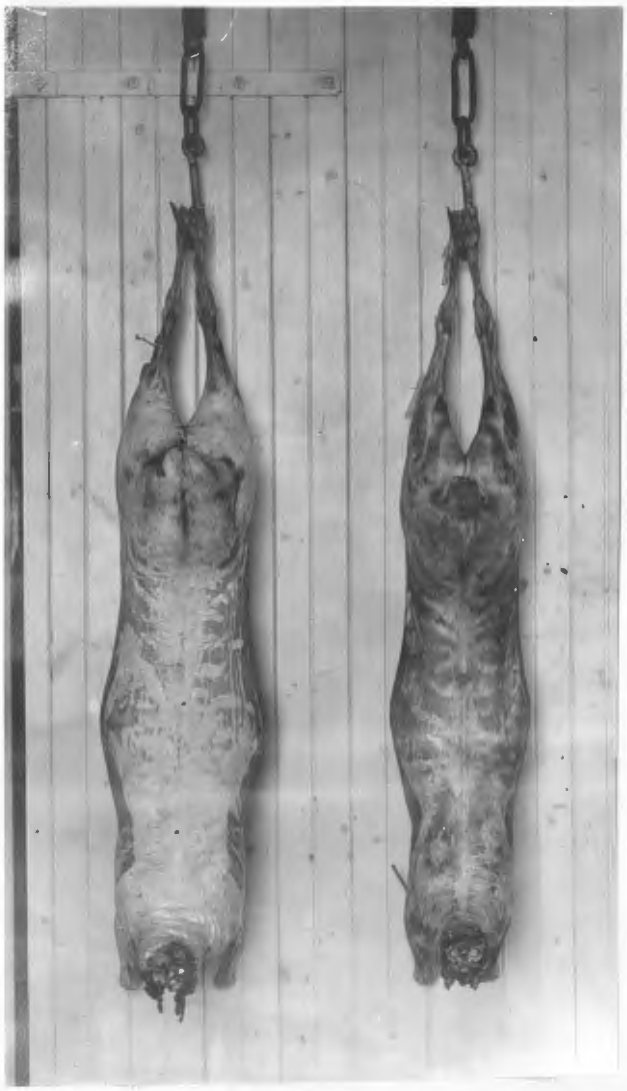
No. 7

No. 8

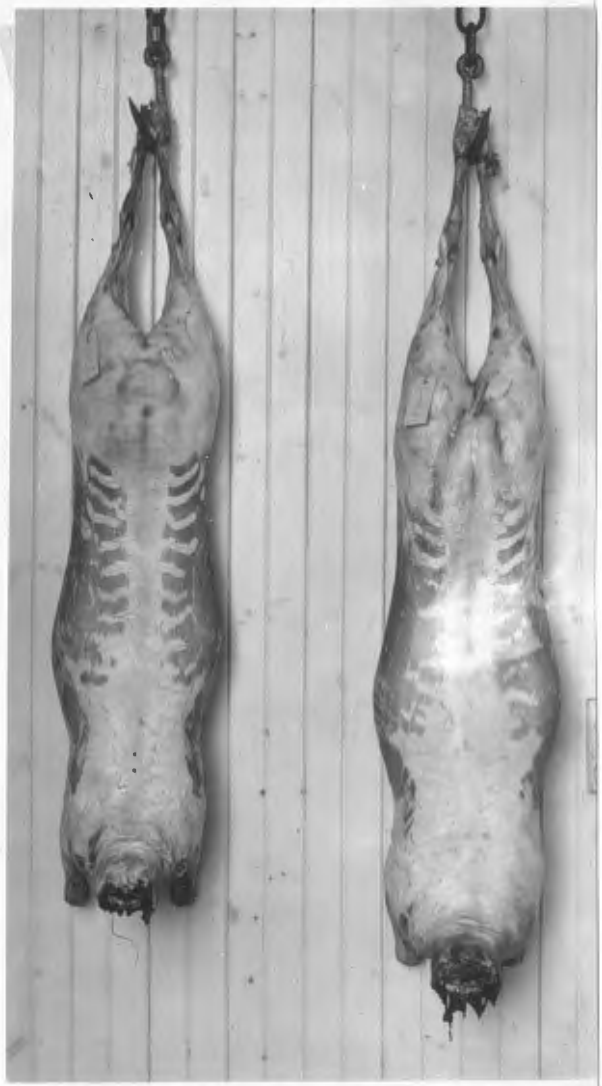
No. 9

No. 10

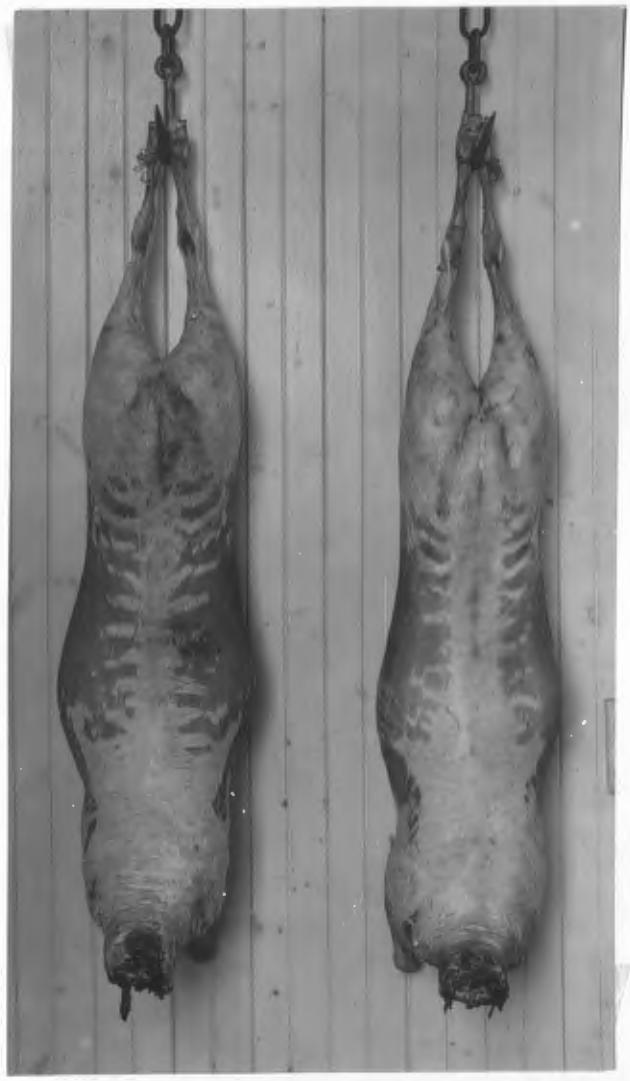
No. 11



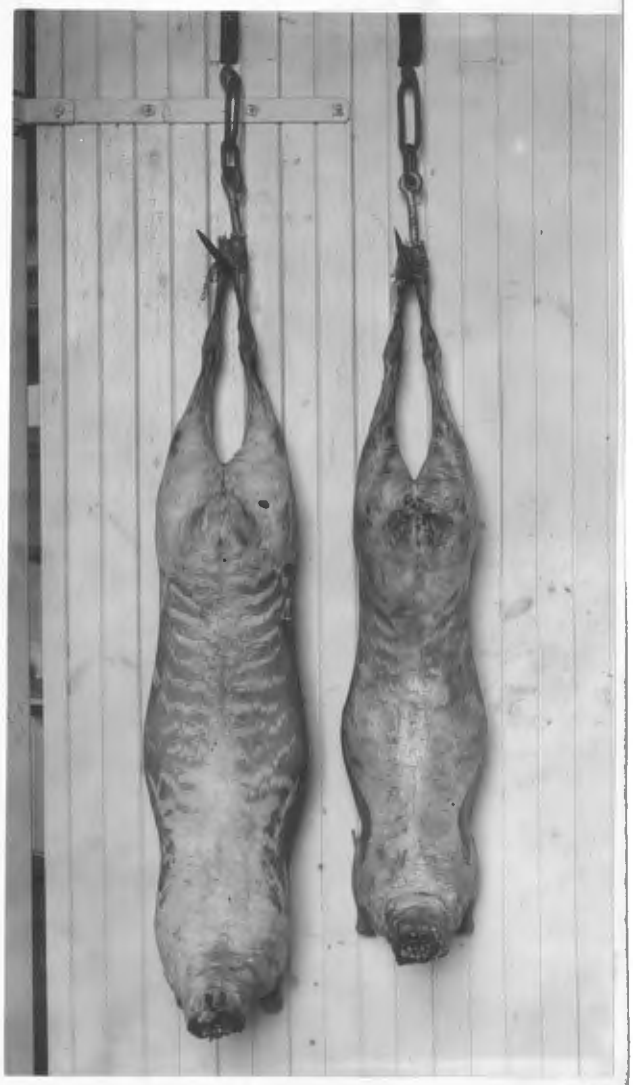
No. 1 No. 2



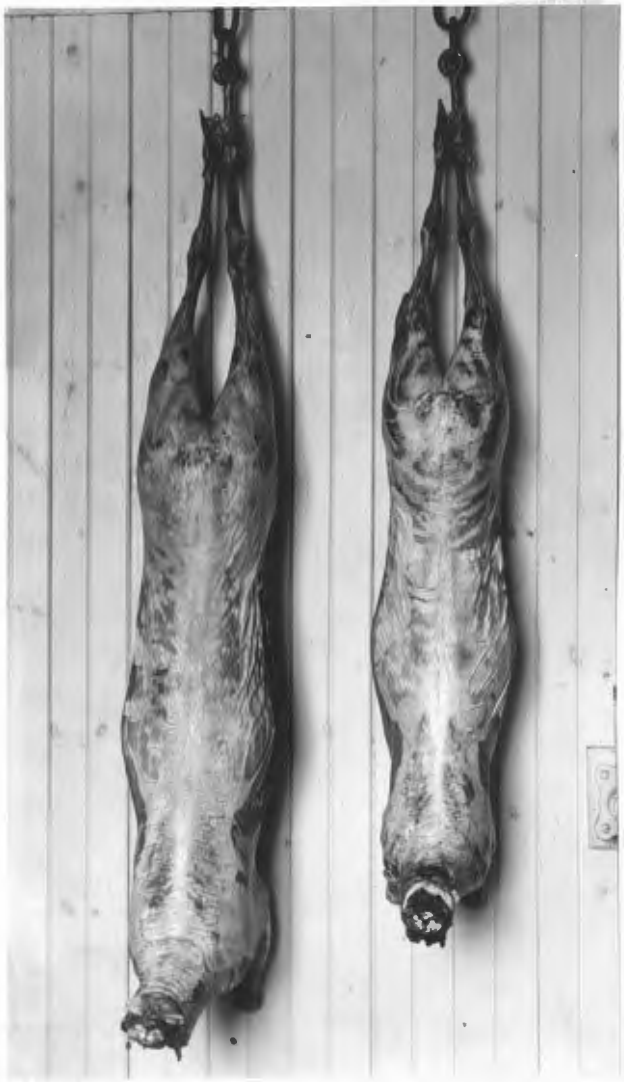
No. 3 No. 4



No. 5 No. 4



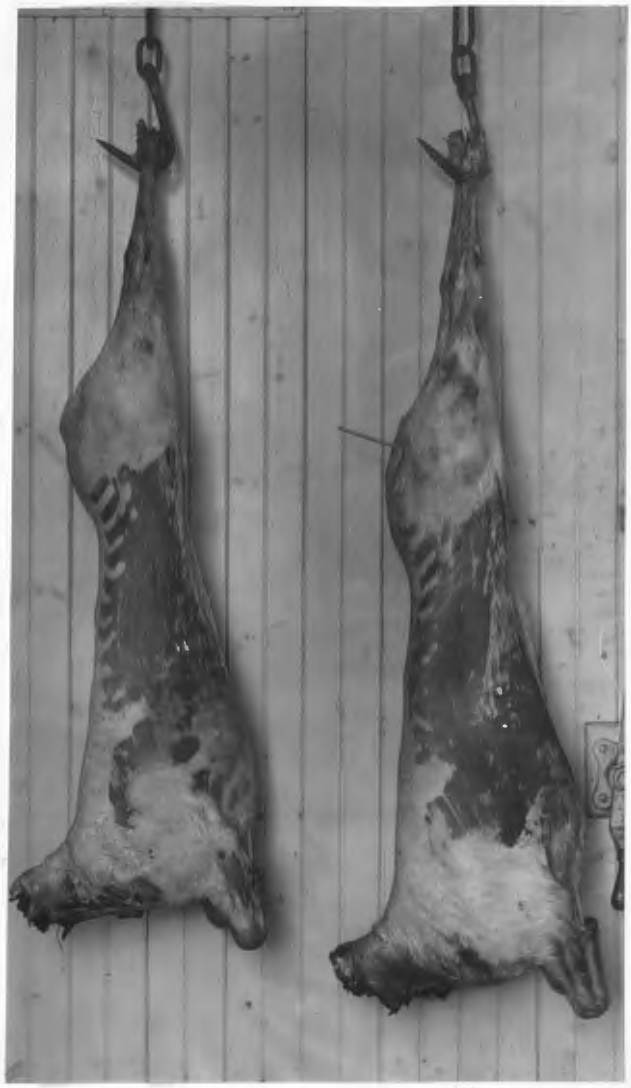
No. 6 No. 7



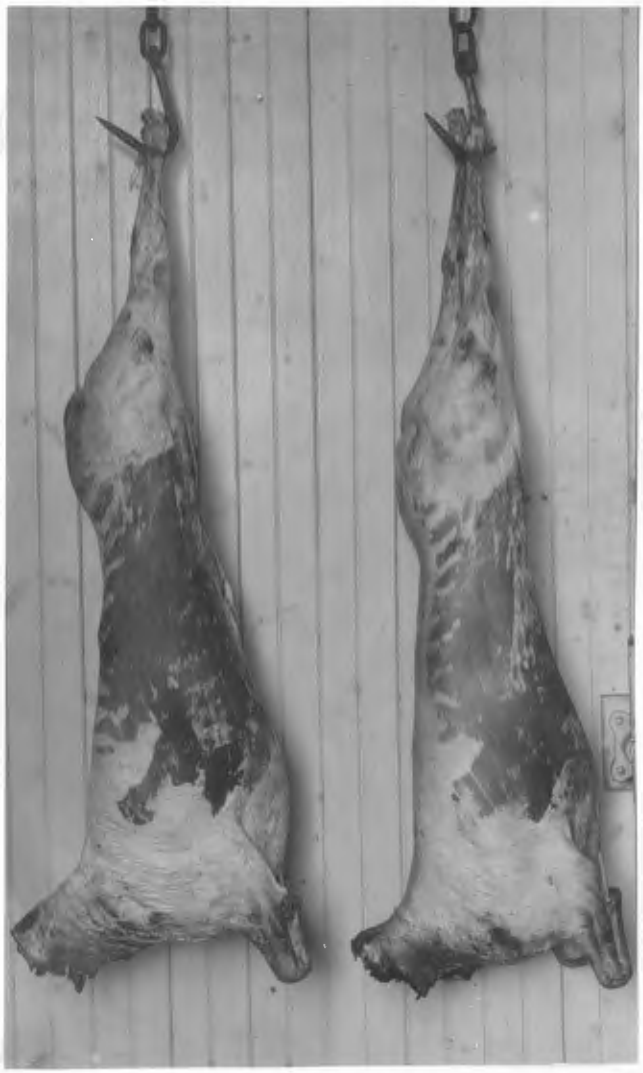
No. 8 No. 9

No. 11 No. 10

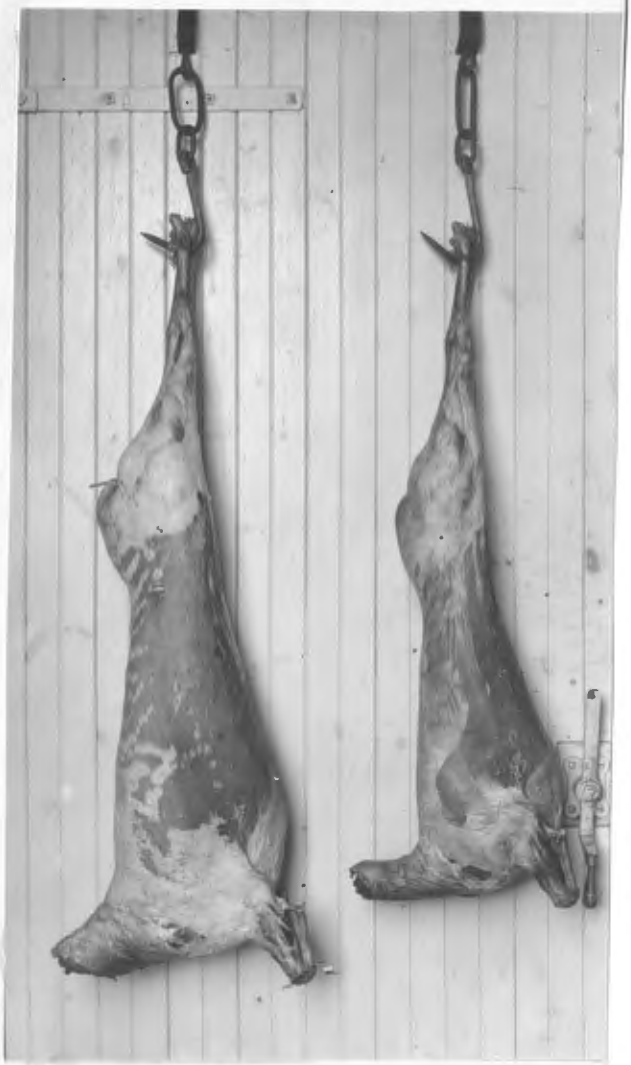
No. 1 No. 2



No. 3 No. 4



No. 5 No. 4



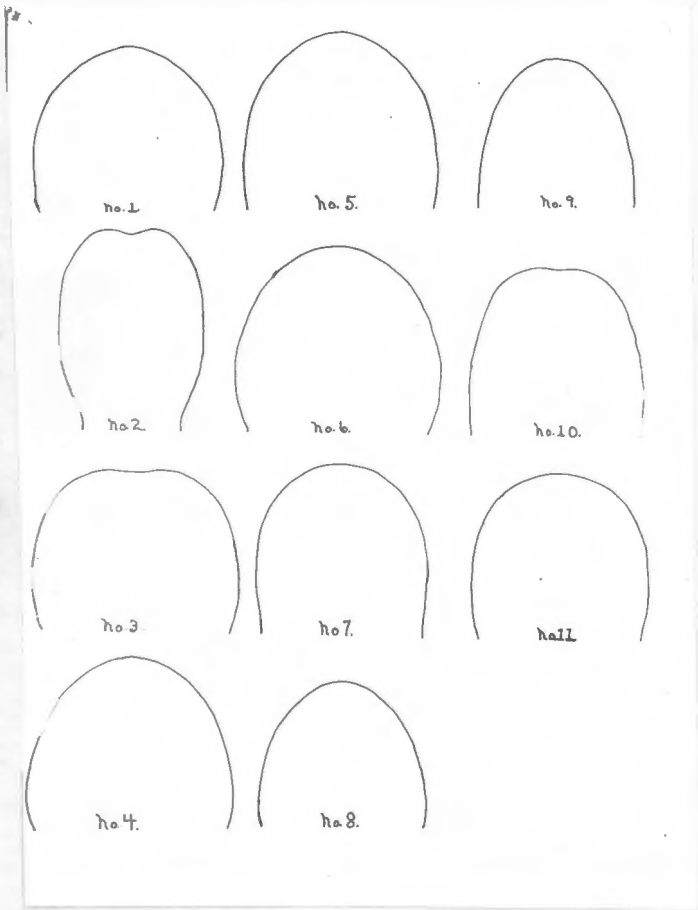
No. 6 No. 7

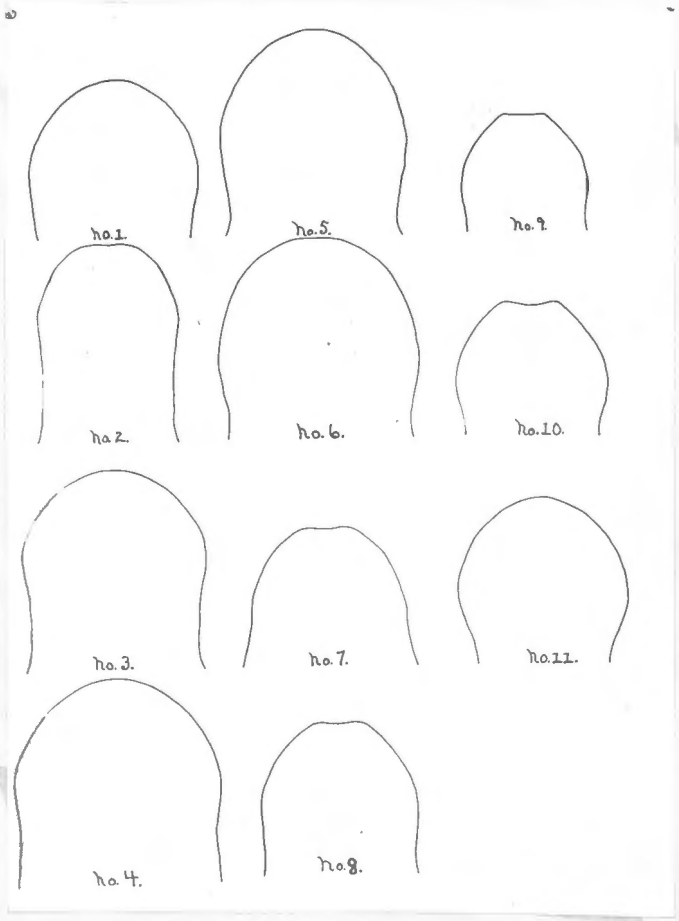
No. 8 No. 9

No. 11 No. 10

FORMS. The final method of recording the conformation was by means of forms, they being taken, as previously explained, in a number of places on each lamb. The form of the lead was traced on paper and the tracings grouped together and photographed. Those pictures follow, the reduction in the print making them appear about one-eighth the natural size.

