14. Number of lambs lost	0	1	1
15. Total cost	$20.53	$23.00	$22.22
16. Final cost per cwt.	$18.24	$21.21	$23.34

* On pasture for 92 days where .64 pound of alfalfa hay was fed daily per lamb. Remainder of feeding period in dry lot.

Observations

1. Slightly larger gains were made by the lambs receiving steam rolled milo than those made by the lambs receiving either whole or ground milo and, while the lambs on rolled milo ate a little more roughage, they still produced their gains at a slightly lower cost than the other two groups. The differences, however, are small and may be due entirely to chance.

2. Alfalfa fed as the sole roughage or as a part of the roughage speeded up the gain but also increased the cost of gains. Silage also increased the rate of gain when it replaced a large portion of the stover, but at current prices the gains were more expensive in the silage-fed group.

3. The addition of a protein supplement to a ration, including one-half alfalfa and one-half sorghum stover, increased the rate of gain slightly but also increased the cost of gain slightly.

4. The lot of lambs receiving Aurofac 2 A with the standard ration of milo grain, Axtell stover, protein, limestone, and salt gained slightly more at a little less cost than the lot of lambs given the standard ration alone. The differences were small, however, and are probably not statistically significant.

5. Excellent gains were made by the lambs on sorghum stubble plus alfalfa hay and at a cost of approximately 60 percent of cost of gains made in the feedlot. The pasture-fed lambs probably are not carrying quite as much finish as those kept in the dry lot, however.

6. The lambs given no salt with their standard ration made the poorest gains and at the greatest cost of any of the groups.

7. Table 4 shows the average daily gains by lots of the lambs receiving one and two hormone implants either with or without vaccination against enterotoxemia compared to the gains made by the untreated lambs.

Table 4.—Average Daily Gains of Vaccinated, Hormone Treated, and Untreated Lambs (Wethers).

	No treatment	Vaccinated	One hormone implant	One hormone implant and vaccine	Two hormone implants	Two hormone implants and vaccine
Lot 1	.295	.291	.335	.419	.358	.328
2	.257	.283	.512	.335	.388	.383
3	.330	.325	.353	.404	.379	.428
4	.403	.408	.497	.580	.445	.546
5	.350	.369	.478	.405	.487	.542
6	.375	.362	.518	.451	.467	.515
7	.289	.291	.369	.402	.371	.397
8	.324	.292	.365	.389	.349	.375
9	.348	.343	.456	.425	.489	.445
10	.....	.....	.324	.389	.371	.391
11	.174	.238	.285	.284	.203	.236
All Lots	.312	.322	.402	.406	.390	.415

Gains were approximately one-third larger in the lambs receiving the hormone implants. The rate of gain was not increased by giving a second implant after 70 days of feeding. In Lot 10, where all of the lambs received the hormone, increased rate of gain was apparently due to greater feed consumption and the amount of feed per pound of gain was actually just as high or a little higher than in the lot of lambs receiving the same standard ration and where only half the lambs were given implants.

These findings differ from reports from other stations, indicating that the hormones produce larger gains because of better feed utilization. Most of the stations also have reported the lambs grow rather than fatten, producing poorer carcasses. The lambs vaccinated for overeating gained a little more than those unvaccinated. This same slight difference was shown last year but still may be due entirely to chance.

Seven lambs died during the tests—two from enterotoxemia and the remaining five apparently from urinary calculi. Both lambs dying of overeating disease had been vaccinated. Four of the five lambs dying from urinary calculi, and one of the two dying from overeating had received two implants of stilbestrol. (See supplementary report below.)

At the conclusion of the feeding period, 151 lambs were selected as high good, and choice slaughter lambs, and the number selected from the various lots were as follows: Lots 1-11; Lots 2-9; Lots 3-15; Lots 4-32; Lots 5-10; Lots 6-32; Lots 7-22; Lots 8-2; Lots 10-12; and Lots 11-2.

A smaller percentage of the lambs given stilbestrol were selected for slaughter as compared to those given no implants. Carcass quality and yields also were lower for the lambs receiving implants. Abnormal development of the reproductive organs was found in the wether lambs given the implants and these abnormalities were capable of producing prolapse of the rectum as well as symptoms of urinary calculi. A high incidence of these difficulties has been reported in several commercial feedlots where the lambs have been given stilbestrol implants.

