

18 to whole sorghum grain, 45% sorghum grain-55% alfalfa hay pellets, and alfalfa hay. Results with the wheat hay emphasize that low-quality feeds should be avoided in creep feeding lambs.

Average weaning age of early weaned lambs in Lot 6 was 68 days, and average weaning weight was 51.7 pounds for single lambs and 41.9 pounds each for twins. These lambs gained slightly slower and consumed more feed (may not be actual, since lambs in non-weaned lots ate some feed with the ewes) than lambs nursing ewes and fed the same creep ration in Lot 1. It cost \$1.87 more per cwt. gain for early weaned lambs; however, considering the reduced ewe feed cost to April 20 for Lot 6 the total feed cost per cwt. gain was \$0.50 less for early weaned lambs.

**Table 44**  
Lamb death losses and treatments by cause in indicated lots.

Lot no.	Urinary calculi	Enterotoxemia	Lameness and stiffness	Scours	Other causes	Death loss
1	3	2	1	9	..	4 <sup>1</sup>
2	1	..	..	5	..	..
3	2	6	1	4	1	6 <sup>2</sup>
4	..	..	..	..	3	..
5	1	..	..	1	3	..
6	..	3	1	14 <sup>3</sup>	3	..

1. Two died of enterotoxemia, one of respiratory infection, and one foundered.

2. Three died of enterotoxemia, two from urinary calculi, and one was killed when shed collapsed.

3. Scours were not serious.

Feed prices used to calculate cost of ewe and lamb feeds were: rye pasture, 1½ cents per ewe per day; whole sorghum grain, \$1.65 per cwt.; whole barley, \$1.75 per cwt.; alfalfa hay, \$27 per ton; sorghum silage, \$8 per ton; 45% sorghum grain-55% sun-cured alfalfa hay pellets, \$42.75 per ton (includes \$8 per ton for processing and \$2.60 per ton for sacks).

#### Lamb Feeding Tests (Winter, 1962-63)

**Procedure:** Ewes and lambs were managed the same during the week adjustment period as in 1961-62 feeding tests.

Following are the 1962-63 treatments:

Lot no.	Nursing ewe daily ration	Lamb ration creep
1	<b>Standard ration</b> 1 pound whole sorghum grain 1½ pounds alfalfa hay Sorghum silage (full feed)	<b>Standard ration</b> Whole sorghum grain Alfalfa hay
2	Standard ration	Dry rolled sorghum grain Alfalfa hay
3	Standard ration	Dry rolled sorghum grain containing 10% soybean oil meal Alfalfa hay
4	Standard ration	Dry rolled sorghum grain containing 5% salt Alfalfa hay
5	Rye pasture—standard ration when needed	Standard ration Rye pasture

6	Standard ration Maintenance ration after lambs were weaned	Standard ration Wean lambs 8 to 10 weeks of age
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One half the single male lambs in each lot were castrated and one half left as ram lambs.

Results of the above test in progress will be reported in the 1963 annual report.

#### Value of 3-mg. Stilbestrol Implants<sup>1</sup> for Young Lambs. Carl Menzies, Myron Hillman and Doxey Leubart

Considerable work has been conducted at this station and at the Garden City Branch Station to determine the value of various hormone treatments for feeder lambs. In a previous test (Circular 378) young lambs implanted with 3 mgs. Stilbestrol or Synovex gained less and shrank more enroute to market than controls. This test was conducted to obtain more information on Stilbestrol implants for young lambs.

#### Experimental Procedure

Forty-two crossbred lambs sired by Suffolk rams and out of commercial fine-wool ewes were used. Twenty-one were implanted with 3 mgs. Stilbestrol each.

Lambs averaged 24 days of age when started on test, February 17. They nursed their mothers until May 1, when all were weaned. A pelleted ration of 45% sorghum grain, 2.5% soybean oil meal, 7.5% molasses, 45% dehydrated alfalfa meal, and 10 mgs. aureomyein per pound was self-fed in a creep before lambs were weaned and in a self-feeder after that. Loose alfalfa hay was fed free choice in addition to the pellets.

#### Results and Discussion

Results are presented in Table 45. There was no significant difference in rate of gain. Since all lambs were fed together, feed efficiencies for different treatments could not be determined.

1. Supplied by Chas. Pfizer & Co., Inc., Terre Haute, Ind.

**Table 45**  
3-mg. stilbestrol implants for young lambs.  
February 17 to May 30, 1962—102 days.

Treatment	Control	3-mg. stilbestrol implants
No. lambs per lot <sup>1</sup>	21	21
Av. age at start of test, days	24	24
Initial wt. per lamb, lbs.	19.8	21.3
Final wt. per lamb, lbs.	76.8	79.9
Total gain per lamb, lbs.	57.0	58.6
Av. daily gain per lamb, lbs.	.559	.574

1. Control group consisted of 10 ewe and 11 wether lambs and the implanted group had 7 ewe and 14 wether lambs.

### Heritabilities, Genetic, and Phenotypic Correlations Between Carcass and Live Animal Traits in Sheep (Project 347).

Carl Menzies, Myron Hillman, John D. Wheat, D. L. Mackintosh and D. H. Kropf

This is part of the North-Central-50 Regional Sheep Breeding Project. This station's project was initiated to determine relationships between various carcass measurements and live animal traits, to estimate heritability of those traits and to determine how findings may be applied to selecting and breeding meat-type lambs.