Top lines both on foot and in the carcass and the side lines of the carcass were all recorded but they have not been included here as it was felt that they could be observed just as plainly in the pictures which precede.

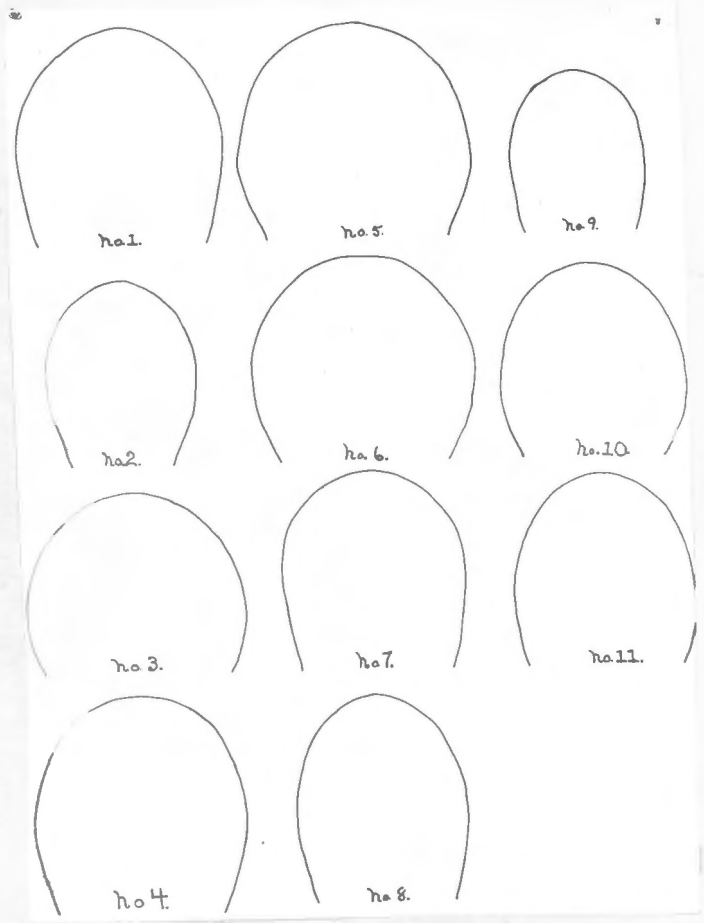


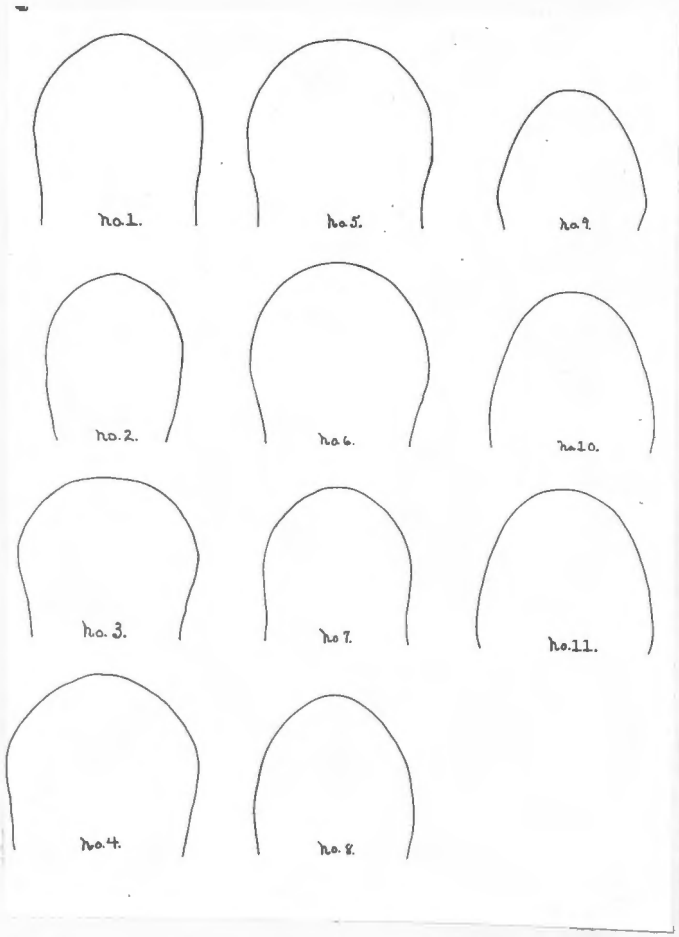




Form Over Shoulder Points

On Foot

On Carcass

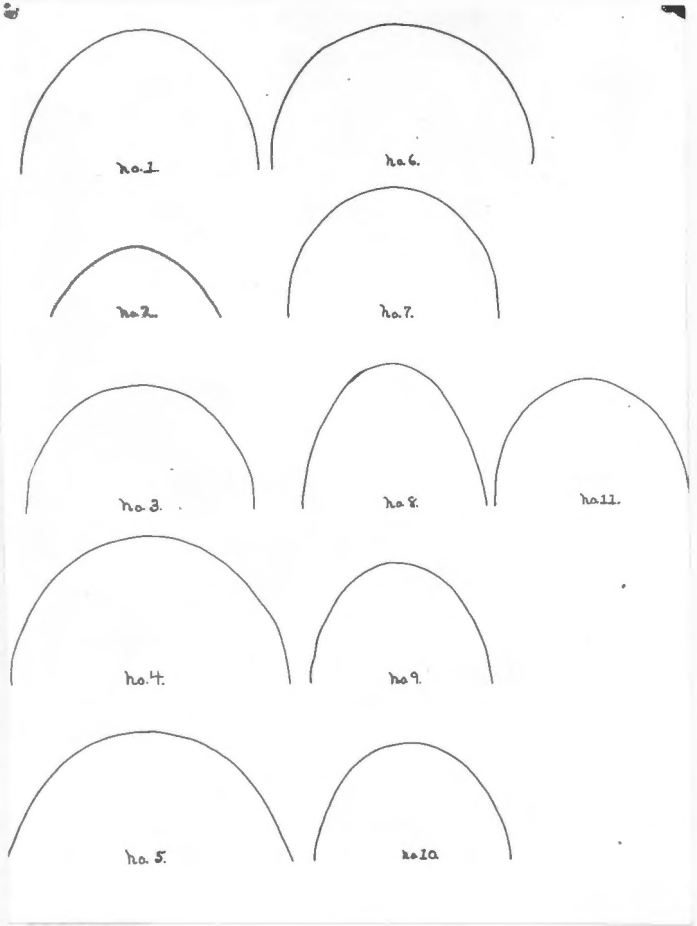


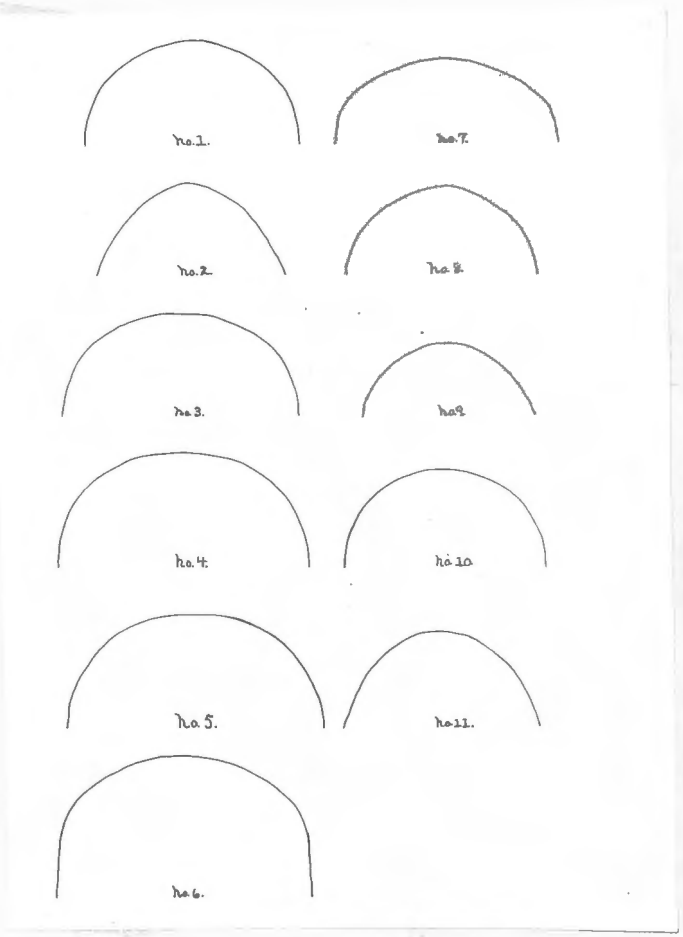




Form Behind Elbow

On Foot

On Carcass

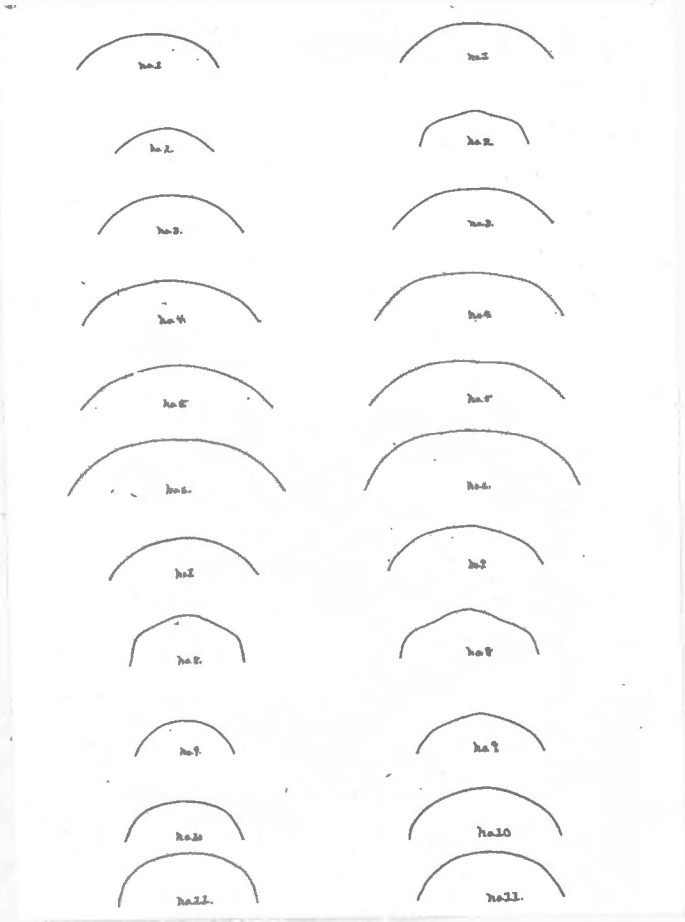



Form Ower Last Rib

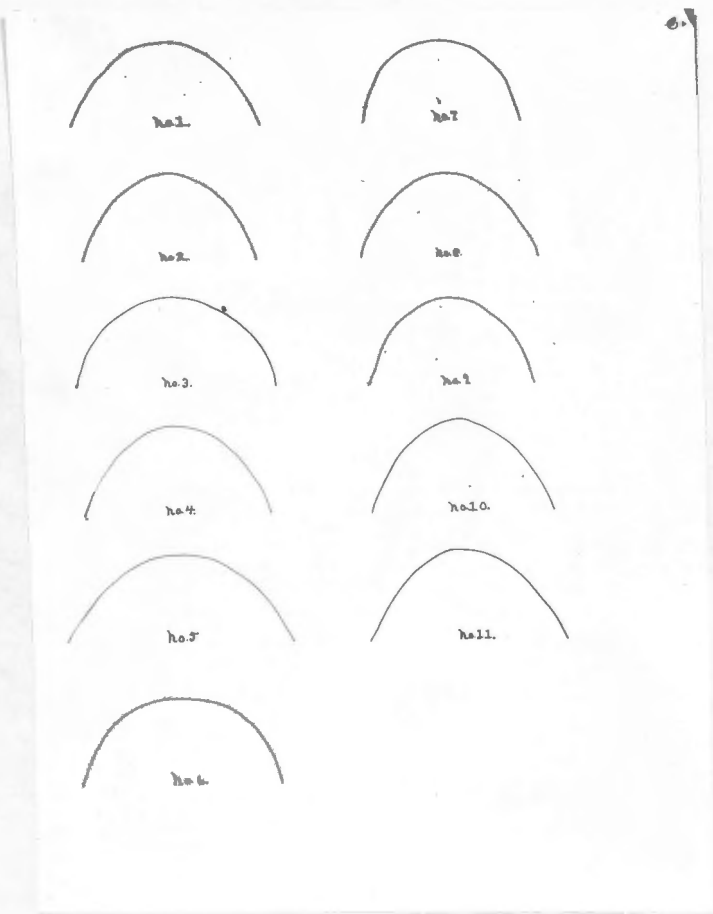
On Foot

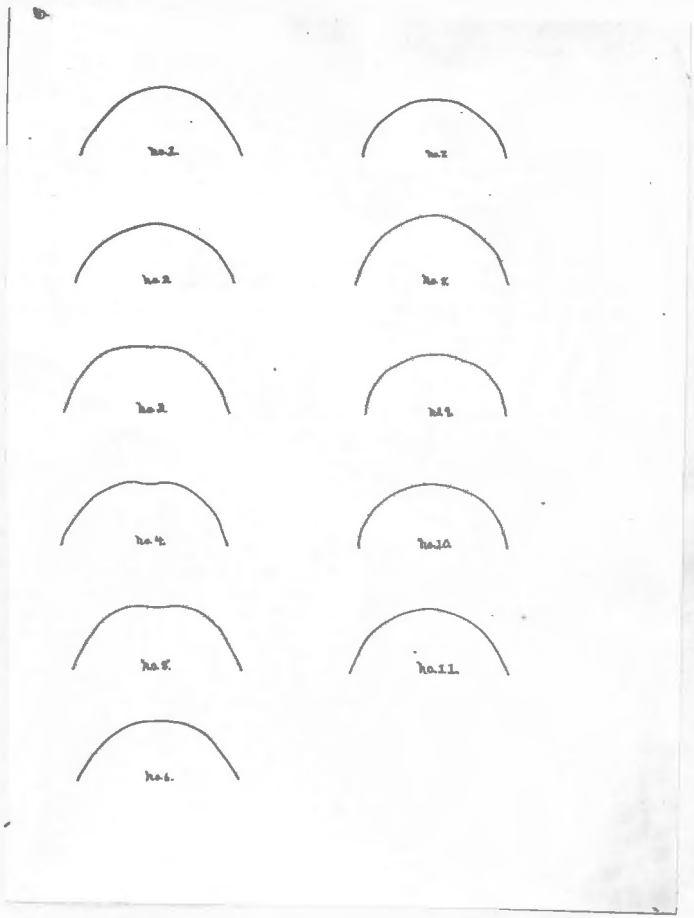
On Carcass



Form Over Loin

On Foot On Carcass




Form Over Rump

On Foot

On Carcass

## COMPARISON OF CONFORMATION WITH BLOCK AND SLAUGHTER YIELDS

Complete slaughter and block records were kept throughout as explained before. These complete tables were so bulky that they have been placed in the appendix as references. Parts of them have been taken, however, to make smaller tables and these inserted in the detailed comparison of conformation with yield as they were needed. Throughout the comparison reference has been made to notes, pictures, forms and measurements. The latter have been placed in the smaller yield tables as indicated, but the notes, pictures and forms were so bulky that they have been kept at the beginning where reference can be made to them when desired.

In the smaller tables which follow immediately and in some of the larger ones found in the appendix, the lambs and cuts have been ranked in the order of percent., the heaviest yielders being listed first. To distinguish between the different individuals the number of

the lamb has been placed in parenthesis just above the percentage figure. Thus "(8) 4.27", in the table showing the cutting per cent. of neck would indicate that the neck of No. 8 constituted 4.27 per cent. of the carcass.

In the following pages each wholesale cut of lamb has been taken separately and a detailed analysis made between the recorded points of conformation and the percentage yields.

BLOCK YIELDS:

SHOULDER. The accepted score card describes the ideal shoulder as broad and flat with compact, well covered shoulder blades. Prominence of shoulder or "buckiness" is associated by that accepted standard with coarseness, a high cutting per cent. and a large proportionate weight of bone.