Project 111 GC: Lamb Feeding Experiments

Supplemental Report Concerning the Use of Stilbestrol[1]

T. Donald Bell, Walter H. Smith, and A. B. Erhart

Since the preparation of the original report on the lamb feeding studies at the Garden City Station, additional information has been obtained concerning the effect of stilbestrol upon the reproductive organs of wether lambs which may result in serious malfunction of the excretory system and possible death of the treated animals.

The use of stilbestrol implants in fattening lambs or cattle has not been approved by the Food and Drug Administration, but reports of increased rates of gain in experimental tests have encouraged the use of the material by commercial feeders. The extent of this use is not completely known but apparently a fairly large number of lamb feeders in Kansas have given their lambs stilbestrol implants. There have been reports of rather heavy losses in several groups of lambs where the hormone-like material has been used but the cause

1. Assistance in preparation of the anatomical specimens was given by Dr. W. M. McLeod, head of the Anatomy Department of the School of Veterinary Medicine, Kansas State College, Manhattan, Kansas.

of the losses has never been attributed directly to the stilbestrol implants.

Symptoms reported were of two types: (1) conditions similar to that of urinary calculi (water belly) and (2) prolapse of the rectum (piles) and excessive swelling in the rectal region.

In the experiments at Garden City, five lambs were lost following the administration of the second stilbestrol implant and the cause of death in four of these lambs was from symptoms similar to those found in lambs dying from urinary calculi.

Approximately one-third of the lambs were marketed at the conclusion of the tests on March 7 and the remainder were shorn and continued on feed. Since that time six lambs, all of which had received two stilbestrol implants, died from "piles" or conditions resulting from the excessive swelling in the rectal region. Several more are exhibiting the same symptoms at the time this paper is being written (April 14). Figures 1 and 2 show lambs exhibiting typical swelling of the rectal region and Figure 3 shows a lamb with prolapse of the rectum without excessive swelling.

A number of the treated and untreated lambs, all apparently in good health, were brought to Manhattan where they were slaughtered and further observations were made. The lambs receiving the implants were difficult to butcher because the pelts adhered so tightly to the carcass. The treated lambs shrank more in the cooler and had lower dressing percentages than the untreated lambs. The carcasses from the treated lambs also appeared to be more watery and had a slimy appearance.

Fig. 1.—Wether lamb that had received two implants of stilbestrol, one at the beginning of the test and another in 70 days. Note the swelling in the rectal region.

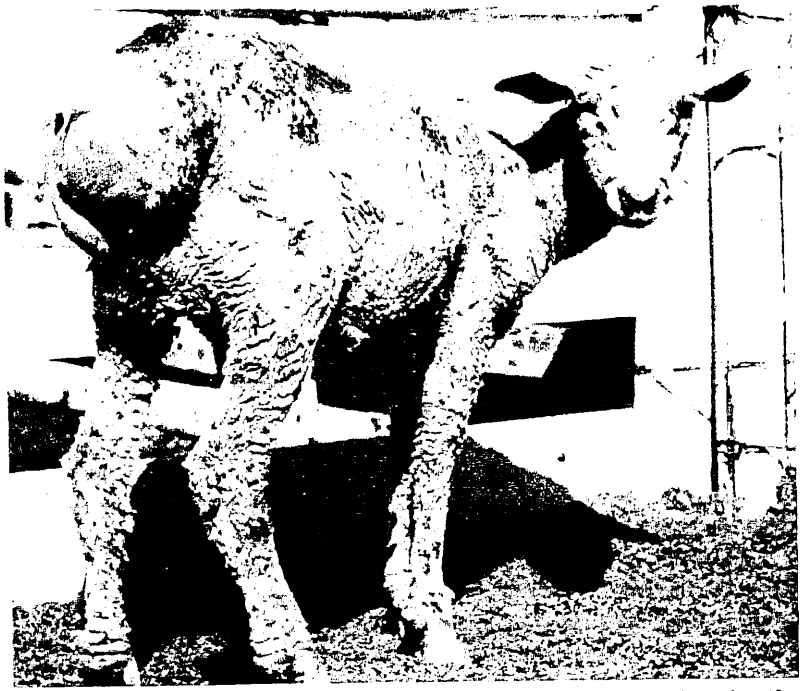

Fig. 2.—Wether lamb showing more pronounced swelling in the rectal region. This lamb also had received two implants of stilbestrol.