#### Experimental Procedure

Seventy-six lambs of known breeding born in the fall of 1961 were used. They were sired by eight unrelated Suffolk rams and were out of an original flock of 100 western ewes. Live animal estimates and measurements were obtained on the rams and lambs and several carcass estimates and measurements were obtained on the lambs. Data are being processed on these lambs. The fourth lamb crop from these ewes is being slaughtered now. Data similar to those on previous lamb crops will be reported.

Also during 1962, 12 Hampshire ram, 3-month-old lambs were obtained from eight breeders. The rams were sheared, adjusted to feed and individually fed. Average daily gain and feed conversion were calculated. These rams will be bred to the original flock of 100 western ewes in the summer of 1963. As in previous years, performance and carcass data will be obtained on lambs produced.

Data on the 176 crossbred lambs produced during the two previous years by mating 19 Hampshire rams to the original flock of 100 western ewes have been analyzed. Rams were scored and corrections calculated between ram scores and lamb production and carcass traits. Lambs were sheared, measured and slaughtered when they weighed 95 to 100 pounds.

Simple correlations and heritability estimates (paternal half-sib correlations) were computed on all lamb and carcass traits studied.

#### Results and Discussion

Performance data on Hampshire rams to be used to breed the ewe flock in 1963 are reported in Table 46.

The relationship between ram scores indicated that in selecting for general type, most emphasis was placed on muscling, size of bone, size of leg, and weight of ram. Size of rear leg was most closely correlated with estimated muscling, and shorter legged rams were believed to be heavier boned. Weight of ram was significantly related with depth of probe of the longissimus dorsi muscle of the live ram.

Only a few traits were significantly related with lamb carcass and production traits. Shorter legged rams sired lambs with greater loin eye,  $r = .45$ ; depth of loin eye,  $r = .50$ ; and larger loin eye areas,  $r = .35$ . Depth of the longissimus dorsi probe in the ram was negatively related to market age of his lambs,  $r = .60$ ; and lamb carcass grade,  $r = .59$ .

The relationship between lamb production traits and their carcass characteristics indicated that lambs heavier at birth gained faster and reached market weight at an earlier age. The carcasses from younger lambs contained less feathering and marbling and consequently graded lower. Rate of gain was positively related to carcass traits indicating leanness and bone, and negatively related to carcass traits indicating fatness, denoting that up to 100 pounds, gain is primarily due to growth rather than to fat production.

Few correlations between lamb measurements and carcass characteristics, even those that were statistically significant, were large enough to be used effectively in a selection program. However, length of rump was significantly correlated with weight of leg, .51, and weight of leg was significantly correlated with loin eye area, .39, and grams of lean in the rack, .39. Width at the second lumbar vertebra was more closely correlated to carcass characteristics, indicating fatness.

Live lamb measurements did not accurately indicate the same meas-

urements on the carcass. The most useful lamb or carcass measurements that could be used as indicators of lean, fat, or bone in the carcass were width of loin in the lamb and carcass as an indicator of fat; circumference of forecannon in the lamb and carcass as an indicator of the amount of bone. Length of rump in the lamb and width of hind leg in the carcass were the best indicators of lean.

Feathering and marbling were significantly related to fat factors and carcass grade, which were positively related to market age. Carcass grade was positively related with fat factors in the carcass and either nonsignificantly or negatively correlated with factors indicating leanness in the carcass. Weights of leg and shoulder were positively related to increased leanness in the carcass and weights of the loin, rack, and breast were positively related to increased fatness in the carcass.

Sire effects were highly significant for birth weight, average daily gain, length of rump and forecannon, feathering and marbling score, and weight of loin. Generally, production traits were more highly heritable than lamb measurements of carcass characteristics, except length of forecannon, .51, and length of rump, .50 for the lamb; and feathering, .57, and marbling, .39 in the carcass.

Table 46  
Performance data on Hampshire ram lambs to be used to breed ewe flock in 1963.

Ram no. (single unless noted)	Birth date	Birth weight, lbs.	Average daily gain, lbs.	Days on feed	Feed conversion, lbs.
1, Twin	1-24-62	7	.55	134	7.19
2, Twin	1- 9-62	10	.64	92	6.31
3.	1-31-62	12.5	.74	104	5.83
4.	1-11-62	11	.70	118	5.69
5.	3-14-62	10	.56	129	7.03
6.	1-13-62	14	.69	118	5.81
7.	1- 1-62	13	.73	82	6.30
8.	1- 4-62	9	.54	134	6.06
9.	1- 7-62	10.5	.63	134	6.14
10.	1- 9-62	13	.47	134	7.20
11, Twin	1-31-62	12	.71	100	6.09
12, Twin	1-10-62	12	.91	58	4.86

1. Lambs were fed from approximately 50 days of age until they weighed 100 pounds. Four lambs not reaching this weight were fed for 131 days.

## Meat

The Relation of Feathering and Overflow Fat of Lamb Carcasses to the Grade of the Lamb, Degree of Marbling, and Market Value of the Lamb (Project 580).

D. L. Mackintosh, R. A. Merkel, C. S. Menzies,  
D. H. Kropf and J. C. Forrest

A total of 279 crossbred lambs were slaughtered over a three-year period at an approximate live weight of 90 pounds. USDA carcass grade and the various quality factors influencing grade were scored by a representative of the Federal Grading Service. The rack was dissected into fat, lean, bone, overflow and intercostal muscle. The longissimus dorsi and intercostal muscles were removed for fat analyses by the Modi-