A comparison of shoulder measurements to cutting per cent. in the accompanying table shows very little uniformity or correlation. As was to be expected, considering their large bulk in proportion to their weight,

TABLE 4

MEASUREMENTS AND YIELD OF THE SHOULDER,

MEASUREMENTS CORRECTED TO 100 POUNDS SHEARED WEIGHT

| Rank | Width Shoulder Points | Width Elbow | Depth Shoulder | Side Area | Yield Shoulder (Per cent.) |
|---|---|---|---|---|---|
| 1st | (9) 10.7 | (3) 8.2 | (9) 16.6 | (9) 154.4 | (10) 21.70 |
| 2nd | (10) 9.2 | (9) 7.8 | (10) 13.3 | (10) 110.4 | (8) 21.36 |
| 3rd | (2) 9.2 | (7) 7.8 | (2) 12.6 | (7) 104.6 | (3) 20.43 |
| 4th | (7) 8.7 | (1) 7.5 | (7) 12.6 | (2) 98.3 | (11) 20.39 |
| 5th | (3) 8.1 | (4) 7.3 | (8) 12.2 | (8) 87.4 | (2) 20.22 |
| 6th | (8) 7.9 | (10) 7.3 | (11) 11.7 | (11) 83.1 | (6) 20.18 |
| 7th | (4) 7.8 | (6) 6.9 | (1) 10.7 | (1) 80.3 | (4) 20.06 |
| 8th | (1) 7.5 | (11) 6.8 | (4) 9.8 | (3) 77.1 | (5) 20.06 |
| 9th | (11) 7.4 | (8) 6.6 | (5) 9.8 | (4) 74.5 | (9) 20.00 |
| 10th | (5) 6.8 | (2) 6.4 | (6) 9.7 | (6) 66.0 | (1) 19.37 |
| 11th | (6) 6.7 | (5) 6.3 | (3) 9.4 | (5) 64.7 | (7) 18.10 |

all the fine wools had a greater measurement than any of the medium wools. No. 9 showed the largest area of the fine wools and No. 8 the least. No. 11 led the medium wools with 4.3 square inches less than No. 8, No. 5 ranking eleventh with 18.4 square inches less than No. 11. In cutting per cent. the fine wools ranked 1st, 2nd, 5th, 9th and last; the medium wools ranking 3rd, 4th, 6th, 7th, 8th and 10th. Nos. 10, 8 and 3 who were 1st, 2nd and 3rd in per cent. of shoulder ranked 2nd, 5th, and 8th in measurement and Nos. 9, 1 and 7 who ranked 9th, 10th and last in proportionate weight of shoulder, were 1st, 7th and 3rd in area. Furthermore, although the difference in measurements varied from 64.7 square inches to 154.4 square inches, the variation in per cent. of shoulder only ran from 18.10 per cent. to 21.7 per cent. In addition, Nos. 10 and 8 cut a good deal larger per-cent. of shoulder than the other lambs and Nos. 1 and 7 cut a good deal smaller, the other seven sheep all coming within a limit of .43 per cent. These large differences and close margins occurred in spite of the

fact that none of the four outstanding sheep were outstanding in their measurements and that few of the lambs which cut so nearly the same per cent. were very near to each other in shoulder area.

The above analysis seems to leave the whole comparison in a hopeless mixture. However, a closer study of all the records serves to show that the measurements taken are but a few of the factors influencing the proportionate weight of the shoulder and the others, which have been recorded in notes, forms and pictures will be used in the following explanation.

Uniformity proved, through the whole experiment, to have, with the exception of condition, the greatest influence upon the cutting per cent. of the carcass, the question being not so much "How wide?" as "How wide proportionately?" Both notes and pictures showed Nos. 10, 8 and 3 as the "bucky" shouldered sheep of the group. The table gives No. 10 with 22.2 square inches more shoulder than No. 8, he being wider both front and rear, and deeper. The forms across the shoulder and elbow show also a decided flatness and fulness not found in the

narrower No. 8, No. 10's prominent shoulder blades causing an unusual spread on top.

No. 8 measured 22.2 square inches less than No. 10 and cut only .34 per cent. less shoulder. On the other hand No. 8 measured only 10.7 square inches more than No. 3 and cut .93 per cent. more shoulder. Both were bucky and both belong with No. 10 among the higher yielders. At the same time, however, the difference between measurements and percentages is very much out of proportion. No. 10 was large, flat and fairly full in body. On the other hand No. 8 although smaller in measurements than No. 10 was narrow and thin in back and loin, that having a tendency to raise the proportionate weight of the shoulder. Comparing No. 8's shoulder with No. 3's, No. 8 was only 10.7 square inches larger. At the same time, however, uniformity again exerts its influence, as with No. 10, and the broad, flat topped, thick fleshed No. 3 is proportionately heavier in the rest of his body than is the thin, sharp topped No. 8. Buckiness and depth of shoulder caused Nos. 10, 8 and 3 to cut large per cents., but equal size in shoulder and lack

of flesh in the rest of the body gave Nos. 10 and 8 the advantage over No. 3, No. 8's lack of uniformity and lightness behind raising his per cent. very close to that of No. 10 and making the margin between him and No. 3 much larger than the measurements would seem to warrant.

Nos. 3, 11, 2, 6, 4, 5 and 9 rank so closely in per cent. of cuts as to make reasons for each ranking almost too finely drawn and too dependent upon slight errors in cutting to be of much value. At the same time, the measurements, forms and notes show such wide variation that a short explanation may serve to bring out the importance of each shoulder character.

No. 3 logically cut the heaviest shoulder of these seven lambs, it having been shown above that, although his actual measurements were smaller than No. 11's, he was proportionately wider and fuller in shoulder. Thus, the heavy shoulders for which he was selected raise his per cent. of that cut above most of the other sheep and next to that of the two thin, bucky lambs, Nos. 10 and 8.

No. 11 who cut the next highest per cent. after

No. 3 measured 15.2 square inches less than No. 2 who followed him but cut .17 per cent. more. Being fatter than No. 2 and much heavier in the plate, it would seem reasonable to suppose that No. 2's natural flesh would also raise her shoulder per cent. above that of No. 11. Two factors seem to have given No. 11 the greater weight. In the first place, No. 2 was uniform, that is she was fairly well balanced from end to end though flaring at the last rib. On the other hand No. 11 was selected for lack of uniformity. He was narrow and raw in the back and very light in his leg. Thus, as each carcass must cut 100 per cent., No. 11's weakness in top and rear would tend to raise the proportionate weight of his shoulder and No. 2's evenness would tend to keep her cuts at an average weight. Secondly, the forms and notes show No. 11 as wide on top while No. 2 was narrow and hollow. No. 11 was slack in his forerib but No. 2 was slacker, thus giving No. 11 a fullness and padding on the shoulder which No. 2 did not have and which would not show up in the measurements. Thus, though No. 2 had the larger measurement and the lesser condition, lack of equal

spread in the rest of his body and a wider, rounder build in shoulder give No. 11 a slight advantage in cutting per-cent.

No. 2 cut .04 per cent. more shoulder than No. 6. She measured 32.3 square inches larger in shoulder than No. 6 and being thinner and lighter in plate, rack, loin and kidney the only wonder is that she did not exceed No. 6 in shoulder by a larger margin than she did. One thing seems to have lowered No. 2's per cent. of shoulder beyond the margin indicated in her measurements and again, as above, the two things are form and uniformity. The forms and notes show No. 2 as narrow and sharp while No. 6 was very flat, full and round in shoulder. As a result the V shaped No. 2, though thinner and bulkier was relatively lighter than her measurements would indicate. In uniformity No. 6 was quite outstanding. As a result her parts cut near the average. No. 2, however, was very sharp and thin, and although these characteristics were not strong enough to raise her per cent. of shoulder above that of uniform No. 11 they were strong enough to raise it above that

of the very flat topped No. 6. The thinner, bulkier sheep should normally have the larger shoulder, but lack of fullness and flatness and the unusual heaviness in the leg, just as it helped to put her below No. 11 , so does it keep No. 2's shoulder very close to the per-cent. of the fatter No. 6.

Nos. 6, 4 and 5 were very similar in form, condition and measurements and their per cents. of shoulder rank so closely together that a slight error in cutting might have changed them either way. No. 4 was leggy but outside of that was quite similar in type, his narrowness behind being more than made up by his length from hips to hocks. Here are three fairly uniform sheep in some-what nearly the same condition and a glance at the table shows the close relation between them in all their cuts.

No. 9, as mentioned in the discussion of the plate and flank, was the 64 pound lamb and, as a result, her corrected measurements are consistently larger than any of the others. Thus, her estimated rank from the cutting standpoint is largely one of form and uniformity. As shown in the table she cut .06 per cent. less than

No. 5 and ranked ninth in the group. She was thin and thus should have cut the more heavily in shoulder. Her forms, however, show to a greater degree the same fault found in No. 2, namely, a peaked top and a slack fore-rib. In addition, No. 9 was very thin, the angles of her shoulder blades protruded prominently and her shoulder vein was very bare. She was thin enough to cut close to the others but her lack of flatness and fullness in her shoulder brings her down to ninth place.

Nos. 1 and 7 were the outstanding sheep for last in the cutting per cent. of the shoulder. Nos. 10 and 8 ranked first, and the others were close, and Nos. 1 and 7 were last by a margin of .63 per cent. and 1.80 per cent. No. 1's measurements were all larger than those of No. 5 the next medium wool above her, but again form and uniformity appear as the deciding factors. No. 5 was much wider and flatter over the elbow than No. 1, that flare carrying back into a wider rack. Thus, No. 5 carried more room for meat on top than No. 1, a point, of course, untouched in the measurements. Again, the pictures show more refinement in the fore end of No. 1

than No. 5. No. 5's shoulder points were heavier and protrude farther forward giving him a greater length of shoulder than No. 1. In addition No. 5 shows a fullness, heaviness and thickness around the neck which No. 1 lacks, the whole giving No. 5 a broader, meatier, coarser shoulder than No. 1. No. 5 was a heavy fronted lamb, carrying less leg than any of the others, and No. 1, being more uniform, is naturally lighter in front. Thus, as in the other instances, the shape of the shoulder, the coarseness and the balance of parts have been the controlling factors in cutting per cent.

No. 7 ranked third in total measurements. Her forms show a good spread for a fine wool and yet she cut 1.17 per cent. less shoulder than No. 1 and was outstanding in the entire group for lightness in front. The explanation of this fact can be found in her pictures, especially the side view of her carcass. In the first place, her shoulder was short in comparison with the rest of the body. Secondly, and most important of all, is the conformation of her arm. It will be remembered that the plate was cut off just above the rise in the

middle of the arm. The arm of No. 7 was abnormally short being placed much higher up than on the others and a comparison with any of the other pictures makes her appear almost deformed. No. 2 shows the exact opposite and makes a good contrast with No. 7, No. 2's elbow being down below the brisket.

It can thus be seen that with the cutting mark so abnormally high, the shoulder would be proportionately light, and narrow shouldered No. 2 in fifth place and broadtopped No. 7 in last place is a good example of the effects of such a conformation. Moreover, No. 7 cut the heaviest plate of all the fine wools while No. 2 was last.

Thus it would seem that the description of the shoulder as given in the score card is fairly correct. Buckiness and coarseness seem associated with a high yield of shoulder, and narrowness on top decreases the proportionate weight. Two other influences are indicated, however, which are frequently overlooked. First, uniformity must be always considered as even a very wide, heavy shouldered lamb will yield a smaller per cent. of

that cut if the rest of the body is broad, flat and thick. Secondly, the conformation of the arm, the cutting guide in removing the plate, varies with the individual and thus changes the proportion of each cut decidedly. Condition, the determining factor in the yield of plate and flank does not seem to be of such importance in the shoulder, as thin and fat lambs, and medium and fine wools were mixed together in Table 4.

PLATE AND FLANK. The ideal middle as described by the popular judging standard should be wide and deep but trim and straight. Excessive depth or "paunchiness" has been held to indicate not only a greater yield of offal but also a greater proportionate weight of plate and flank, thus giving the lamb of the true Shropshire type a cutting advantage over the Merino form.

Two comparisons contrast strongly in the above record of the plate and flank. In the first place, all the corrected measurements for the average depth and width of the fine wools are greater, with one exception, than those of the better type. Secondly, all the

TABLE 5

MEASUREMENTS AND YIELD OF THE PLATE AND FLANK,

MEASUREMENTS CORRECTED TO 100 POUNDS SHEARED WEIGHT

| Rank | Av. Depth of Body | Width Last Rib | Width Elbow | Total Width and Depth | Yield Plate and Flank (Per cent.) |
|---|---|---|---|---|---|
| | (9) | (9) | (3) | (9) | (11) |
| 1st | 16.6 | 12.5 | 8.2 | 36.9 | 14.31 |
| | (7) | (7) | (9) | (7) | (1) |
| 2nd | 13.9 | 11.3 | 7.8 | 32.0 | 13.86 |
| | (10) | (2) | (7) | (2) | (4) |
| 3rd | 13.9 | 11.2 | 7.8 | 31.2 | 13.73 |
| | (8) | (4) | (1) | (10) | (5) |
| 4th | 13.6 | 10.8 | 7.5 | 30.7 | 13.66 |
| | (2) | (1) | (4) | (11) | (3) |
| 5th | 13.6 | 10.5 | 7.3 | 29.9 | 13.63 |
| | (11) | (3) | (10) | (8) | (6) |
| 6th | 13.4 | 10.2 | 7.3 | 29.0 | 12.86 |
| | (1) | (5) | (6) | (1) | (7) |
| 7th | 10.9 | 10.1 | 6.9 | 28.9 | 11.43 |
| | (5) | (11) | (11) | (3) | (8) |
| 8th | 10.5 | 9.7 | 6.8 | 28.9 | 11.05 |
| | (3) | (6) | (8) | (4) | (9) |
| 9th | 10.5 | 9.7 | 6.6 | 28.4 | 10.78 |
| | (6) | (10) | (2) | (6) | (10) |
| 10th | 10.5 | 9.5 | 6.4 | 27.1 | 10.62 |
| | (4) | (8) | (5) | (5) | (2) |
| 11th | 10.3 | 8.8 | 6.3 | 26.9 | 10.61 |

plates of the medium wools cut a higher per cent. than those of any of the fine wools. Fat sheep are invariably preferred to thin ones, yet the figures given above go to show that from the cutting standpoint, a fat sheep of the so-called "desirable" type will cut a higher per-cent. of cheap plate and flank than a roomy, thin one.

Groups of large, working muscles make up a considerable part of the leg of the sheep's body. The middle parts are used mainly for supporting purposes and as a consequence the back, loin and plate are normally thin. Thus, while a thin lamb is light in meat throughout, the amount of flesh in the leg is proportionately heavier than that in the plate and the per cent. of plate and flank is low. Conversely, as sheep fatten, the back, loin, kidney and plate thicken much more rapidly than either the shoulder or the leg, the latter being the last to cover. As a result, the proportionate weight of plate and flank increases as the sheep is fed, showing as is illustrated in the table, that condition is the chief determining factor and that thin sheep, though of longer rib, are lighter in that lower cut than the

short ribbed, heavy fleshed ones.

As shown in the table, the average depth for the six medium wools ranked Nos. 11, 1, 5, 3, 6, and 4. Nos. 5, 3 and 6 had each the same depth of 10.5 inches and No. 4 was only .2 of an inch shallower. To complete the measurement the width at last rib and at elbow was added to the depth. It was realized that this total did not give any exact measurement of the plate but it was felt that the sum of the three measurements should make a fair comparison between the lambs, as to the relative bulk of their respective middles. The total measurement of the medium wools ranked Nos. 11, 1, 3, 4, 6 and 5 and the per cent. of plate Nos. 11, 1, 4, 5, 3 and 6. No. 11 is logically the wastiest cutter of the group. Not only did he have by far the greatest measurement, but also the notes and pictures show him as a very paunchy individual, a fault popularly associated with a heavy plate and flank. Nos. 1, 4, 5 and 3 cut within .23 per cent. of each other, were of much the same type and with the exception of No. 5 had a very similar total measurement. No. 1 measured .5 inches

more but was not as fat as the others, to which fact is probably due her very slight cutting advantage of only .13 per cent. No. 4 was .2 of an inch shallower than No. 5 but had a total measurement of 1.5 inches larger. Thus, although No. 5 was the fatter of the two, No. 4's extra width at last rib and elbow gave him a larger and heavier plate and flank.

No. 5 had the same average depth as No. 3. However, as with No. 4 he carried less width, No. 3 showing 2.0 inches larger in total measurement. Such figures being similar to those of Nos. 5 and 4 it appears strange that No. 4 should have cut .07 per-cent. more and No. 3, .03 per cent. less than No. 5. With the difference in cutting per cent. only a matter of hundreds, however, there is ample opportunity for error in cutting to creep in. Nevertheless, in this case, a study of the tables will show that, whereas No. 4 and No. 5 were of equal average depth, No. 5 was .4 of an inch deeper in brisket than No. 3. Thus, No. 5 was deeper in the heavier, wastier end of the plate and al-though narrower is thus entitled to his .03 per cent.

advantage in plate. Moreover, No. 3 was of the extremely blocky type, No. 5 carrying more stretch. No. 11 cut by far the heaviest plate and flank and the other sheep were closely grouped except for No. 6. She cut a plate .77 per cent. lighter than No. 3 the next sheep above her. No. 6's measurements are .2 of an inch larger than No. 5, though 1.8 inches smaller than No. 3. Reference to the accompanying table shows clearly that although of equal depth she was .5 of an inch narrower behind and 1.3 inches narrower in the fore rib. Thus, as a "V" should weigh less than a "U", so should No. 6, fat though she is, cut a less per cent. of plate than No. 3 Two things, however, might be added. First, she should have cut less than No. 5, though No. 5 had a still smaller measurement, as she was shallower in brisket. Secondly, she should have cut less than any of them as her top was so thick and uniformly flat and her kidney so heavy as to make a closer balance between those cuts, such balance having a tendency to reduce the per cent. of plate and flank.

A greater proportion of natural flesh in the

leg, as has been explained before, caused the fine wools to cut a less per cent. of plate and flank than the medium wools.

The total measurement ranked Nos. 9, 7, 2, 10 and 8 and the cutting per cent. Nos. 7, 8, 9, 10 and 2. As mentioned before all the measurements of No. 9 are larger than any of the other lambs. Correcting them to 100 pounds live weight produces an unavoidable error, an error so large in the case of this 64 pound lamb as to make the results misleading. She was thin but stretchy having a large middle in comparison with her size. At the same time she was very thin, a fact which goes with a low per cent. of plate. Thus, it seems logical to find the two extremes balanced and No. 9 ranking third in plate amongst the fine wools. No. 7 is the logical leader in this respect. She lead this type in measurements except for No. 9, had 3 inches advantages over No. 8 in bulk, and was the fattest of the fine wools. Thus, it is only surprising that she did not cut more than a .38 per cent. margin over No. 8 who follows her. No. 8 measured 1.7 inches less than No. 10

and cut .43 per cent. more plate and flank. Furthermore, No. 10 was 1.1 inches deeper in brisket, a fact which correlated with heaviness of plate in the medium wools.

However, we find again the same influence at work that was mentioned at the beginning. Each sheep must cut 100 per cent. and lack of uniformity causes some parts to be abnormally heavy. No. 10 was very symmetrical while No. 8 was sharp on top and light in back leg. As a result his plate cut proportionately heavier than normal, while No. 10 cut out more uniformly.