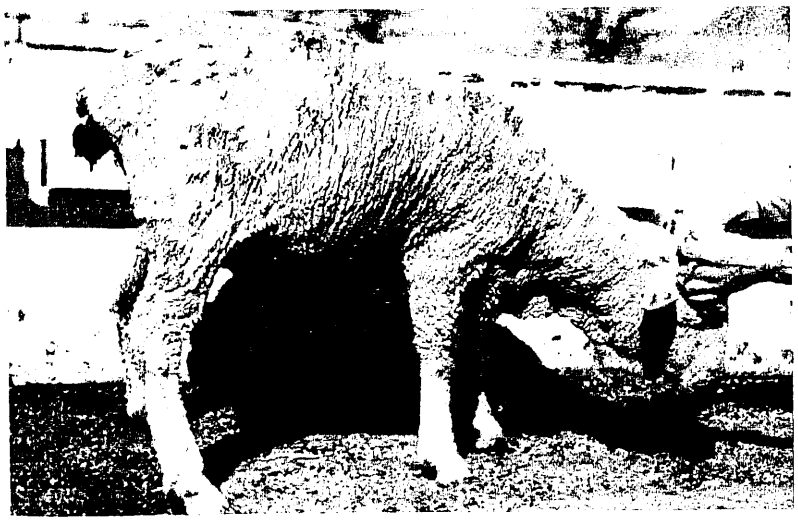

Fig. 3.—Wether lamb that had received two stilbestrol implants exhibiting symptoms of prolapse of the rectum (piles).

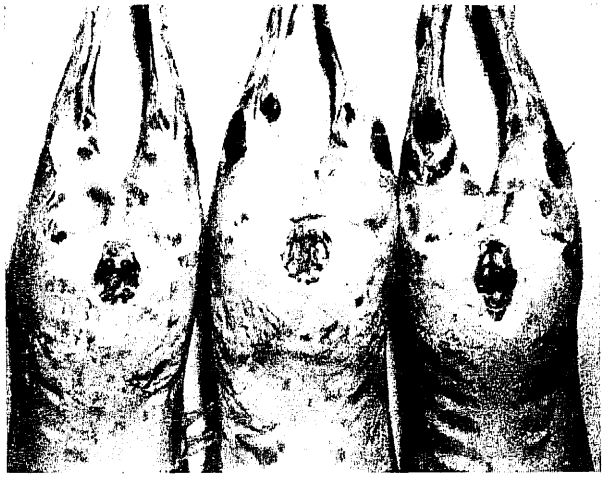

Fig. 4.—Carcasses with the tails removed, from treated and untreated lambs; left to right, the carcass from a lamb receiving the implant at the beginning of the test and another after 70 days on the test; the carcass from a lamb receiving one implant at the beginning of the tests; and the carcass from an untreated lamb. Note the enlarged gland and urethral tracts in the two lambs on the left.

An examination of the reproductive organs revealed that the implants resulted in an enlargement of reproductive organs of the wethers. These enlargements are shown in Figures 4, 5, and 6. Figure 4 shows, from left to right: the carcass from a lamb receiving the implant at the beginning of the test and another after 70 days on the test; the carcass from a lamb receiving one implant at the beginning of the tests; and the carcass from an untreated lamb. The tails have been removed to give a better view of the rectal region. In the carcass at the left the two large round Cowper's glands may be clearly seen as well as the enlarged urethra extending down from them. In the middle carcass the glands and urethra are still plainly visible, although the development isn't too great. In the control lambs on the right, the Cowper's glands do not show enough development to be noticeable and the urethra is much smaller than in either of the two lambs receiving implants.

Figure 5 shows a portion of the reproductive tracts removed. Number I is the organs from the control or untreated lamb; Number II is from the lamb receiving one implant; and Number III is from the lamb receiving two implants. The numeral 1 on each of the three pictures indicates the urethra surrounded by the prostate gland and the numeral 2 shows the location of the Cowper's or bulbo-urethral glands.