No. 2 ranked third in measurements, was .5 of an inch bulkier in plate and flank than No. 10 and yet cut less. Even though she cut only .01 per cent. below No. 10 her measurements would seem to indicate that she should have yielded more. Two other things, however, must be considered, in the first place, No. 2's advantage in total measurement comes solely from the great flare of her last rib. No. 10 was .3 of an inch deeper in middle, .7 of an inch deeper in the heavy brisket and .9 of an inch

wider behind the elbow. Again, No. 2 was thinner than No. 10. Thus, it is only No. 2's sharpness of back and great disproportionate flare in her lower rib that brings her per cent. of plate and flank as close to No. 10's as .01 per cent.

A review of the records of plate and flank would seem to indicate that the accepted score card is both right and wrong. It is right in that, in general, paunchiness or extreme width and depth in the brisket, flank and lower ribs causes an increase in the weight of plate. It is wrong, in that depth and roominess are not the most important influences, the degree of fatness being more important. In short, fattening sheep thicken in the plate more rapidly than in some other parts of the body and this study shows that fat lambs carry a greater percentage of that cut. Width and paunchiness exert some influence on the cutting per cent. as shown in the cutting record of No. 11 but condition is the most important factor of all and fat lambs are uniformly heavier in the plate and flank than thin ones.

TABLE 6

MEASUREMENTS AND YIELD OF THE RACK

MEASUREMENTS CORRECTED TO 100 POUNDS SHEARED WEIGHT

| Rank | Width Elbow | Width Last Rib | Yield of Rack (Per cent.) |
|---|---|---|---|
| 1st | (3) 8.2 | (9) 12.5 | (4) 14.81 |
| 2nd | (9) 7.8 | (7) 11.3 | (7) 14.76 |
| 3rd | (7) 7.8 | (2) 11.2 | (5) 14.65 |
| 4th | (1) 7.5 | (4) 10.8 | (6) 14.20 |
| 5th | (4) 7.3 | (1) 10.5 | (1) 13.34 |
| 6th | (10) 7.3 | (3) 10.2 | (3) 13.33 |
| 7th | (6) 6.9 | (5) 10.1 | (10) 13.17 |
| 8th | (11) 6.8 | (6) 9.7 | (9) 13.08 |
| 9th | (8) 6.6 | (11) 9.7 | (8) 13.07 |
| 10th | (2) 6.4 | (10) 9.5 | (11) 12.94 |
| 11th | (5) 6.3 | (8) 8.8 | (2) 12.84 |

RACK. Popular judging standards credit flat and wide backed sheep with a higher per cent. of rack than narrow, sharp ones. In addition ,the figures on the plate and flank would go to show that the fat sheep carries a larger proportion of its fat on the back and middle thus giving a greater proportionate weight to those cuts. The per cent. of the eleven racks included in the accompanying table follow out these theories very closely, as with two exceptions, all the medium wools ranked higher than the fine wools. The two exceptions are No. 7 and No. 11, No. 7 ranked second in the entire group, and No. 11 tenth.

In measurements, three of the bulkier fine wools had a greater width at last rib than any of the medium wools. Nos. 10 and 8, however, being narrow enough to rank last. In general, the medium wools were actually wider in the rack than the poorer type. The fine wools, however, weighed under 100 pounds while the medium wools went well over, the correcting of the measurements thus raising those of the fine wools and lower-

ing those of the medium wools. Nos. 8 and 10, although measuring the least of the entire group, were not much narrower than the others but weighed so close to 100 pounds that computing their width to the 100 pound standard change it but slightly. The medium wools measured from 10.8 inches in width to 9.5 inches the sequence being moderately close throughout.

Comparing the two records the fine wools ranked in width of rib Nos. 9, 7, 2, 10 and 8, the per cent. of rack running Nos. 7, 10, 9, 8 and 2. Sixty-four pound No. 9 was the widest in corrected width as usual. Excepting No. 9, however, it will be noticed that the sequence of the two placings is very much the same. No. 2 is out of order but a very good explanation for her greater width will be included later.

In the medium wools the width ranked Nos. 4, 1, 3, 5, 6, and 11, the cutting per cent. standing Nos. 4, 5, 6, 1, 3 and 11. It can be seen that the middle numbers do not coincide but the extremes hold true. Moreover, it will be remembered that the difference in width was slight, so small in fact that form and condition would

easily swing the balance either way.

In comparing the records in detail, Nos. 7 and 11 will be taken up last. They were exceptions to the general rule as followed by the other lambs and will therefore be described later. The comparison of the other lambs follow.

No. 4 cut out the largest proportionate weight of rack, measured .3 of an inch wider than any of the medium wools and had .7 of an inch more spring of rib than No. 5 who cut the next largest back. Moreover, No. 4's forms show a flatness of top which,though no better than Nos. 5, 6 or 3 is flatter in proportion to his entire top. His loin was narrower and sharper than his back, giving him a lack of symmetry found in the other uniform sheep. Notes and measurements record the rack as No. 4's strong feature, and with a covering almost equal to No. 5 his strength on top and lack of balance elsewhere gave him the logical lead in weight of rib.

Nos. 5 and 6 were of very much the same type, uniformity, levelness of back and condition. This being

true,one would expect them to cut almost the same per-cent. of rack, provided always that they had the same width of rib. No. 5 measured .4 of an inch wider in spring of rib than did No. 6 and cut .45 per cent. more rack. In addition No. 5 showed a bit more flare of rib and paunch than No. 6 who carried a well sprung back into a wonderfully wide loin. Thus, with other things equal, it is normal to find the rib with a spring wide enough to make it bulge beyond the sideline cutting proportionately heavier than a trimmer lamb with an exceptional loin.

No. 6 was .8 of an inch narrower in rib than No. 1. In spite of that, however, she cut .86 per cent. more rack. Both sheep showed good flatness over the last rib but No. 6 carried a fullness of breadth in forerib that No. 1 lacked. Besides her greater fullness at the elbow No. 6 has also one other right to a heavier cutting rack -- she was fatter. Nos. 4, 5 and 6 were the fattest sheep of the group and their easy lead over the others, points strongly to the real influence of those characteristics sought for in the judging ring, namely, width,

flatness, uniformity and, above all, condition.

Nos. 1 and 3 were both well balanced sheep but lacked the flesh of Nos. 4, 5 and 6. As compared with each other they had equally flat forms across the last rib but No. 1 measured .3 of an inch wider. In the forerib No. 3 flared out more strongly to meet his bucky shoulder measuring .7 of an inch wider behind the elbow. Thus, with type and condition fairly similar and with No. 1 wider at last rib and No. 3 fuller in forerib, it is only natural to find the difference between them but .01 per cent.

The four remaining fine wools follow No. 3 in the order of Nos. 10, 9, 8 and 2. Reference to the notes and forms shows that here again, the form and condition have been the chief influences at work. The differences in per cent. are small but they coincide almost exactly with the factors just mentioned. No. 10 was the fattest, flattest and most uniform of the group. No. 9 came next. No. 8 was very thin and peaked but it will be remembered that No. 2 was worse thus making her an easy last.

In measurements No. 9 and No. 2 were wider than either Nos. 10 or 8. It will be remembered, however, that No. 9 was the 64 pound lamb and that No. 2 showed in her form a width in her lower rib where the measurements were taken which was not reflected at all by her top. No. 10 showed .7 of an inch more width behind than No. 8 and .7 of an inch more width in front. He was uniform throughout, however, thus making the actual width of less importance.

Nos. 7 and 11 as previously mentioned were exceptions to the general cutting rule as followed by the other lambs. No. 7 was a fine wool and lacked the condition of the medium wools. She was the fattest of the fine wools and should logically have cut more rack than any of them. At the same time, even though she had a larger width than any lamb except No. 9, it seems strange to see her cut, with the exception of No. 4, the heaviest rack of the group.

No. 7 was quite an exceptional sheep in her top. She measured .4 of an inch wider than No. 4 who ranked above her in per cent. and .8 of an inch wider than No. 5

who ranked third. In addition, notes, forms and pictures show her with a remarkable flatness and spread of back for a fine wool, a spread equal to the medium wools considering size. In addition, the pictures show No. 7 with a shortness of shoulder and an exceptional width and bulge in the top. Thus, her width of back was all out of proportion to the rest of the body, she was less handicapped than the other fine wools by lack of condition and flatness and proportionate width on top gave her a rack but .05 per cent. lighter than No. 4 the leader of the group.

No. 11 was the medium wool which ranked last among that type and tenth in the entire group. Belonging to the "meatier" type and in higher flesh than any of the fine wools it is just as surprising to find him cutting below four fine wools as it was to find No. 7 cutting above five medium wools. The records on No. 11, however, show his case to be just the reverse to No. 7's. He had less width of back than any of the medium wools, with No. 10 only .2 of an inch narrower and No. 8, the narrowest of all, but .9 of an inch smaller.

No. 11 was also paunchy and heavy in the plate. In addition, his forms and notes record him as sharp and "V" shaped in rack and "raw on the back." Thus, four things cut down the proportionate weight of his back. First, it was narrower than any of the medium wools and all but two of the fine wools; second, he lacked flatness in his spring of rib; third, although fat his back was comparatively bare; and fourth he lacked uniformity, and his back, being proportionately small, naturally cut less than the other parts. Thus, like No. 7, he was an outstanding lamb and as it was a question of how high a per cent No. 7's wide, flat top would cut, so here it was only a question of how low a per cent. No. 11's rack would test out.

One thing more is worthy of passing notice. No. 11 was paunchy and narrow on top and although in good condition his back was bare. One sheep is insufficient to prove anything but this instance suggests the correlation between a heavy middle, a narrow back and a back that is slow to cover.

Thus, the score card standard seems to check

very closely with the actual yields. In the judging standards, form and condition have been emphasized as causes of high producing backs and in this group those two factors have largely decided the results. In addition, however, lack of uniformity, as in the cases of Nos. 7 and 11 have produced exceptions to the rule. In general, however, flatness, proportionate width and condition are the determining factors of a high yield of rack just as described in the score card.

LOIN. A high yield of loin has long been popularly associated with the width, flatness and thickness of that particular part. Therefore, the following analysis is made with the idea of bringing out the presence or absence of any such relation as shown in the records taken.

The measurements taken at the front and rear of the loin were averaged and the result multiplied by the length to get the area. That final figure showed that all the fine wools, with the exception of No. 8 had a larger loin than any of the medium wools, No. 9 leading, as usual, and followed by Nos. 7, 2 and 10, with No. 8 a

TABLE 7

MEASUREMENTS AND YIELD OF THE LOIN

MEASUREMENTS CORRECTED TO 100 POUNDS SHEARED WEIGHT

| Rank | Area | Yield of Loin (Per cent.) |
|---|---|---|
| 1st | (9) 62.6 | (6) 13.75 |
| 2nd | (7) 50.1 | (11) 12.94 |
| 3rd | (2) 50.0 | (1) 12.51 |
| 4th | (10) 42.2 | (3) 12.44 |
| 5th | (6) 37.7 | (5) 12.23 |
| 6th | (4) 36.0 | (4) 11.25 |
| 7th | (3) 35.4 | (7) 10.86 |
| 8th | (8) 33.2 | (10) 10.59 |
| 9th | (1) 31.9 | (8) 10.55 |
| 10th | (11) 29.7 | (9) 10.38 |
| 11th | (5) 27.0 | (2) 9.63 |

bad last. The variation ran from 62.6 to 33.2 square inches or a difference of 29.4 square inches. The medium wools ranked Nos. 6, 4, 3, 1, 11 and 5, garying from 37.7 to 27.0 for a difference of only 10.7 square inches. In cutting per cent., the flatter, fatter, though smaller loined, medium wools all exceeded the fine wools ranking Nos. 6, 11, 1, 3, 5 and 4, No. 4 cutting 11.25 per cent. or .39 per cent. more than No. 7 the best fine wool. The fine wools ranked Nos. 7, 10, 8, 9, 2 or practically the same as in the rack. It will be noticed that the rank in measurements and cutting per cent. varies widely though a closer study will show that the difference in both places are small enough to allow ample opportunity for other factors to influence it.

The fatter, medium wools, as mentioned before, all cut a higher per cent. of loin than the fine wools. No. 6 headed the list with 13.75 per cent. or .81 percent. more than No. 11 who followed her. No. 6 had three advantages over the rest of the lambs. In loin area she measured 1.7 square inches more than the next medium wool and 8 square inches more than No. 11. No. 6's

forms also show a levelness and fullness not found in the other sheep and being the fattest of the group, illustrates the actual importance of the form, width and thickness of loin mentioned and emphasized in all the judging standards.

Uniformity has played an important part in the cutting per cent. of the other cuts and it is of interest to note here, that in addition to No. 6's other advantages, her loin was proportionately wider than those of the others. A glance at the back views of the carcasses shows unusual strength and fullness in the loin of No. 6 and reference to the measurement table brings out the fact that whereas both Nos. 11 and 6 had a spring of last rib, of 9.7 inches, No. 11 only measured 5.3 inches in loin while No. 6 recorded 6.5 inches. Thus, form, condition, width and uniformity all combine to prove the popular judging standard and to show that No. 6 should logically lead the rest of the group in per cent. of loin.

No. 11 measured 2.2 square inches less than No. 1 but cut out .43 per cent. more loin. However, notes,

pictures, and forms show No. 11 with a fuller, stronger, thicker coupling than No. 1. In addition, No. 1 was a more symmetrical lamb, No. 11 being proportionately lighter in back and leg and heavier in loin. It will be remembered that No. 11 was not only narrower in rack than No. 1 but was also barer. This being true, it is natural that No. 11's strongest parts should cut a higher per cent. than those of a more uniform sheep even though the latter one was actually wider.

No. 1 measured 3.5 square inches less than No. 3 and although No. 3 was the fatter, No. 1 cut out a little heavier loin, yielding .07 per cent. more. The forms were practically the same and No. 1's advantage is hard to explain. All the way through these two lambs with the exception of the leg, cut closely together. There No. 3's greater bulge and fullness gave him a 1 per-cent. advantage, that seeming to be the main reason for No. 1's advantage in loin. If one excels decidedly in some part the other must surpass somewhere else. Thus, again, the question of uniformity seems to be the controlling factor when the others show little difference.

No. 3 naturally cut a higher per cent. of loin than No. 5. He was neither more uniform than No. 5 nor fatter on top but he had a loin area 8.4 square inches larger. The only question that arises is the wonder that No. 3 should have cut only .21 per cent. more than No. 5. No. 5, however, was fatter and as has been mentioned before, condition exerts a very large influence upon the cutting per cent. In this instance it happened that the difference in condition was not as great as in width and thus No. 3 retained a slight advantage.

Nos. 1, 3 and 5 cut very similar per cents. of loin, per cents. so close as to make general conclusions impossible. No. 4, however, though ranking above the fine wools, was outstandingly the poorest cutting medium wool, yielding .98 per cent. less than No. 5. This occurred in spite of the fact that No. 4 ranked second in loin area and measured 9 square inches more than No. 5. Both sheep were fairly similar in form thus making it a question of uniformity and condition. It will be remembered that No. 4 was the outstanding sheep in his rack, being both actually and proportionately wider

than any of the others. Coming back to the same proposition of each carcass cutting 100 per cent., it is only natural to find that even a good loined sheep cuts a less per cent. of that cut when it so happens that he was exceptionally strong in his back. No. 5 was more evenly balanced and cut lower in rack and higher in loin.

Condition, the prime factor throughout this problem also influenced the loin of No. 4. Judging standards credit fat loins with a high cutting percent. and here No. 5 was fatter than No. 4.n Not only was No. 5 a little fatter than No. 4 as a whole but No. 4 was recorded in the notes as "raw in loin." Thus as unsymmetrical, big loined, raw backed No. 11 cut less rack than any of the medium wools, so does unsymmetrical, big backed, raw loined No. 4 cut less loin than any of the medium wools.

The fine wools,as mentioned before, lacked the spread and covering which would enable them to cut as high a per cent. of loin as the medium wools. Here again, as in the loins of the medium wools and the racks of the entire group, the popular judging standard seems

to be verified and the poorer type ranked Nos. 7, 10, 8, 9 and 2 in almost the same order as in the racks and in almost the same rank as that of form and condition.

No. 7 who cut such an exceptional rack is the logical leader of the fine wools because of the greater spread and condition. Not only that but she had the largest area of any lamb except for 64 pound No. 9 ranking 7.9 square inches above No. 10. No. 10 carried 9 square inches more loin, showed a more level loin and a greater thickness than No. 8 and the surprising feature is that he did not cut over .04 per cent. more. No. 9 outyielded No. 8 in rack but in the loin, No. 8 was proportionately longer and slightly fatter. As in rack, however, they cut very close together, so close in fact, that a small error in cutting might have swung the balance either way.

Bare No. 9 did not cut the least loin of the group because there was one other lamb a li ttle plainer in that respect. All the way through No. 2 was the slabsided, raw backed, thin fleshed individual and in the loin, as in the rack, her measurements counted for little

as she had no flatness or covering. Thin and "V" shaped, she logically cut .75 per cent. less than even No. 9.

The facts and relationships as outlined above would go to show that the present judging standards, as in use today, consider and emphasize the really important factors. As in the rack, the essential things in a high cutting loin are: proportionate size, levelness and condition, the latter being the most important of all. Form is important, but regardless of all else, fat loins as a rule are the heaviest yielders.

LEG. The weight of the leg of lamb is one of the very important factors which influence the value of a lamb and the value of the lamb's carcass. This cut makes a roast of a very handy weight and because of that it is more popular with the trade than the other lamb cuts. As a result, the fat sheep score cards have put a large value upon the thickness, fullness and squareness of rump, depth of twist and all the other points which seem to indicate a high per cent. of leg. The lambs used in this experiment were therefore selected

TABLE 8

MEASUREMENTS AND YIELD OF THE LEG

MEASUREMENTS CORRECTED TO 100 POUNDS SHEARED WEIGHT

| Rank | Length hip to Hock | Width Widest Bulge | Depth of Twist | Yield of Leg (Per cent.) |
|---|---|---|---|---|
| 1st | (9) 29.2 | (9) 13.0 | (11) 4.6 | (2) 34.35 |
| 2nd | (2) 22.1 | (2) 10.9 | (1) 3.9 | (9) 33.92 |
| 3rd | (8) 21.4 | (10) 10.9 | (6) 3.9 | (7) 33.43 |
| 4th | (10) 20.8 | (7) 10.4 | (5) 3.8 | (10) 31.76 |
| 5th | (7) 20.1 | (8) 9.1 | (3) 3.5 | (8) 31.28 |
| 6th | (11) 18.9 | (6) 9.0 | (8) 3.1 | (3) 30.56 |
| 7th | (1) 18.8 | (3) 8.9 | (10) 3.0 | (1) 29.50 |
| 8th | (4) 18.1 | (1) 8.8 | (4) 3.0 | (11) 29.40 |
| 9th | (6) 16.6 | (11) 8.7 | (2) 0.0 | (4) 28.12 |
| 10th | (3) 16.0 | (5) 7.8 | (7) 0.0 | (6) 27.65 |
| 11th | (5) 15.7 | (4) 6.8 | (9) 0.0 | (5) 27.59 |

with the idea of contrasting a number of those different characters and a glance at the pictures and notes shows that they differed widely. In the medium wools, Nos. 1, 3, 5 and 6 were well made behind being thick and long and well let down in the twist. Nos. 4 and 11, though fairly thick, were selected for peakedness behind, No. 4 being not only narrow, but also shallow in the twist. The fine wools were selected for the extreme faults of the leg, and showed, as can be seen in the pictures, such drooping, peaked rumps, hollow thighs and empty twists that they would hardly have merited a look from a judge of mutton sheep.

The cutting percentages of the entire group can be seen in the table and they furnish the greatest surprise of the whole experiment. The "good" lambs with almost "ideal" legs yielded uniformly smaller per cent. of that cut than the peaked rumped, shallow twisted type. Furthermore, the thinnest, most peaked lambs of the group cut the highest per cent. and Nos. 4 and 11, the narrowest legged lambs of the medium wools, cut more leg than the fatter, more evenly balanced Nos. 5

and 6.

On the basis of the above facts it appears as though the whole judging standard were turned upside down and that the fuller, thicker and deeper the leg the less the cutting per cent.

No. 2 was recorded in the notes and pictures with a very peaked, drooping rump, a thin hollow thigh and a twist measurement of nothing. She had but one good feature as viewed from the popular standard, namely, length from hip to hock. Yet with all those popularly accepted faults, she cut out 34.35 per cent. of leg or .43 per cent. more than the next sheep and 3.79 per cent. more than No. 3 the best medium wool. The reason for such a contrast in theories and results is stated in the following paragraph and forms the most interesting result of the whole problem.

The facts were brought out plainly in the discussion of the plate and flank: first, that there is more natural flesh on the leg of a lamb than on the other parts of the body; and second, that the middle parts of a fattening sheep gain in weight more rapidly

than the other parts, the leg being the last to cover. Thus, No. 2, the thinnest, sharpest topped lamb, with the rawest, narrowest and lightest plate, rack and loin of the group was a natural leader in the leg. She had little room on her back and middle for meat; she lacked the covering that even her narrow top would have carried: there had to be some muscle in her leg to support and move the body, and, lastly, she had to cut 100 per cent. of carcass. Thus, as a result, her leg cut proportionately high. Conformation plays an important part in cutting per cent. of leg under certain conditions, but as demonstrated here, lack of fat and lack of breadth and size in the fore end of the body seem to be the principle causes of a high yielding leg.

No. 9 was just as poor in rump and light in twist as No. 2 but her forms showed a broader spring of rib and she carried a bit more condition. As a result, she cut .43 per cent. less than No. 2 though she was thin and narrow in body to excel No. 7 by .49 per cent.

No. 7 is the first exception to the rule as outlined by Nos. 2 and 9. She was fatter and broader in

back than Nos. 10 and 8, showed .7 of an inch less length in leg and yet cut out 1.67 per cent. higher. The answer for this result goes back to the question of uniformity. A study of the carcass pictures shows No. 7 with a leg, which though not actually as large, looks longer and fuller in proportion to the rest of the carcass than does the leg of No. 10. In addition, No. 10 was a big front ended sheep while No. 7 was much trimmer. Thus, although No. 7's greater condition gave a heavier plate and rack, No. 10 carried the larger front and when taken as a whole, a correspondingly smaller leg.

Nos. 10 and 8 were so close in form and condition that, as with Nos. 10 and 7, certain limitations creep in to the rule of "the thinner the sheep the heavier the leg." The rule holds true in general, but with sheep as near alike as No. 10 and No. 8 the points of conformation prescribed in the average score card show their influence. No. 8 was .6 of an inch longer than No. 10 and .1 of an inch deeper in the twist. No. 10, however, was 1.8 inches wider thus giving him the advantage in total bulk. In addition, the form of the rump

and the notes and pictures all show No. 10 with a greater proportionate fullness in leg and with a proportionately smaller flare toward the front. Thus, with type and condition fairly similar, fullness and meatiness behind and comparative lightness in front, tend to produce a high per cent. of leg.

In the medium wools the comparison seems a bit confusing. Placed in the judging ring the six legs would have been ranked Nos. 3, 6, 5, 1, 11 and 4. They cut out per cents. which ranked Nos. 3, 1, 11, 4, 6 and 5. It will be remembered that all those sheep were of the same general type, that Nos. 1, 3, 5 and 6 were fairly uniform and that No. 4 and No. 11 had been selected because of their narrow, peaked rumps. Thus it seems queer to find not only No. 1 above Nos. 5 and 6 but also Nos. 4 and 11.

No. 3, the logical leader of the medium wools in per cent. of leg and cutting the highest per cent. somewhat substantiates the score card description. She lacked the actual, width, depth and length of the other sheep, her great advantage being proportionate size.

Whereas, No. 1 measured 10.5 inches at last rib and 8.8 inches in leg, and whereas, No. 5 showed a 10.1 inch spread of rib and 7.8 inches in leg, No. 3 measured 10.2 inches in rack or .3 of an inch less than No. 1 and 8.9 inches in leg or .1 of an inch more than No. 1. Moreover, the notes give him credit for a roundness, fullness and plumpness in leg not found in the others and a reference to the carcass pictures quickly illustrates this fact. No. 3 carried the outstanding leg from the score card standpoint and compared with lambs of her same type and condition verified that standard by cutting out the largest leg.

No. 1 was .7 of an inch longer than No. 11 and .1 of an inch wider but .7 of an inch shallower in twist. Thus, as a whole, she had the larger leg. It will also be remembered that No. 11 was selected for his peaked rump. He was full enough in the lower leg but his narrow, pointed rump was his chief fault. Thus, he logically cut a less per cent. of leg than No. 1 and if it had not been for a tendency to narrowness in the rump of No. 1 and a slackness in her outer thigh, peaked

No. 11 probably would not have cut so close to her as .10 per cent.

Between Nos. 11 and 4 it was mainly a question as to which was the worst. No. 11 measured .7 of an inch longer, 1.9 inches wider and 1.6 inches deeper in the twist. The measurements, however, fail to record the peakedness of his rump, the chief defect of his leg and the fault which held him below the cutting record of No. 1. Reference to notes, pictures and forms, show that while No. 11 was sharper on his rump than No. 4 he was much fuller in his twist. Thus, the judging standards seem to check again for between sheep that are nearly alike the smaller points of conformation are the deciding factors.

Nos. 6 and 5 bring up the rear. Both lambs were fairly similar in type, uniformity, measurements, and condition and it is only logical that they should have cut such similar percentages of leg. Their measurements are the lowest of any of the lambs, and it would thus seem natural to find their legs cutting the least per cent. However, a glance at their notes and

pictures shows that,except in length, their legs fitted very uniformly to the rest of their bodies. Their quarters were round, square and meaty, and,as has been mentioned before,,would have been placed over Nos. 11 and 4. Yet the table shows that they cut less than No. 4, the margin being as large as .47 per cent.

The explanation of the above fact seems to be the same one that explained the high yield of the fine wools. Nos. 5 and 6 were easily the fattest lambs of the group. Being fattest they had a greater proportion of weight on back and middle and less on the leg. Thus, although Nos. 4 and 11 were primarily selected for their narrow legs, the extra condition of Nos. 5 and 6 was enough to swing the balance the other way. Uniform and well made behind Nos. 5 and 6 were very fat, that condition raising the yield of back and middle and lowering that of the leg.

Peakedness in the rump, fullness in the thigh and depth of twist are given by the score card as the prime factors in determining the yield of the leg. Although such a relationship is shown to exist, in the

above comparison, nevertheless, the fine wools with peaked rumps and shallow twists all cut a higher per cent. of leg than the medium wools, thus illustrating clearly that there are other points of conformation which carry a greater influence than those listed in the judging standards. The thin lambs carried a greater proportion of natural flesh in the leg than the fat ones and as a result, their legs yielded a higher per cent., than those of the thicker ones, regardless of conformation. Evenness of the body and the details of conformation as described in the score card had an influence upon the yield of the leg when all the other factors were similar. In general, however, condition was the determining factor throughout and the thin lambs cut a leg which was proportionately heavier than that of the well finished ones.

NECK. No measurements were taken on the neck as before mentioned. Being fatter, however, and proportionately heavier in the body it is very logical to find the medium wools cutting almost 1 per cent. less neck than the fine wools. Nos. 8 and 9 show up in the

TABLE 9

YIELDS OF FORE LEG, NECK AND KIDNEY FAT (PER CENT.)

| Rank | Neck | Fore Leg | Kidney Fat |
|---|---|---|---|
| 1st | (8) 4.27 | (8) 5.02 | (6) 5.98 |
| 2nd | (9) 4.23 | (9) 4.61 | (5) 5.69 |
| 3rd | (10) 4.13 | (2) 4.49 | (4) 5.55 |
| 4th | (2) 4.01 | (4) 4.47 | (1) 5.44 |
| 5th | (7) 3.34 | (10) 4.40 | (11) 4.12 |
| 6th | (5) 2.99 | (7) 4.18 | (7) 3.90 |
| 7th | (1) 2.62 | (3) 3.56 | (2) 3.85 |
| 8th | (11) 2.57 | (1) 3.36 | (3) 3.73 |
| 9th | (3) 2.32 | (11) 3.33 | (10) 3.63 |
| 10th | (6) 2.09 | (6) 3.29 | (8) 3.40 |
| 11th | (4) 2.01 | (5) 5.13 | (9) 3.00 |

pictures with the largest and longest necks and those two lead the other fine wools,as indicated in the accompanying table. No. 7, the fattest of the fine wools cut the least per cent. of neck having .67 per cent. less than No. 2 and .35 per cent. more than No. 5.

No. 5 led the medium wools by .37 per cent., the pictures and notes showing him with a neck, which though of equal length, was thicker and buckier than the others. The rest followed so closely that few accurate deductions can be made from the records taken.

Thus, it would appear, first, that the large amount of bone in the neck gives that cut a greater proportionate weight in thin sheep, and, second, that "buckiness" of neck is associated with a higher cutting per cent.

FORELEG. The foreleg consists of a great deal larger proportion of bone than the rest of the body. Thus, as in the neck, thin sheep should cut out the higher per cent. and fat sheep should be lower. It, therefore, seems logical to find that the fine wools, with one exception, are outstanding in that respect,

with the thin and coarse No. 8 in the lead, thin No. 9 and No. 2 next in order, and the fatter No. 7 a poor fifth. No. 4 proved to be the exception in this case as he cut .29 per cent. more than No. 7 and 1.11 per cent. more than No. 3 the nearest medium wool. Both notes and pictures, however, show No. 4 as leggy, and a glance at his length of shank would indicate that it would be merely a question as to the size of his per-cent.

No figures were taken on the foreleg and as with the neck, definite comparisons would be too approximate to be of value. Nevertheless, the records would indicate that fat sheep cut a smaller per cent. of foreleg than thin ones and that legginess so increases the weight of the shank bone as to raise the yield of that cut.

KIDNEY FAT. Kidney fat is the poorest product of the sheep's carcass. As a result, judges watch carefully for signs of wasty insides and discriminate against them in placing. Two things have long been popularly associated with heavy kidneys, namely, a high

condition and roomy middles. Those two characters were watched closely in these eleven sheep and the records checked with the cutting per cent.

The medium wools, with one exception, cut out more kidney fat than the fine wools. Moreover, Nos. 6, 5 and 4, the fattest of the group ranked first and second in this respect. Nos. 4 and 1 carried a little less covering and a little less kidney. No. 11, though as fat as No. 1 and much paunchier, cut out 1.32 per cent. less, ranking a very bad fifth. The fine wools, also with one exception, ranked Nos. 7, 10, 8, 9, or in the exact order of their condition, thin No. 9 being a poor last.

The two exceptions to the above statements are Nos. 2 and 3, No. 2 ranking seventh instead of last and No. 3 eighth instead of sixth. On the basis of the general judging standard and from the general rule followed by the other lambs, No. 3 should have had at least .25 per cent. more kidney and have ranked above all the fine wools. His blockiness and compactness might explain the lightness of internal fat, in part,

but considering his condition he should, logically have cut out heavier in that place.

No. 2 was the thinnest lamb of the group. So thin in fact that she cut out the least per cent. of plate, flank, rack, and loin of the entire group. Logically then, if there is any relation between condition and per cent. of kidney she should have had even a smaller per cent. than No. 9. For some reason, however, she ranked second among the fine wools.

The two exceptions as noted above make the record of kidney fat a bit irregular. The influence of paunchiness upon the yield of this cut cannot be either proved or disproved by the data at hand. It would seem, however, that there are enough other lambs in logical succession to make one safe in saying that a high per-cent. of kidney fat depends largely upon high condition.

BONE. The yield of both carcasses and carcass cuts has been figured in this experiment from the standpoint of total weight. Meat, however, is the real product desired and a true value cannot be placed upon

TABLE 10

TOTAL AND PROPORTIONATE WEIGHT OF BONE IN THE LAMB CARCASSES

| Rank | Weight of Meat | Weight of Bone | Percent of Bone |
|---|---|---|---|
| 1st | (5) 62.4 | (4) 8.9 | (9) 19.62 |
| 2nd | (6) 59.7 | (5) 7.9 | (10) 18.76 |
| 3rd | (4) 55.9 | (6) 7.2 | (2) 18.28 |
| 4th | (1) 52.6 | (8) 7.2 | (8) 18.09 |
| 5th | (3) 49.4 | (1) 6.9 | (7) 15.04 |
| 6th | (11) 44.5 | (3) 6.9 | (4) 13.74 |
| 7th | (8) 32.6 | (10) 6.8 | (11) 12.75 |
| 8th | (2) 32.2 | (2) 6.7 | (8) 12.26 |
| 9th | (10) 31.9 | (11) 6.5 | (1) 11.56 |
| 10th | (7) 30.5 | (7) 5.4 | (5) 11.24 |
| 11th | (9) 20.9 | (9) 5.1 | (6) 10.76 |

the animal intended for slaughter until the bone has been removed. To that end, all the carcasses were carefully boned, the respective weights and percentages appearing in the accompanying tables.

As can be seen in the above figures, all the fine wools carried a greater proportionate weight of bone than any of the medium wools, fine wools ranking Nos. 9, 10, 2, 8 and 7 and the medium wools Nos. 4, 11, 3, 1, 5 and 6.

A careful study of the weights of bone in both cuts and carcasses brings out the fact that with sheep of the same size, the actual weight of the frame work is very similar. Thus, the difference in amount of meat determines the percentage. That being true, the fatter sheep were comparatively lighter in bone, one pound of the fine wool carcasses containing more waste and less real food. Thus, we find that condition again exerts the chief influence giving fatter No. 7 the least bone of the fine wools and Nos. 5 and 6 the least per cent. of the medium wools.

Condition is certainly the most important fac-

tor in determining the per cent. of bone. Yet No. 9 who was one of the two thinnest lambs and who leads in the per cent. of bone is followed not by No. 2 the other poorly covered lamb, but by No. 10. Moreover, none of the medium wools show the weight of bone found in No. 4, although he was fatter than either Nos. 1 or 3, and No. 5 with practically the same amount of flesh as No. 6 cut .48 per cent. more bone.

Coarseness is a character much emphasized in judging circles. Lack of quality has been the downfall of many promising show animals, and if this feature is to be given such prominence it should be clearly shown that it injures the food value of the animal. Differences in quality are often very slight and hard to determine. For that reason its relation to yield of bone will be only taken up in two or three outstanding instances. No. 10 was a very thin lamb, being rough in head, bucky in shoulders and heavy in leg bones. However, he was fatter than either Nos. 9, 2 or 8 and from the standpoint of condition should have carried less bone than any of them. As shown, he

yielded .86 per cent. less than No. 9, but .48 per cent. more than No. 2 and .67 per cent. more than No. 8. With condition in his favor and only coarseness against him, it appears logical to believe that the latter caused his high yield.

In the same way, No. 4 was fatter than either No. 3 or No. 11, but he cut out .99 per cent. more than No. 11 and 1.48 per cent. more bone than No. 3. No. 4 was fat but he was leggy and coarse and those two factors seem again to be the chief cause of the higher yield of bone. Lastly, No. 5 was much the same type and in much the same condition as No. 6, his main difference being in the heaviness of his head, neck and legs. Instead of boning about the same per cent. of frame, however, he weighed out .48 per cent. more.

These instances are insufficient to establish a law but the above figures would indicate that the total per cent. of waste of non-edible material, or in short of bone, in a sheep's carcass, though chiefly dependent upon condition is also influenced very de-

TABLE 11

A COMPARISON OF THE WEIGHT OF FLEECE, HEAD AND HIDE WITH THE DRESSING PER CENT.

| Rank | Dressing Per cent. Fleece on | Dressing Per cent. Fleece off | Fleece Per cent. | Head and Hide Per-cent. |
|---|---|---|---|---|
| | (7) | (9) | (7) | (8) |
| 1st | 36.63 | 40.62 | 13.70 | 17.95 |
| | (9) | (7) | (2) | (7) |
| 2nd | 37.68 | 42.48 | 10.44 | 17.52 |
| | (8) | (8) | (1) | (10) |
| 3rd | 39.02 | 42.79 | 9.63 | 17.48 |
| | (10) | (10) | (5) | (9) |
| 4th | 41.61 | 44.48 | 8.93 | 15.31 |
| | (2) | (2) | (8) | (2) |
| 5th | 42.74 | 47.73 | 8.80 | 14.72 |
| | (11) | (11) | (6) | (3) |
| 6th | 48.57 | 52.04 | 8.28 | 12.38 |
| | (1) | (4) | (9) | (1) |
| 7th | 49.79 | 54.68 | 7.27 | 12.24 |
| | (5) | (6) | (3) | (11) |
| 8th | 50.20 | 54.85 | 6.91 | 11.53 |
| | (6) | (1) | (11) | (6) |
| 9th | 50.30 | 55.09 | 6.67 | 11.48 |
| | (3) | (5) | (10) | (4) |
| 10th | 51.89 | 55.14 | 6.45 | 10.96 |
| | (4) | (3) | (4) | (a) |
| 11th | 52.02 | 55.74 | 4.82 | |

(a) Slaughter record of No. 5 missing.

cidedly by quality or the lack of quality.

FLEECE. The estimated dressing per cent. of meat animals is based largely upon three things: condition, form and trimness. Sheep, however, possess one other character, which, though often not considered, is always of importance and is often the deciding factor. The fleeces of the eleven sheep used here weighed from 13.5 pounds to 5 pounds and varied from 13.7 per cent. of the total live weight to 4.82 per cent. The first and third lines in Table 11 illustrate the relation found between a heavy fleece and a low dressing per cent., the second line having been tabulated with the poorest dressers first. Flesh, form and paunch are of such importance in dressing, however, that it can be seen that the factor of fleece is the deciding point only in the cases of the two extremes. No. 7 sheared 3.26 per cent. more fleece than the next sheep and dressed 1.05 per cent. less. With fleece out she ranked tenth instead of eleventh, dressing 1.86 per-cent. more than the poorest lamb and very close to the other fine wools.

No. 4, the other extreme, sheared 1.63 per cent. less fleece than the next lamb and dressed .13 per cent. more. With fleece out he ranked fifth instead of first, dressing 1.06 per cent. less than the best dresser.

Reference to the second line in the accompanying table illustrates plainly, the small difference in the dressing per cent. of sheared lambs of the same type. No. 11 was so paunchy as to make him incomparable with the other more uniform medium wools. Excluding No. 11 then, the dressing per cent. of the five medium wools, when based on total live weight varied 2.23 per-cent. When based on sheared weight the difference shrank to 1.06 per cent. or less than half. The difference in the fine wools does not narrow when the fleece is excluded due to such a vast difference in the characters of the five lambs. However, it would seem logical to conclude from the relationships which show up that; first, in some instances the fleece is the determining factor in dressing per cent.; second, that in any case it must be considered; and third, that as a

rule the yield of lambs of the same type and condition, if based on sheared weights, will vary but slightly, the difference between them being so small as to be of little practical value.