Figure 6 shows a cross section through the urethra and surrounding prostatic tissue. Number I is from the untreated lamb; Number II from the lamb receiving one implant; and Number III from the lamb receiving the two implants. A study of the lumen of the urethra in each specimen reveals a fairly large and unimpaired opening in the control lamb; a smaller and partially closed opening in the lamb receiving one implant; and an almost entirely closed lumen in the lamb receiving the two implants. While these animals had shown

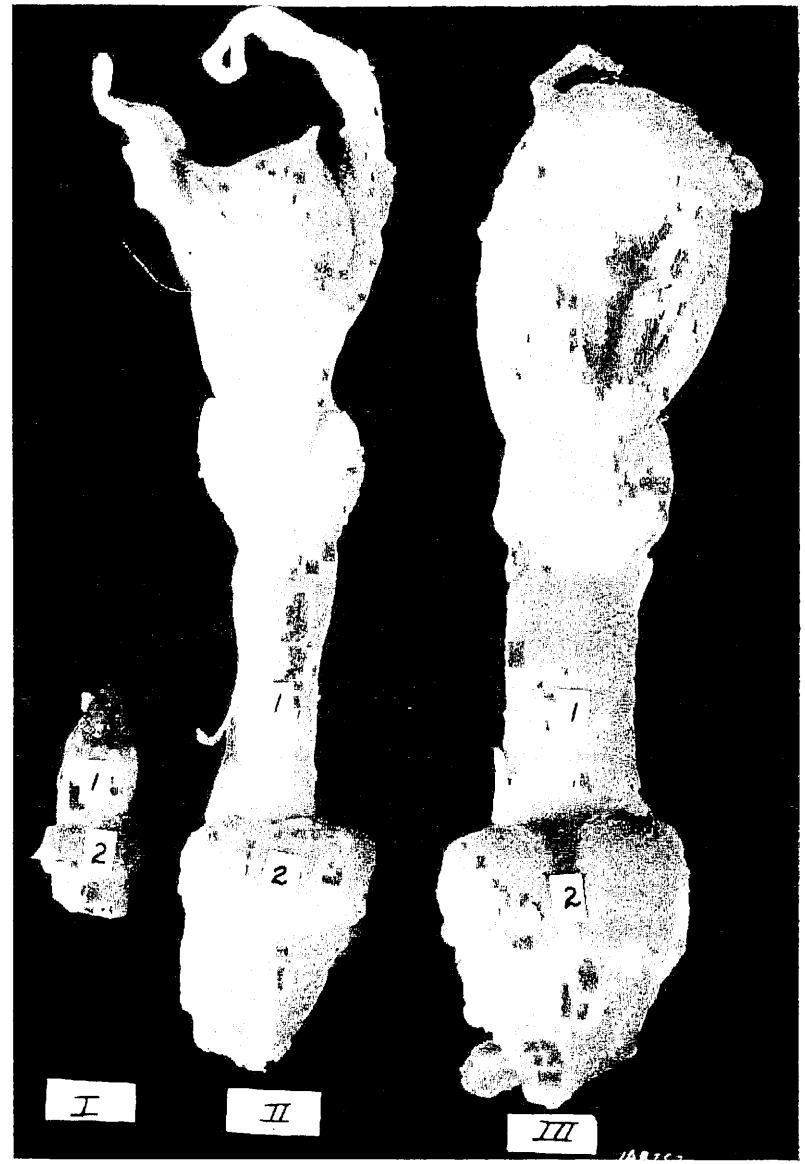

Fig. 5.—Portions of the reproductive organs from (I) an untreated lamb; (II) a lamb receiving a single implant at the beginning of the feeding period; and (III) a lamb receiving the initial implant plus an additional implant after 70 days on feed. Number 1 on each specimen indicates the urethra with the surrounding prostate; Number 2 indicates the Cowper's or bulbo-urethral glands.

no external visible symptoms of distress, it would appear logical that further closure of the urinary passage might result in symptoms similar to that produced by a blockage of the passage by urinary calculi. The extreme swelling of the Cowper's glands may be responsible for difficulty in passage of fecal material and could possibly result in considerable straining with resulting prolapse of the rectum. Further studies are being continued on those animals either dying from the symptoms indicated or showing symptoms sufficient to cause death. The possible serious effect of the indiscriminate use of this hormone-like material in lamb fattening should deter any commercial feeders from using it until further experimental work has indicated that it can be used safely without danger from heavy losses.