HEAD AND HIDE. The weight of the head and hide has, naturally, a very important influence upon the dressing per cent. of sheep, an influence which, as previously explained, is much greater in unshorn lambs. Nevertheless, the difference in weights of the hides of the eleven sheep used here were great enough to merit the consideration of a judge.

Two things show up clearly in the comparison of the proportionate weights of the heads and hides of the eleven sheep used here. First, all the medium wools carried a lighter hide than any of the fine wools and second, although the variation in the per cents. of the medium wools was restricted to but 1.42 per cent., the fine wools showed a difference of 3.23 per cent., Nos. 8, 7 and 10 being grouped at the top with Nos. 9 and 2 at the other extreme.

The medium wools yielded a proportionately smaller pelt for the very natural reason that they were fatter, this making the carcass proportionately heavier. However, Nos. 8, 7 and 10 were fatter sheep than Nos. 9 and 2, and on the basis of the yield of the medium wools should thus have carried less pelt than the latter two. As it was, they cut about 3 per cent. more. Reference to notes and pictures, however, shows those three sheep carried the very wrinkled skin, which is characteristic of their breed. On the other hand those same records show Nos. 2 and 9 with exceptionally smooth skins for fine wools. As a result, the more heavily folded pelts weighed the most and the smoother ones of Nos. 2 and 9 come last.

The wrinkles of the fine wools probably account for part of the difference between the yield of pelt in the two types. Nevertheless, condition was undoubtedly the determining factor, as even the smooth skinned fine wools, carried a heavier hide than the medium wools.

EDIBLE AND NON-EDIBLE OFFAL. The previous discussion on per cent. of offal with relation to dressing

TABLE 12

YIELDS OF EDIBLE AND NON-EDIBLE OFFAL AND BLOOD

| Rank | Edible Offal Per cent. | Non-Edible Offal Per-cent. | Total Offal Per cent. | Blood Pounds | Blood Per cent. |
|---|---|---|---|---|---|
| 1st | (6) 8.52 | (9) 35.78 | (9) 41.26 | (2) 5.8 | (2) 7.12 |
| 2nd | (4) 8.17 | (8) 31.09 | (7) 37.52 | (4) 5.5 | (8) 5.38 |
| 3rd | (11) 7.05 | (10) 30.92 | (8) 37.43 | (8) 5.0 | (7) 5.33 |
| 4th | (1) 7.00 | (7) 30.66 | (10) 36.55 | (6) 5.0 | (9) 4.69 |
| 5th | (3) 6.96 | (2) 30.60 | (2) 36.20 | (1) 5.0 | (1) 4.63 |
| 6th | (7) 6.86 | (11) 28.36 | (11) 35.41 | (7) 4.5 | (10) 4.60 |
| 7th | (8) 6.34 | (4) 24.77 | (4) 32.94 | (3) 4.5 | (4) 4.60 |
| 8th | (10) 5.63 | (1) 23.87 | (1) 30.87 | (10) 4.0 | (8) 4.46 |
| 9th | (2) 5.60 | (3) 23.24 | (6) 30.74 | (11) 4.0 | (6) 4.10 |
| 10th | (9) 5.48 | (6) 22.22 | (3) 30.20 | (9) 3.0 | (11) 4.08 |
| 11th | (a) | (a) | (a) | (a) | (a) |

(a) Slaughter record of No. 5 missing.

per cent. considered the offal as a whole. However, as part of this is edible, a brief survey of the proportion of the food to waste will be included, together with the factors which seem to influence such proportion.

All the fine wools had a greater total per cent. of offal than any of the medium wools. However, all the medium wools carried a larger proportion of edible offal than the fine wools, the latter type, nevertheless, being enough heavier in the non-edible part to raise their total above that of the better sheep.

As stated above, the medium wools, though shallower in body than the fine wools, cut out a larger amount of edible offal than any of the fine wools. The table of weights in the appendix shows that the fine wools carried hearts, livers and tongues with a weight almost equal to those of the medium wools and percentages consequently larger. Nevertheless, the better type yielded a greater amount of total edible offal. The explanation is, of course, in the weight of the internal fat. The medium wools were fatter and, as a re-

sult, the weight of pluck, paunch and intestinal fat was large enough to raise the total percentage of edible offal above that of the fine wools. Furthermore, No. 6, the fattest of the medium wools yielded .35 per cent. more than did No. 4 who followed her. Nos. 4 and 11 come next in line, No. 4's higher condition ranking him above No. 11, No. 11's paunchiness, however, raising his yield above that of No. 1. No. 3 the blockiest and trimmest of the fat lambs, logically came last.

In the fine wools condition seems to have been again the chief influence, fatter No. 7 carrying .52 per cent. more than the next lamb with thin, bare topped No.2 and No. 9 bringing up the rear.

The per cent. of non-edible offal is likewise based upon condition. In contrast, however, to the records on the edible product, high condition makes for a low per cent. The internal fat is here eliminated and the fatter the carcass, the smaller is the comparative weight of the digestive organs. As a result, the previous ranking is just reversed and the fine wools showed a greater yield than the medium wools. Thin

No. 9 contained a much larger amount of waste than any of the others, this per cent. being 4.69 per cent. greater than the next lamb No. 8. The other three follow No. 8 very closely though thin No. 2 shows .06 per cent. less middle than fatter No. 7. No. 7, however, was paunchier than the others and would have probably yielded nearly the same as No. 9 but for her condition.

In the medium wools, paunchy No. 11 led by 3.59 per cent. with roomy No. 4 a bad second. No. 6 ranked last instead of No. 3. Being almost of the same type as No. 3 and carrying higher condition, her carcass weighed proportionately more.

The record for total offal shows almost the same ranking as that for the non-edible product. The internal fat is included with the waste and although it narrows decidedly the margin between them, it is not sufficient to rank any of the medium wools above the fine wools.

Thin, stretchy No. 9 was logically the wastiest of the group. No. 7, roomy enough to almost equal the other fine wools in non-edible offal and fat enough

to lead them in the edible part, was also a logical lamb for second place. The other fine wools followed closely with thin No. 2 last. Again, paunchy,No. 11 led the medium wools and,with No. 4 second,illustrates plainly the effect of a heavy middle. Nos. 1, 6 and 3 followed closely, No. 6's extra weight of internal fat raising her above the thinner, blockier No. 3.

The above figures would thus seem to show first: that the per cent. of edible offal depends upon the amount of internal fat, that being due largely to condition; second, that the per cent. of non-edible offal depends upon the amount of carcass fat; third, that the total offal depends largely upon the condition of the lamb; and fourth, that, though of less importance than condition, paunchiness is the controlling factor between sheep of the same flesh.

BODY VOLUME. In addition to the measurements and forms taken on the outside of the carcass, another experiment was tried to determine the body volume and its relation to slaughter records. The estimated dressing per cent. of all live animals can never be more than an

TABLE 13

A COMPARISON OF BODY VOLUME WITH DRESSING PER CENT.,

TOTAL OFFAL AND DEPTH OF BODY

| Rank | Av. Body Depth | Vol. per Lb. Sheared Wt.cc. | Total Offal (Per cent.) | Dressing Per cent. Fleece Off. |
|---|---|---|---|---|
| 1st | (9) 16.7 | (9) 113.8 | (9) 36.10 | (9) 40.62 |
| 2nd | (10) 13.9 | (8) 107.5 | (7) 31.72 | (7) 42.48 |
| 3rd | (7) 13.8 | (7) 105.3 | (8) 31.51 | (8) 42.79 |
| 4th | (8) 13.6 | (10) 104.9 | (10) 31.49 | (10) 44.48 |
| 5th | (2) 13.6 | (2) 97.0 | (11) 30.92 | (2) 47.53 |
| 6th | (11) 13.4 | (11) 93.0 | (2) 28.72 | (11) 53.06 |
| 7th | (1) 10.9 | (1) 87.0 | (4) 27.92 | (4) 54.68 |
| 8th | (5) 10.5 | (4) 85.5 | (6) 26.31 | (6) 54.83 |
| 9th | (6) 10.5 | (5) 84.6 | (1) 25.96 | (1) 55.09 |
| 10th | (3) 10.5 | (6) 83.6 | (3) 25.35 | (5) 55.14 |
| 11th | (4) 10.3 | (3) 76.2 | (a) | (3) 55.74 |

(a) Offal record of No. 5 missing.

estimation but it was hoped that some relationships would appear in the records which would either check or disprove the influences accepted by the judging standards. Paunchiness is popularly supposed to be correlated with large body volume, this roominess causing a high per cent. of offal, this resulting in a lower per cent. of carcass. To this end, therefore, those four things were measured and compared.

The cold carcasses were laid back down with brisket and udder level. The neck and anal openings were closed and enough measured water poured in to fill the cavity. It was recognized that the collapse of the plate after the removal of the paunch, made the results considerably lower than the actual volume of the live lamb. Nevertheless, the method used seemed to be the only practical one and it was felt that the error in each case would be proportionate enough to make the results comparable.

The total inside volume of the eleven lambs ran from 10,200 cc in No. 6 to 7,280 cc in No. 9 while the volume per pound of sheared, live weight varied from

113.8 cc in No. 9 to 76.2 cc in No. 3. A study of the adjoining table shows, as would be expected, that the fine wools all had a greater volume per pound than any of the medium wools with paunchy No. 11 the roomiest of the medium wools next, and blocky No. 3 a very decided last.

Comparison with the average depth of body, shows a general correlation. No. 9 held 6.3 cc per pound more than the next roomiest lamb and measured 2.8 inches deeper. Nos. 8, 7 and 10 were close in volume and measured within .3 inches of each other in depth. In contrast, however, No. 8 contained 2.6 cc more than No. 10 and measured .3 of an inch shallower. This may be accounted for by the fact that though of a bit less average depth No. 8 was shallower in the narrow, fleshy chest, carrying down .4 of an inch deeper in the wide, roomy flank. No. 2 is credited with 13.6 inches, the same average depth as No. 8, but being shorter, naturally held a smaller volume of water.

In the medium wools, the comparison holds equally true. No. 11 was credited in notes and pictures with

"paunchiness" and had an average depth of 13.4 inches, or 2.2 inches more than No. 1 the next medium wool. Thus, it is only natural to find him with a body content of 6 cc per pound larger than the others. Although fatter than No. 1, his excess room was great enough to give him a large margin in volume. No. 1 was longer than the remaining lambs, measured .7 inches deeper and held 2.5 cc more per pound than No. 4 who came next. Nos. 5, 6, 3 and 4 were practically alike in depth and, with the exception of No. 3, had very similar body volumes. No. 4, though .2 of an inch shallower than the rest was longer and thinner and had .9 cc the advantage of No. 5 in volume. No. 3 had an equal depth with No. 5 and No. 6 but measured 7.4 cc less. No. 3, however, was the outstanding sheep from the standpoint of blockiness and uniformity and his shortness and trimness are undoubtedly the reason for this advantage in volume.

A comparison of dressing per cent. with the body volume shows practically the same relation as in the above discussion. As would be expected from the judging standards, the greater body volume went with the lower

dressing per cent. All the fine wools dressed lower and measured higher than any of the medium wools. No. 9 leads the volume table and dressed the lowest of the eleven lambs. No. 2 comes fifth in one table and fifth in the other. No. 11 measured higher than any of the medium wools and dressed lower, while No. 3 showed the best body volume of the group and dressed the highest. There are two exceptions to the above rule, however, Nos. 6 and 7 measured less in body volume and dressed a less per cent. than the sheep next to them. Reference to slaughter records, however, shows an abnormal shrink of carcass in these two. They were the last sheep killed in the spring of 1914 and warm weather and rush of other work gave them almost a week more of drying at a bad temperature than the others in the experiment. If the difference in shrink were considered and the difference in weight of hide between No. 7 and No. 10 subtracted, the correlation would be consistent throughout.

One other factor was also considered, a factor which should normally effect depth, body volume and dressing per cent., namely per cent. of offal. Again

all the fine wools lead all the medium wools in this respect, with the exception of No. 11. No. 9 is again in first place with No. 2 the least wasty of that type, last. No. 11 again ranks first among the medium wools being paunchy enough to carry 2.21 per cent. more offal than No. 2. Blocky, trim No. 3 comes last as in the other comparisons. Nos. 7, 8 and 10 rank closely as in depth, volume and dressing per cent. No. 10 dressed 1.69 per cent. more than No. 8 and yet carried only .02 per cent. less offal. Reference to Tables 11 and 12 however, shows that his higher per cent. of carcass was due to lightness in blood and hide, thus making the thin sheep very close in all four characters and the correlation between those characters consistent. No. 2 had less volume, less depth and a higher dressing per cent. than the other fine wools and shows less offal, also. No. 11 ranked ahead of all the medium wools in all four respects, holding sixth place in the entire group for everything but per cent. of offal. Here paunchiness shows its effects and having a relatively lighter hide and head, No. 11 carried 2.20 per cent. more offal than No. 2.

Nos. 4, 6 and 1 were close in depth, volume and dressing per cent. and rank closely in offal. Low dressing No. 4, carrying the highest per cent. Trim, compact No. 3 is last in per cent. of offal as in the other thin characters, being as uniform in his rank as No. 9.

The results of this part of the experiment were more even than any of the others and they would seem to show conclusively that when based upon sheared weight, the judging standards are correct and that there is a steady relation between depth of middle, body volume per pound, sheared weight, dressing per-cent. and per cent. of offal, it being always remembered that condition is the chief, determining factor in any case.

## CONCLUSIONS

The object of this experiment, as stated before, was to definitely study the influence of the present accepted judging standard of lambs upon their slaughter and block yields. The recorded points of conformation have been previously compared with the actual producing value of each lamb and there follows a brief summary of all the relationships brought out by those comparisons.

SHOULDER. The cutting per cent. of the shoulder depended upon its actual dimensions, its flatness and covering, its smooth blending with the rest of the body, and its length of arm. The lambs with a good proportionate width, depth and length of shoulder, with fair covering and with a fairly flat top cut out average shoulders as per the score card. The judging standard credits a prominent or bucky shoulder with a high cutting percentage and this factor proved to be of decided importance as Nos. 10, 8 and 3, the lambs with the heaviest shoulders of the group, yielded the highest per cent. of that cut. No. 2 with the sharp, narrow top, and No. 7

with the broad, flat shoulder reversed the general cutting rule, No. 2 yielding a comparatively heavy shoulder and No. 7 the smallest of the eleven lambs. However, No. 2 had a very long arm and No. 7 a very short one. This feature lowering and raising the dividing line between shoulder and plate. Condition did not seem to have such an influence upon the yield of this cut as upon that of the other cuts.

It would thus appear, first, that the general ideal form of shoulder as laid down in the accepted standards is really correlated with yield; second, that those same standards are also right in relating a prominent shoulder to a high cutting per cent.; and third, that the score card does not consider the important point length of arm, a factor which governs the place at which the plate is removed and which thus influences the respective yields of those two cuts.

PLATE AND FLANK. Three things influenced the cutting per cent. of the plate and flank, namely: width, depth, and condition. Other things being equal, the paunchy lamb yielded the largest per cent. of plate

and flank as per the score card. Condition, however, proved to be the most important factor of all and thin lambs of the roomy Merino type cut uniformly less plate and flank than the fat, short ribbed medium wools. Paunchiness increased the yield of this cut among lambs of the same type and flesh, as with No. 11, but the thickly covered individuals were uniformly heavier in the plate and flank than the thin ones, even though the latter had a larger measurement in this part.

RACK. The comparative yield of the rack depended upon width, length, flatness and thickness. Thin, narrow backs cut a lower per cent. than thick, wide ones as outlined in the judging standard. Form also proved to be of decided importance, the lambs with sharper shoulders showing a smaller yield of rack. Moreover, a lack of flatness was associated with bareness in the case of No. 11, the two faults combining to reduce his yield decidedly.

The score card emphasizes uniformity or straightness of lines. No. 7 was thinner than the medium wools but, with the exception of No. 4, cut a higher per cent. of

fack than any of them. Her rack, however, was not only wide but it was also much wider in proportion to the rest of her body than that of the other lambs. Thus, her great proportionate width and flatness were sufficient to overcome her lack of thickness. It would thus appear that the actual width, both front and rear, the length and the flatness which are used to describe the ideal rack in the judging standards have the decided influence upon the yield of rack, it being always remembered that thickness and the proportionate relation of the above factors to the rest of the body is of first importance in any case.

LOIN. The same width, flatness and thickness which make up the ideal rack, as outlined in the judging standards are repeated in the description of the loin. Moreover, as was true in the records of the rack, those points proved to have a great influence in determining the cutting per cent. of loin. The broad, thick medium wools all cut a higher per cent. of loin than the fine wools, the broader and fatter ones of that type leading the narrower ones, with the fattest, flattest fine wool lead-

ing those of the poorer type. However, one other factor proved to be of such importance that it would seem to merit more emphasis than that given it in the score card. Wide shoulders, plates and racks cut a high percent. but, just as proportionately wider ones cut a still higher yield, so did the loins with the greater proportionate width, flatness and thickness cut a larger percent. than those of the more evenly balanced lamb. No. 4 was very wide in rack and narrow in the loin. Thus, his lack of symmetry caused him to cut the heaviest rack and the lightest loin. No. 11 was narrow and bare in rack but wide and thick in loin and his yields in those two cuts were just the reverse of No. 4. No. 6 was wide and thick throughout but proportionately wider, flatter and thicker in the loin and as a result she led the group in the yield of this cut.

Thus the score card seems to emphasize the size, flatness and thickness which go to make up a high yielding loin but the records here would go to show that more emphasis is needed upon one point, namely, uniformity or balance of parts.

LEG. The yields of the leg, as recorded here, both verify and disprove the popular judging standard. Width and flatness in rump, length of quarter and fullness in thigh and twist caused the leg in some instances to yield a higher per cent. as per the score card. Other factors, however, proved to be of such importance that the yield of leg corresponded but twice to the accepted standard. As explained before, and as shown in Table 23 in the appendix, a greater proportion of the meat of the thin lambs is located in the leg, while a greater proportion of the flesh of a fattening lamb is deposited upon the back, loin and plate. As a result, the thin lambs with peaked rumps, empty twists and narrow thighs all cut a higher per cent. of leg than the well made fat ones. Moreover, Nos. 2 and 9, the lambs which cut the largest per cent. carried the lightest thighs of the group and Nos. 5 and 6, who cut the least per cent. were almost as well filled behind as No. 3. Those differences show clearly the relationship before mentioned as Nos. 2 and 9 were the thinnest lambs of the group and Nos. 5

and 6 the fattest.

No. 3 who carried the best leg of the group, as judged by the accepted standard, was too fat to cut a higher per cent. than any of the fine wools. However, he had sufficient fullness to lead the other lambs of his own type, thus verifying, in part, the score card. Moreover, Nos. 11 and 4, the two lambs picked for peakedness behind cut a smaller per cent. of leg than Nos. 3 or 1, lambs carrying about an equal thickness. However, Nos. 6 and 5, not withstanding their full rumps and twists, were too fat and heavy in the middle cuts to yield as high a per cent. of this cut as the two with narrower legs, again illustrating the importance of condition.