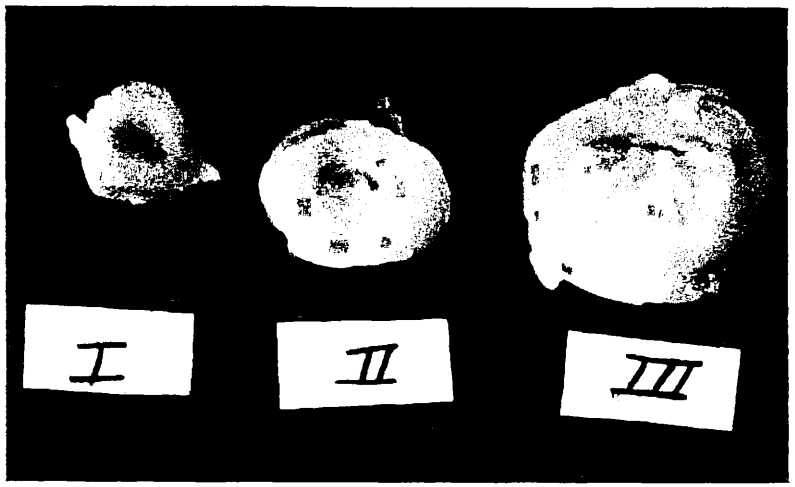

Fig. 6.—Cross section through the urethra and surrounding prostate tissue of lambs; (I) receiving no treatment; (II) receiving one stilbestrol implant; and (III) receiving two stilbestrol implants. Note the almost complete closure of the lumen of the urethra in the treated lambs.

Project Commercial 108: Salt Research with Feeder Lambs

T. D. Bell, E. L. Hix, A. B. Erhart, D. B. Parrish, and G. K. L. Underbjerg

Experiments designed to test the need and value of salt in the rations of feeder lambs have been conducted by the Kansas Agricultural Experiment Station for the past three years. The tests have shown that feedlot gains and feedlot efficiency are reduced when supplemental salt is withheld from the rations of fattening lambs in the feedlot. When the lambs were all slaughtered after a uniform feeding period, the lambs receiving no salt had lower yielding and lower grading carcasses than the lambs given salt.

Digestion trials and mineral balance studies have shown that the deprivation of supplemental salt slightly lowers feed digestibility of all feed components other than fat; depletes the animal body of sodium;

decreases water consumption and urine excretion; and dehydrates the body fluids.

Most range feeder lambs haven't had salt during their movement from the range to the feedlot and should be gradually accustomed to salt. Since many lamb feeders have felt that salt wasn't necessary during the 80 to 120 day feeding period, they haven't provided supplemental salt for their lambs. The tests at Kansas State College clearly demonstrate the need and advisability of salt in lamb-fattening rations even though the feeding period is of short duration.

Project State 347: Adaptability of Breeds of Rams and Breed Types of Range Ewes to Market Lamb Production in Kansas

T. Donald Bell and Lewis A. Holland

During the fall of 1951, ewe lambs representing the three types of ewes commonly used in Kansas were secured from southern Utah. One-third of these 140 lambs were of straight Rambouillet or fine-wool breeding and similar to Texas ewes; one-third of the lambs were sired by Columbia rams out of Columbia x Rambouillet ewes and were similar to the Northwestern whiteface crossbred ewes commonly obtained from the Northwestern range area; and one-third of the lambs were sired by Suffolk rams and out of whiteface crossbred ewes and were similar to Northwestern blackface ewes. These ewes will be maintained at the College as long as their productive life will permit and careful records will be kept of their wool production as well as their lamb production when mated to different breeds of rams. Other factors of economic importance, such as longevity and the ability to produce early lambs, will be studied.

During the summer of 1952, the ewes of each of the three types were randomly divided into four groups and bred to Hampshire, Suffolk, Southdown, and Shropshire yearling rams. During the summer of 1953 the breeding procedure will be repeated but a new set of yearling rams of all breeds will be used and the ewes will be rotated so they are bred to different breeds of rams.

The data obtained from the different types of ewes and different breeds of rams are summarized in the two following tables. Lamb production figures are subject to tremendous variation and there should be no definite conclusions drawn from these preliminary findings. Additional information concerning final market weights and market grades will be obtained from this year's lamb crop and similar information will be gathered from the lamb crops of the several following years before any definite conclusions are drawn.

Grease fleece weights are less subject to variation and the yearling grease fleece weights should be a fairly good estimate of future wool production. Date of lambing figures also should be fairly reliable indicators of comparative ability to breed and lamb early. Most sheepmen have believed that the finewools would lamb earlier than the other types but they have thought also that the whiteface crossbreds would probably lamb earlier than the blackface crossbreds. This year's data failed to confirm this opinion.

Table 5.—Comparative Wool and Lamb Production of Ewes of Three Different Types.

Types of ewes	Grease fleece weight	Average lambing date	Average birth weight of lambs — Single	Twins	Average weight of lambs on April 8
Blackface crossbreds	6.8	Jan. 20	10.0	8.1	50.3