Thus, it would seem that the description of the score card is accurate but that it has a very limited application. Between lambs of the same flesh the correlation holds but as high condition was one of the chief factors in determining the yield of rack, loin and plate, so has it an even more important influence upon the yield of the leg. Occasionally the full, plump legs cut a higher per cent. than the slack ones, but in general,

regardless of conformation, the fatter the lamb the lower the per cent. of leg.

NECK. Long, thick, bucky necks cut a higher per cent. than shorter, finer ones as per the judging standard. However, the general condition of the lambs proved to be the deciding factor, the weight of the bone of the thinner lambs tending to raise the per cent. of this cut when the carcass lacked covering.

FORELEG. As in the record of the neck and as described by the score card, the weight of the bone in the foreleg was sufficient to raise the yield of that cut in the thin lambs above that of the fat ones. In addition, No. 4, the one, leggy, medium wool cut a decidedly higher per cent. of foreleg than the other lambs of the same type, indicating, as far as one individual can indicate anything, that legginess goes with a higher yield of that cut.

KIDNEY FAT. The judging standard credits fat lambs with a higher per cent. of kidney than thin ones and fat, paunchy lambs with a higher per cent. than fat, trim ones. In the records taken, five of the fat lambs

had a higher yield of kidney than any of the thin, fine wools, blocky No. 3 alone carrying less. Thus, it would seem that high condition really does raise the per cent. of this cut, although the individuals were too few in number and too nearly alike in trimness of middle to warrant any conclusions as to the relation between a heavy kidney and paunchiness.

BONE. In the yield of bone the score card seemed to be verified quite closely, as the lambs with greater thickness all yielded proportionately less bone. Moreover, the records would indicate that the standard is still further right in correlating coarseness with a higher yield of frame. Sufficient figures are not available to establish this fact but a general relation between lack of quality and a high yield of bone was shown throughout, Nos. 4 and 10 yielding a higher per cent. than the thinner more refined lambs.

FLEECE. The influence of the weight of fleece upon dressing per cent. was shown quite conclusively in the records. It proved to be the chief factor which made No. 4 the highest dresser of the eleven lambs

and No. 7 the lowest. Moreover, in all cases the fleece proved to be of decided importance and these records would indicate that it should receive very careful consideration from a fat lamb judge.

HEAD AND HIDE. The lambs with heavy, bucky heads and the ones with heavy wrinkled hides all yielded a higher per cent. of pelt than those which showed more quality. Moreover, the difference between the yields of the respective pelts was large enough to give this factor an important influence upon the dressing per cent.

EDIBLE OFFAL. The yield of edible offal was determined almost entirely by condition. The livers, hearts and tongues of both types of lambs weighed about the same. The difference in the weight of the thin and thick carcasses, however, raising the per centage yield of the fine wools above that of the medium wools. Conversely, the yield of offal fat increased with the condition, its weight being large enough to raise the total yield of the edible offal of the fat lambs above that of the thin ones.

NON-EDIBLE OFFAL. Non-edible offal consists

of the pluck, the digestive organs and the digestive waste. As a result, its proportion to the total weight of carcass decreased with the increase of condition. The score card associates paunchiness with a high yield of this product and the records,here taken,verify this supposition thruughout. Nos. 9 and 8, the paunchiest fine wools and No. 11 the roomiest medium wool led their respective types in yield of offal. However, condition was the deciding factor and No. 11 the paunchiest of the entire group showed a smaller percentage of waste than the trimmest of the thinner fine wools.

BLOOD. There seemed to be no difference in the actual amount of blood yielded by the lambs of the different types. Condition proved to be the determining factor in the per cent. of yield, the lambs with the larger covering of fat having the smaller proportionate weight of blood.

BODY VOLUME. The judging standard associates width and depth of middle with a roomy body cavity and a resultant high per cent. of offal and low dressing per-cent. In the records taken here, the relationship be-

tween those four things check very closely. Condition had, of course, the most important influence and divided the eleven lambs into two groups of five and six respectively. Between lambs of the same type and condition however, the correlation held closely, No. 9 leading the fine wools and paunchy No. 11 the medium wools. Moreover, No. 3 the blockiest, trimmest lamb of the group had smaller measurements, a smaller body volume, a smaller yield of offal and the highest dressing per cent.

SUMMARY. In general the descriptions of the score card checked with the yield of the different parts of the lamb's body. Width, depth and length all seemed to exert an influence upon the percentages. However, three other factors stood out with a more important bearing upon the yield than the three just mentioned. First, flatness of top raised the yield of some of the cuts even when the measurements were smaller. Second, uniformity exerted a more powerful influence than even flatness as the proportionately heavy or light shoulders and the proportionately wide or narrow backs, loins and legs yielded more or less respectively than the average.

Lastly, and most important of all was condition. The fine wools and medium wools differed in form but they varied much more widely in covering and as a result the two types were divided almost throughout in their respective yields. Condition raised the yield of plate, rack loin and kidney fat and lowered that of neck, foreleg, hindleg and bone. Condition lowered the percent. of offal and raised the dressing per cent. Lastly, it made the difference between good meat and poor meat. Regardless of percentage yields, the medium wools were all more valuable from the consumer's standpoint, a fact due not so much, to actual quality of muscle fiber as to covering. Thus,

Thus, it would seem: first that the score card is largely correct; second that between lambs of the same type and condition the minute distinctions made between them in the judging ring are of little practical value; and lastly, that in estimating the value of a lamb on foot two things exert a greater influence than all the rest, namely, uniformity and condition and between those two condition is by far the most important.

# APPENDIX

The complete yield tables of the eleven lambs used in this study have been grouped together in the following pages. The slaughter records were figured out on both the sheared and non-sheared basis thus, giving a good illustration of the importance of fleece. The yields have been averaged separately for both the fine wools and the medium wools and the average of those two groups determined. Five, Six and eleven individuals are too few to make any general average yield more than approximate but they have been included here with the idea that they may, at least, indicate the general average figures.

The slaughter records, as given in Tables 14 to 17, have been summarized in Tables 18 to 20. Again, the few individuals used make representative averages impossible but those tables give a general indication of the relative yields of all the different parts.

Table 23 illustrates clearly the two facts mentioned with regard to the yield of the plate, flank and leg, namely, that a greater proportion of the meat of a thin lamb is found in the leg, and that a fattening lamb increases the proportionate weight of back, loin and plate more rapidly than that of the leg, this latter part being the last to cover.

Table 24 is a summary of the smaller yield tables found throughout the foregoing comparisons and, by reason of the starred numbers, shows clearly the fairly definite line of demarcation followed by the cutting percentages of these two respective types of lambs..

Table 25 is a rearranged summary of Table 22. It is of interest from the standpoint of the consumer-buyer in that it shows the relative amounts of waste bone which are found in the respective cuts of lambs.

Table 26 is again a summary of but eleven lambs and, although the number is few, it shows, in so far as this experiment can show, the relative proportionate weights of the respective cuts of lamb, as separated by the cutting system here used.

TABLE 14

SLAUGHTER RECORDS OF LAMBS - WEIGHTS

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Live wt. | 119.5 | 91.0 | 108.5 | 124.5 | 140.0 | 133.0 | 98.0 | 102.0 | 69.0 | 93.0 | 105.0 |
| Fleece | 11.5 | 9.5 | 7.5 | 6.0 | 12.5 | 11.0 | 13.5 | 9.0 | 5.0 | 6.0 | 7.0 |
| Blood | 5.0 | 5.8 | 4.5 | 5.5 | * | 5.0 | 4.5 | 5.0 | 3.0 | 4.0 | 4.0 |
| Head | 3.8 | 4.2 | 3.9 | 4.5 | * | 4.3 | 4.3 | 4.7 | 3.5 | 5.0 | 3.8 |
| Hide | 9.4 | 7.8 | 8.6 | 8.5 | * | 9.7 | 10.5 | 12.0 | 6.3 | 10.2 | 7.5 |
| Paunch | 13.0 | 13.0 | 11.7 | 16.5 | * | 14.2 | 14.4 | 16.3 | 12.0 | 15.0 | 16.0 |
| Intestines | 7.7 | 5.8 | 7.5 | 7.8 | * | 8.2 | 7.0 | 7.9 | 7.5 | 7.8 | 7.7 |
| Tongue | 0.3 | 0.3 | 0.4 | 0.5 | * | 0.4 | 0.4 | 0.5 | 0.3 | 0.4 | 0.4 |
| Liver | 1.7 | 1.4 | 1.2 | 1.5 | * | 2.0 | 1.8 | 1.4 | 1.1 | 1.4 | 1.4 |
| Pluck and fat | 2.2 | 2.1 | 1.8 | 2.7 | * | 2.5 | 1.8 | 2.0 | 1.6 | 2.0 | 2.0 |
| Paunch fat | 3.4 | 1.1 | 3.4 | 4.5 | * | 5.2 | 1.8 | 1.7 | 0.9 | 1.2 | 3.2 |
| Carcass cold | 59.5 | 38.9 | 56.3 | 64.8 | 70.3 | 66.9 | 35.9 | 39.8 | 26.0 | 38.7 | 51.0 |
| Shrink | 2.0 | 1.1 | 1.7 | 1.7 | 1.7 | 3.6 | 2.1 | 1.7 | 1.8 | 1.3 | 1.0 |

*Slaughter record of No. 5 missing.

TABLE 15

SLAUGHTER RECORDS OF LAMBS - PERCENTAGES, FLEECE ON

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fleece | 9.63 | 10.44 | 6.91 | 4.82 | 8.93 | 8.28 | 13.7 | 8.8 | 7.27 | 6.45 | 6.67 |
| Blood | 4.19 | 6.32 | 4.15 | 4.42 | * | 3.76 | 4.6 | 4.9 | 4.32 | 4.30 | 3.81 |
| Head | 3.23 | 4.67 | 3.55 | 3.62 | * | 3.23 | 4.39 | 4.6 | 5.67 | 5.37 | 3.62 |
| Hide | 7.85 | 8.66 | 7.91 | 6.84 | * | 7.29 | 10.72 | 11.77 | 9.13 | 10.96 | 7.14 |
| Paunch | 10.89 | 14.28 | 10.83 | 13.27 | * | 10.68 | 14.70 | 16.00 | 17.39 | 16.13 | 15.24 |
| Intestines | 6.50 | 6.32 | 6.91 | 6.26 | * | 6.17 | 7.15 | 7.74 | 10.87 | 8.38 | 7.33 |
| Tongue | 0.26 | 0.34 | 0.35 | 0.40 | * | 0.30 | 0.42 | 0.49 | 0.43 | 0.43 | 0.38 |
| Liver | 1.40 | 1.51 | 1.10 | 1.20 | * | 1.50 | 1.85 | 1.37 | 1.60 | 1.51 | 1.33 |
| Pluck and fat | 1.83 | 2.27 | 1.67 | 2.17 | * | 1.88 | 1.85 | 1.97 | 2.32 | 2.16 | 1.91 |
| Paunch fat | 2.83 | 1.23 | 3.17 | 3.61 | * | 3.91 | 1.84 | 1.67 | 1.31 | 1.30 | 3.05 |
| Carcass,cold | 49.79 | 42.79 | 51.89 | 52.02 | 50.20 | 50.30 | 36.63 | 39.02 | 37.68 | 41.61 | 48.57 |
| Shrink | 1.6 | 1.17 | 1.56 | 1.37 | 1.70 | 2.70 | 2.15 | 1.67 | 2.61 | 1.40 | 0.95 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

* Slaughter record of No. 5 missing.

TABLE 16

SLAUGHTER RECORDS OF LAMBS - PERCENTAGES, FLEECE OFF

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Blood | 4.63 | 7.12 | 4.46 | 4.60 | * | 4.10 | 5.33 | 5.38 | 4.69 | 4.60 | 4.08 |
| Head | 3.53 | 5.15 | 3.86 | 3.79 | * | 3.53 | 5.09 | 5.05 | 5.47 | 5.75 | 3.88 |
| Hide | 8.71 | 9.57 | 8.52 | 7.17 | * | 7.95 | 12.43 | 12.90 | 9.84 | 11.73 | 7.65 |
| Paunch | 12.04 | 15.95 | 11.58 | 13.92 | * | 11.64 | 17.04 | 17.53 | 18.75 | 17.24 | 16.32 |
| Intestines | 7.13 | 7.12 | 7.43 | 6.66 | * | 6.72 | 8.29 | 8.49 | 11.72 | 8.96 | 7.86 |
| Tongue | 0.28 | 0.36 | 0.39 | 0.42 | * | 0.33 | 0.47 | 0.54 | 0.47 | 0.46 | 0.41 |
| Liver | 1.58 | 1.72 | 1.19 | 1.27 | * | 1.64 | 2.13 | 1.51 | 1.72 | 1.61 | 1.43 |
| Pluck and fat | 2.04 | 2.58 | 1.78 | 2.28 | * | 2.05 | 2.13 | 2.15 | 2.50 | 2.30 | 2.04 |
| Paunch fat | 3.17 | 1.35 | 3.37 | 3.79 | * | 4.27 | 2.13 | 1.83 | 1.41 | 1.38 | 3.27 |
| Carcass, cold | 55.09 | 47.73 | 55.74 | 54.68 | 55.14 | 54.83 | 52.48 | 42.79 | 40.62 | 44.48 | 52.04 |
| Shrink | 1.80 | 1.35 | 1.68 | 1.42 | 1.33 | 2.95 | 2.48 | 1.83 | 2.81 | 1.49 | 1.02 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | * | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

*Slaughter record of No. 5 missing.

TABLE 17

AVERAGE SLAUGHTER RECORDS OF LAMBS - PERCENTAGES

| | FLEECE ON | | | FLEECE OFF | | |
|---|---|---|---|---|---|---|
| | Av. Fine Wools | Av. Medium Wools | Final Av. | Av. Fine Wools | Av. Medium Wools | Final Av. |
| Fleece | 9.33 | 7.26 | 8.30 | | | |
| Blood | 4.89 | 4.07 | 4.48 | 5.42 | 4.37 | 4.90 |
| Head | 4.82 | 3.45 | 4.14 | 5.30 | 3.72 | 4.51 |
| Hide | 10.25 | 7.41 | 8.83 | 11.29 | 8.00 | 9.65 |
| Paunch | 15.70 | 12.18 | 13.94 | 17.30 | 13.10 | 15.20 |
| Intestines | 8.09 | 6.63 | 7.37 | 8.92 | 7.16 | 8.01 |
| Tongue | 0.42 | 0.34 | 0.38 | 0.46 | 0.37 | 0.42 |
| Liver | 1.57 | 1.31 | 1.44 | 1.74 | 1.42 | 1.58 |
| Pluck and fat | 2.11 | 1.89 | 2.01 | 2.33 | 2.04 | 2.19 |
| Paunch fat | 1.47 | 3.31 | 2.39 | 1.62 | 3.57 | 2.60 |
| Carcass, cold | 39.55 | 50.51 | 45.00 | 43.63 | 54.48 | 49.05 |
| Shrink | 1.80 | 1.64 | 1.72 | 1.99 | 1.77 | 1.89 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

TABLE 18

SUMMARIZED SLAUGHTER RECORDS OF LAMBS - PERCENTAGES, FLEECE ON

OFFAL FATS

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 6* | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Pluck fat | 0.37 | 0.28 | 0.25 | 0.40 | 0.38 | 0.31 | 0.40 | 0.43 | 0.54 | 0.48 |
| Intestine fat | 0.99 | 1.23 | 1.38 | 1.52 | 1.35 | 1.12 | 1.47 | 0.87 | 1.08 | 0.95 |
| Paunch fat | 2.83 | 1.23 | 3.17 | 3.61 | 3.91 | 1.84 | 1.67 | 1.31 | 1.30 | 3.05 |
| Total offal fat | 4.19 | 2.74 | 4.80 | 5.53 | 5.64 | 3.27 | 3.54 | 2.61 | 2.92 | 4.48 |

EDIBLE OFFAL

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 6* | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Tongue | 0.26 | 0.34 | 0.35 | 0.40 | 0.30 | 0.42 | 0.49 | 0.43 | 0.43 | 0.38 |
| Liver | 1.40 | 1.51 | 1.10 | 1.20 | 1.50 | 1.85 | 1.37 | 1.60 | 1.51 | 1.33 |
| Heart | 0.42 | 0.44 | 0.37 | 0.40 | 0.38 | 0.41 | 0.39 | 0.43 | 0.43 | 0.38 |
| Total fat | 4.19 | 2.74 | 4.80 | 5.53 | 5.64 | 3.27 | 3.54 | 2.61 | 2.92 | 4.48 |
| Total edible offal | 6.27 | 5.03 | 6.62 | 7.53 | 7.82 | 5.95 | 7.79 | 5.07 | 5.29 | 6.57 |

TABLE 18

SUMMARIZED SLAUGHTER RECORDS OF LAMBS - PERCENTAGES, FLEECE ON -- Continued

PAUNCH AND INTESTINES - FAT OUT

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 6* | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Paunch and Contents | 10.89 | 14.28 | 10.83 | 13.37 | 10.68 | 14.70 | 16.00 | 17.39 | 16.13 | 15.24 |
| Paunch, Empty | 2.30 | 2.75 | 2.50 | 2.41 | 2.63 | 2.76 | 2.94 | 3.19 | 2.79 | 2.57 |
| Contents of Paunch | 8.59 | 11.53 | 8.33 | 10.86 | 8.05 | 11.94 | 13.06 | 14.20 | 13.34 | 12.67 |
| Intestines and Contents | 5.51 | 5.09 | 5.53 | 4.74 | 4.82 | 6.03 | 6.27 | 10.00 | 7.30 | 6.38 |
| Intestines | 2.93 | 3.02 | 2.81 | 2.17 | 3.10 | 2.75 | 2.55 | 2.90 | 2.68 | 3.05 |
| Contents of Intestines | 2.58 | 2.07 | 2.72 | 2.57 | 1.72 | 3.28 | 3.72 | 7.10 | 4.62 | 3.33 |
| Paunch, Intestines and contents | 16.40 | 19.37 | 16.36 | 18.01 | 15.50 | 20.73 | 22.27 | 27.39 | 23.43 | 21.62 |
| Paunch and Intestines, Empty | 5.23 | 5.77 | 5.31 | 4.58 | 5.73 | 5.51 | 4.49 | 6.09 | 5.47 | 5.62 |
| Total Digestive Waste | 11.17 | 13.60 | 11.05 | 13.43 | 9.77 | 15.22 | 16.78 | 21.30 | 17.96 | 16.00 |

NON-EDIBLE OFFAL - PELT OUT

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 6* | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Pluck - Heart and Fat Out | 1.04 | 1.55 | 1.05 | 1.37 | 1.12 | 1.13 | 1.18 | 1.46 | 1.19 | 1.05 |
| Paunch, Intestines and Contents | 16.40 | 19.37 | 16.36 | 18.01 | 15.50 | 20.73 | 22.27 | 27.39 | 23.43 | 21.62 |
| Blood | 4.19 | 6.32 | 4.15 | 4.42 | 3.76 | 4.60 | 4.90 | 4.32 | 4.30 | 3.81 |
| Total | 21.63 | 27.24 | 21.56 | 23.80 | 20.38 | 26.46 | 28.35 | 33.17 | 28.92 | 26.48 |

TABLE 18

SUMMARIZED SLAUGHTER RECORDS OF LAMBS - PERCENTAGES, FLEECE ON -- Continued

PELT

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 6* | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Head | 3.83 | 4.67 | 3.55 | 3.62 | 3.23 | 4.39 | 4.60 | 5.07 | 5.37 | 3.62 |
| Hide | 7.85 | 8.66 | 7.91 | 6.84 | 7.29 | 10.72 | 11.77 | 9.13 | 10.96 | 7.14 |
| Fleece | 9.63 | 10.44 | 6.91 | 4.82 | 8.28 | 13.70 | 8.80 | 7.27 | 6.45 | 6.67 |
| Total | 20.71 | 23.77 | 18.37 | 15.28 | 18.80 | 28.81 | 25.17 | 21.47 | 22.78 | 17.43 |

*Slaughter record of No. 5 missing.

TABLE 19

SUMMARIZED SLAUGHTER RECORDS OF LAMBS - PERCENTAGES, FLEECE OFF

OFFAL FATS

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 6* | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Pluck fat | 0.41 | 0.31 | 0.25 | 0.49 | 0.41 | 0.36 | 0.43 | 0.47 | 0.57 | 0.51 |
| Intestine fat | 1.10 | 1.37 | 1.37 | 1.78 | 1.47 | 1.30 | 1.60 | 0.94 | 1.15 | 1.02 |
| Paunch fat | 3.17 | 1.35 | 3.37 | 3.79 | 4.26 | 2.13 | 1.83 | 1.41 | 1.38 | 3.27 |
| Total offal fat | 4.68 | 3.03 | 4.99 | 6.06 | 6.14 | 3.79 | 3.86 | 2.82 | 3.10 | 4.80 |

TABLE 19

SUMMARIZED SLAUGHTER RECORDS OF LAMBS - PERCENTAGES, FLEECE OFF -- Continued

EDIBLE OFFAL

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 6* | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Tongue | 0.38 | 0.36 | 0.39 | 0.42 | 0.33 | 0.47 | 0.54 | 0.47 | 0.46 | 0.41 |
| Liver | 1.58 | 1.72 | 1.19 | 1.27 | 1.64 | 2.13 | 1.51 | 1.72 | 1.61 | 1.43 |
| Heart | 0.46 | 0.49 | 0.39 | 0.42 | 0.41 | 0.47 | 0.43 | 0.47 | 0.46 | 0.41 |
| Total fat | 4.68 | 3.03 | 4.99 | 6.06 | 6.14 | 3.79 | 3.86 | 2.82 | 3.10 | 4.80 |
| Total edible offal | 7.00 | 5.60 | 6.96 | 8.17 | 8.52 | 6.86 | 6.34 | 5.48 | 5.63 | 7.05 |

PAUNCH AND INTESTINES - FAT OUT

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 6* | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Paunch and Contents - - - | 12.04 | 15.95 | 11.58 | 13.92 | 11.64 | 17.04 | 17.53 | 18.75 | 17.24 | 16.32 |
| Paunch, empty- | 2.55 | 3.06 | 2.47 | 2.53 | 2.87 | 3.21 | 3.22 | 3.44 | 3.00 | 2.75 |
| Contents of Paunch - - - | 9.49 | 12.89 | 9.11 | 11.39 | 8.77 | 13.83 | 14.31 | 15.31 | 14.24 | 13.57 |
| Intestines and Contents - - - | 6.03 | 5.75 | 6.06 | 4.88 | 5.25 | 6.99 | 6.89 | 10.78 | 7.81 | 6.84 |
| Intestines, empty - - - - | 3.24 | 3.37 | 2.78 | 1.60 | 2.54 | 3.21 | 2.81 | 4.53 | 2.87 | 3.26 |
| Contents of Intestines - - - | 2.79 | 2.38 | 3.28 | 3.28 | 2.71 | 3.78 | 4.08 | 6.25 | 4.94 | 3.58 |
| Paunch, Intestines and Contents - | 18.07 | 21.70 | 17.64 | 18.80 | 16.89 | 24.03 | 24.42 | 29.53 | 25.05 | 23.16 |
| Paunch and Intestines, empty - | 5.79 | 6.43 | 5.25 | 4.13 | 5.25 | 6.42 | 6.03 | 7.97 | 5.87 | 6.01 |
| Total Digestive Waste - - - - | 12.28 | 15.27 | 12.39 | 14.67 | 11.64 | 17.61 | 18.39 | 21.56 | 19.18 | 17.15 |

TABLE 19

SUMMARIZED SLAUGHTER RECORDS OF LAMBS - PERCENTAGES, FLEECE OFF -- Continued

NON-EDIBLE OFFAL - PELT OUT

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 6* | No. 7 | No. 8 | No. 9 | No. 10 | No.11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Pluck - Heart and Fat out- - | 1.17 | 1.78 | 1.14 | 1.37 | 1.23 | 1.30 | 1.29 | 1.56 | 1.27 | 1.12 |
| Paunch, Intestines and Cont.- | 18.07 | 21.70 | 17.64 | 18.80 | 16.89 | 24.03 | 24.42 | 29.53 | 25.05 | 23.16 |
| Blood - - - - - -- | 4.63 | 7.12 | 4.46 | 4.60 | 4.10 | 5.33 | 5.38 | 4.69 | 4.60 | 4.08 |
| Total - - - - - - | 23.87 | 30.60 | 23.24 | 24.77 | 22.22 | 30.66 | 31.09 | 35.78 | 30.92 | 28.36 |

PELT

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 6* | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| Head | 3.53 | 5.15 | 3.86 | 3.79 | 3.53 | 5.09 | 5.05 | 5.47 | 5.75 | 3.88 |
| Hide | 8.71 | 9.57 | 8.52 | 7.17 | 7.95 | 12.43 | 12.90 | 9.84 | 11.73 | 7.65 |
| Total | 12.24 | 14.72 | 12.38 | 10.96 | 11.48 | 17.52 | 17.95 | 15.31 | 17.48 | 11.53 |

*Slaughter record of No. 5 missing.

TABLE 20

SUMMARY OF AVERAGE SLAUGHTER RECORDS OF LAMBS - PERCENTAGES

| | FLEECE ON | | | FLEECE OFF | | |
|---|---|---|---|---|---|---|
| | Av. Fine Wools | Av. Medium Wools | Final Av. | Av. Fine Wools | Av. Medium Wools | Final Av. |
| Total Offal fat | 3.02 | 4.93 | 3.97 | 3.32 | 5.33 | 4.33 |
| Total Edible Offal - - - - - - | 5.43 | 6.96 | 6.20 | 5.98 | 7.54 | 6.76 |
| Total Non-Edible Offal - - - - - - | 29.03 | 22.77 | 25.90 | 31.81 | 24.45 | 28.13 |
| Total Offal - - | 34.46 | 29.73 | 32.10 | 37.79 | 31.99 | 34.89 |
| Total Pelt - - | 24.20 | 18.12 | 21.16 | 16.60 | 11.72 | 14.16 |

TABLE 21

THE WEIGHTS OF MEAT AND BONE IN THE CARCASSES AND CARCASS CUTS

| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COLD WEIGHT | | 59.5 | 38.9 | 56.3 | 64.8 | 70.3 | 66.9 | 35.9 | 39.8 | 26.0 | 38.7 | 51.0 |
| NECK | Meat | 1.3 | 1.3 | 1.1 | 1.0 | 1.8 | 1.2 | 0.9 | 1.4 | 0.9 | 1.3 | 1.1 |
| | Bone | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 |
| SHOULDER | Meat | 10.0 | 6.8 | 10.2 | 11.5 | 12.5 | 12.1 | 5.7 | 7.2 | 4.3 | 7.2 | 9.2 |
| | Bone | 1.5 | 1.1 | 1.3 | 1.5 | 1.6 | 1.4 | 0.8 | 1.3 | 0.9 | 1.2 | 1.2 |
| PLATE | Meat | 5.8 | 2.7 | 5.2 | 5.8 | 6.3 | 5.6 | 2.7 | 2.8 | 1.7 | 2.7 | 4.8 |
| | Bone | 0.6 | 0.4 | 0.5 | 0.7 | 0.5 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.5 |
| FORELEG | Meat | 1.3 | 0.9 | 1.3 | 1.7 | 1.4 | 1.4 | 0.9 | 1.1 | 0.6 | 0.9 | 1.0 |
| | Bone | 0.7 | 0.8 | 0.7 | 1.2 | 0.8 | 0.8 | 0.6 | 0.9 | 0.6 | 0.8 | 0.7 |
| RACK | Meat | 7.0 | 4.1 | 6.6 | 8.4 | 9.2 | 8.5 | 4.5 | 4.2 | 2.8 | 4.3 | 5.8 |
| | Bone | 0.9 | 0.9 | 0.9 | 1.2 | 1.1 | 1.0 | 0.8 | 1.0 | 0.6 | 0.8 | 0.8 |
| LOIN | Meat | 6.9 | 3.2 | 6.4 | 6.6 | 8.0 | 8.6 | 3.5 | 3.7 | 2.4 | 3.6 | 6.1 |
| | Bone | 0.5 | 0.5 | 0.6 | 0.7 | 0.6 | 0.6 | 0.4 | 0.5 | 0.3 | 0.5 | 0.5 |
| FLANK | Meat | 1.9 | 1.0 | 2.0 | 2.4 | 2.8 | 2.5 | 1.0 | 1.1 | 0.7 | 0.9 | 2.0 |
| KIDNEY | Meat | 3.2 | 1.5 | 2.1 | 3.6 | 4.0 | 4.0 | 1.4 | 1.3 | 0.8 | 1.4 | 2.1 |
| LEG | Meat | 15.2 | 10.7 | 14.5 | 14.9 | 16.4 | 15.8 | 9.9 | 9.8 | 6.7 | 9.6 | 12.4 |
| | Bone | 2.4 | 2.7 | 2.7 | 3.3 | 3.0 | 2.7 | 2.1 | 2.7 | 2.1 | 2.7 | 2.6 |
| TOTAL | Meat | 52.6 | 32.2 | 49.4 | 55.9 | 63.4 | 59.7 | 30.5 | 32.6 | 20.9 | 31.9 | 44.5 |
| | Bone | 6.9 | 6.7 | 6.9 | 8.9 | 7.9 | 7.2 | 5.4 | 7.2 | 5.1 | 6.8 | 6.5 |

TABLE 22

THE PERCENTAGES OF MEAT AND BONE IN THE CARCASSES AND CARCASS CUTS

| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NECK | Meat | 81.25 | 81.25 | 84.61 | 77.00 | 85.71 | 85.71 | 76.66 | 82.36 | 81.82 | 81.25 | 84.61 |
| | Bone | 18.75 | 18.75 | 15.39 | 23.00 | 14.29 | 14.29 | 23.34 | 17.64 | 18.18 | 18.75 | 15.39 |
| SHOULDER | Meat | 87.00 | 86.08 | 88.69 | 88.46 | 88.65 | 89.63 | 87.69 | 84.71 | 82.69 | 84.52 | 89.42 |
| | Bone | 13.00 | 13.92 | 11.31 | 11.54 | 11.35 | 10.37 | 12.31 | 15.29 | 17.31 | 15.48 | 10.58 |
| PLATE | Meat | 89.66 | 85.19 | 91.23 | 89.23 | 92.65 | 91.80 | 87.10 | 84.84 | 81.00 | 87.37 | 90.57 |
| | Bone | 10.34 | 14.81 | 8.77 | 10.77 | 7.35 | 8.20 | 12.90 | 15.16 | 19.00 | 15.63 | 19.43 |
| FORELEG | Meat | 65.00 | 53.00 | 65.00 | 58.62 | 63.63 | 63.63 | 60.00 | 55.00 | 50.00 | 53.00 | 58.83 |
| | Bone | 35.00 | 47.00 | 35.00 | 41.38 | 36.37 | 36.37 | 40.00 | 45.00 | 50.00 | 47.00 | 41.17 |
| RACK | Meat | 88.61 | 82.00 | 88.00 | 87.50 | 89.32 | 89.47 | 84.91 | 80.77 | 85.29 | 84.31 | 87.87 |
| | Bone | 11.39 | 18.00 | 12.00 | 12.50 | 10.68 | 10.53 | 15.09 | 19.23 | 14.71 | 15.69 | 12.13 |
| LOIN | Meat | 93.24 | 86.49 | 91.43 | 90.41 | 93.02 | 93.47 | 89.74 | 88.09 | 88.88 | 87.80 | 92.44 |
| | Bone | 6.76 | 13.51 | 8.57 | 9.59 | 6.98 | 6.53 | 10.26 | 11.91 | 11.12 | 12.20 | 7.56 |
| FLANK | Meat | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| KIDNEY | Meat | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| LEG | Meat | 86.36 | 80.00 | 82.52 | 81.87 | 84.54 | 85.45 | 82.50 | 78.40 | 76.13 | 78.05 | 82.67 |
| | Bone | 13.64 | 20.00 | 17.48 | 18.13 | 15.46 | 14.55 | 17.50 | 21.60 | 23.87 | 21.95 | 17.33 |
| TOTAL | Meat | 88.44 | 81.72 | 87.74 | 86.26 | 88.76 | 89.24 | 84.96 | 81.91 | 80.38 | 81.24 | 87.25 |
| | Bone | 11.56 | 18.28 | 12.26 | 13.74 | 11.24 | 10.76 | 15.04 | 18.09 | 19.62 | 18.76 | 12.75 |

TABLE 23

PERCENTAGES OF THE TOTAL BONED MEAT IN EACH CARCASS FOUND IN THE WHOLESALE CUTS OF LAMB

| | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7. | No. 8 | No. 9 | No. 10 | No. 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Neck | 2.47 | 4.04 | 2.23 | 1.79 | 2.72 | 2.01 | 2.95 | 4.29 | 4.31 | 4.07 | 2.47 |
| Shoulder | 19.01 | 21.13 | 20.64 | 20.57 | 20.06 | 20.28 | 18.69 | 22.08 | 20.58 | 22.57 | 20.66 |
| Plate and flank | 14.64 | 11.50 | 14.57 | 14.67 | 14.60 | 13.53 | 12.13 | 11.97 | 11.48 | 11.28 | 15.28 |
| Foreleg | 2.47 | 2.79 | 2.63 | 3.04 | 2.25 | 2.34 | 2.95 | 3.35 | 2.87 | 2.82 | 2.25 |
| Rack | 13.30 | 12.74 | 13.41 | 15.03 | 14.77 | 14.25 | 14.75 | 12.88 | 13.39 | 13.49 | 13.03 |
| Loin | 13.12 | 9.91 | 12.94 | 11.81 | 12.84 | 14.42 | 11.48 | 11.36 | 11.48 | 11.28 | 13.70 |
| Kidney fat | 6.08 | 4.66 | 4.24 | 6.44 | 6.46 | 6.70 | 4.59 | 3.99 | 3.83 | 4.40 | 4.72 |
| Leg | 28.88 | 33.23 | 29.34 | 26.65 | 26.30 | 26.47 | 32.46 | 30.08 | 32.06 | 30.09 | 27.89 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

TABLE 24

YIELDS OF THE WHOLESALE CUTS OF LAMBS

PERCENTAGES OF EACH CUT ARRANGED ACCORDING TO THEIR SIZE

| | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Neck | (8)* 4.27 | (9)* 4.23 | (10)* 4.13 | (2)* 4.01 | (7)* 3.34 | (5) 2.99 | (1) 2.62 | (11) 2.57 | (3) 2.32 | (6) 2.09 | (4) 2.01 |
| Plate and flank | (11) 14.31 | (1) 13.86 | (4) 13.73 | (5) 13.66 | (3) 13.63 | (6) 12.86 | (7)* 11.43 | (8)* 11.05 | (9)* 10.78 | (10)* 10.62 | (2)* 10.61 |
| Shoulder | (10)* 21.70 | (8)* 21.36 | (3) 20.43 | (11) 20.39 | (2)* 20.22 | (6) 20.18 | (4) 20.06 | (5) 20.06 | (9)* 20.00 | (1) 19.37 | (7)* 18.10 |
| Foreleg | (8)* 5.02 | (9)* 4.61 | (2)* 4.49 | (4) 4.47 | (10)* 4.40 | (7)* 4.18 | (3) 3.56 | (1) 3.36 | (11) 3.33 | (6) 3.29 | (5) 3.13 |
| Rack | (4) 14.81 | (7)* 14.76 | (5) 14.65 | (6) 14.20 | (1) 13.34 | (3) 13.33 | (10)* 13.17 | (9)* 13.08 | (8)* 13.07 | (11) 12.94 | (2)* 12.84 |
| Loin | (6) 13.75 | (11) 12.94 | (1) 12.51 | (3) 12.44 | (5) 12.23 | (4) 11.25 | (7)* 10.86 | (10)* 10.59 | (8)* 10.55 | (9)* 10.38 | (2)* 9.63 |
| Kidney Fat | (6) 5.98 | (5) 5.69 | (4) 5.55 | (1) 5.44 | (11) 4.12 | (7)* 3.90 | (2)* 3.85 | (3) 3.73 | (10)* 3.63 | (8)* 3.40 | (9)* 3.00 |
| Leg | (2)* 34.35 | (9)* 33.92 | (7)* 33.43 | (10)* 31.76 | (8)* 31.28 | (3) 30.56 | (1) 29.50 | (11) 29.40 | (4) 28.12 | (6) 27.65 | (5) 27.59 |

*Fine Wools.

TABLE 25

AVERAGE YIELDS OF BONE IN THE WHOLESALE CUTS OF LAMB

PERCENTAGES OF EACH CUT ARRANGED ACCORDING TO THEIR SIZE

| Rank | | Av. Fine Wools | | Av. Medium Wools | | Final Average |
|---|---|---|---|---|---|---|
| 1st | Foreleg | 46.00 | Foreleg | 37.55 | Foreleg | 41.30 |
| 2nd | Leg | 20.39 | Neck | 16.85 | Neck | 17.98 |
| 3rd | Neck | 19.33 | Leg | 15.97 | Leg | 17.98 |
| 4th | Rack | 16.54 | Rack | 11.54 | Rack | 13.81 |
| 5th | Plate and flank | 15.50 | Shoulder | 11.36 | Shoulder | 12.95 |
| 6th | Shoulder | 14.86 | Plate and flank | 9.14 | Plate and flank | 12.03 |
| 7th | Loin | 11.80 | Loin | 7.66 | Loin | 9.55 |
| | Total bone | 17.96 | Total bone | 11.89 | Total bone | 14.65 |

TABLE 26

AVERAGE PERCENTAGE YIELDS OF THE WHOLESALE CUTS OF LAMB

| Cut | Av. Fine Wools | Av. Medium Wools | Final Average |
|---|---|---|---|
| Neck | 4.00 | 2.43 | 3.07 |
| Plate and Flank | 10.90 | 13.67 | 12.42 |
| Shoulder | 20.28 | 20.08 | 20.19 |
| Foreleg | 4.54 | 3.52 | 3.99 |
| Rack | 13.38 | 13.89 | 13.66 |
| Loin | 10.40 | 12.52 | 11.57 |
| Kidney Fat | 3.56 | 5.08 | 4.40 |
| Leg | 32.94 | 28.81 | 30.70 |
| Total | 100.00 | 100.00 | 100.005 |