The effect of hexoestrol implantation on carcass composition and efficiency of food utilization in fattening lambs

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The subcutaneous implantation of stilboestrol or hexoestrol has been shown to increase the daily rate of live-weight gain and efficiency of food utilization in lambs (Andrews, Beeson & Harper, 1949; Jordan, 1950; O'Mary, Pope, Wilson, Bray & Casida, 1952; Andrews & Beeson, 1953; Means, Andrews & Beeson, 1953; Jordan, 1953*a*, *b*; Bell, Smith & Erhart, 1954; Clegg, Albaugh, Lucas & Weir, 1955; Wilkinson, O'Mary, Wilson, Bray, Pope & Casida, 1955; Gill, Thomson & Crichton, 1956; Jordan & Croom, 1956). The same action is apparent in cattle (Clegg & Cole, 1954; Aitken & Crichton, 1956). These reported advantages have been offset by consistent accounts of a reduction in the grade or quality of the carcasses (Andrews *et al.* 1949; O'Mary *et al.* 1952; Bell *et al.* 1954; Gill *et al.* 1956). Aitken & Crichton (1956) found that the carcasses from treated steers contained more muscle, more bone and less fat than carcasses from untreated animals. O'Mary *et al.* (1952) reported that, whereas the subcutaneous fat of treated lambs was thinner and contained more moisture, there were no significant differences in muscular development or in intermuscular fat. Whiting, Clark & Allen (1954) suggested that the increase in live weight of treated lambs might be due entirely to an increase in moisture content of the tissues and to a higher percentage of offal.

These conclusions have been based on limited carcass measurements and analyses of small sample joints such as the cut incorporating the ninth, tenth and eleventh ribs in steers (Aitken & Crichton, 1956) and the eleventh rib in lambs (O'Mary *et al.* 1952). Since stilboestrol is known to alter the conformation of the animal (Acker, Whiteman, Gallup & Tillman, 1955) the composition of such sample joints is unlikely to be representative of the carcass as a whole. Moreover, the claims that stilboestrol treatment improves the efficiency of utilization of food are based only on live-weight increases per unit of food consumed and can have little significance until the composition of the extra live weight of treated animals is known.

The object of the present experiment was to determine the composition of the weight gains of lambs implanted with hexoestrol and the relative efficiency with which the lambs converted protein and energy in the food to protein and fat in the carcass.

EXPERIMENTAL

Thirty-six Suffolk × Half-bred, 5-month-old, wether lambs were allocated at random to three groups. The first group, designated the 'sample-slaughter group', was

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killed at the beginning of the experiment. Each lamb of the second group had implanted subcutaneously in the left ear a 15 mg pellet of hexoestrol. The third group was a control. Implanted and control lambs were housed individually indoors and were given a daily ration of 100 g hay and increasing amounts of a mixture of 8 parts maize meal, 2 parts crushed oats, 2 parts bran, 1 part white-fish meal and 1 part linseed cake for an experimental period of about 90 days.

After 50 days it was no longer possible to feel the pellet in the ears of the animals and a further implantation of a 15 mg pellet of hexoestrol was made.

The lambs given hexoestrol and the controls were slaughtered at a similar stage of fatness as decided by two independent judges. One animal from the control group and one from the implanted group failed to adjust itself to indoor feeding conditions and the results for these two lambs have been excluded.

Slaughter technique. Immediately after slaughter the warm carcass weight of each lamb was recorded together with the weights of the head, feet, skin and fleece, pluck (i.e. heart, lungs and liver), kidney and associated fat and the alimentary tract and its contents. The carcasses were left to cool for 24 h and were reweighed to obtain cold-carcass weights. The carcasses were then split medially down the back, and the left side was separated into leg, half-loin and 'rest' as follows:

Leg: a transverse cut was made through the lateral muscles of the leg at the level of the articulation of the femur and the acetabulum of the pelvis. This joint was then disarticulated and cut along the ischial arch, working as close to the bone as possible.

Half-loin: it was separated anteriorly by a transverse cut through the flank behind the last rib and posteriorly by a transverse cut at the articulation of the lumbar-sacral joint.

'Rest': it comprised the remainder of the left side of the carcass after the leg and half-loin had been removed, namely neck, forequarter, ribs, flanks, pelvis and tail.

The leg, half-loin and 'rest' were weighed and then separated into the following tissues: (*a*) subcutaneous fat; (*b*) 'flesh' including muscle tissue, intermuscular and, intramuscular fat; (*c*) bone. These tissues were weighed. The subcutaneous fat and 'flesh' were minced and the bone was crushed in an Ancol Bone Patent Grinding Machine (Union Food Machinery Equipment Ltd, London) to obtain representative samples which were stored at $-20°$. These samples were freeze-dried, minced again, and analysed for ether extract ('fat') (Callow, 1944), residual moisture and ash. Protein was calculated as 90% of the dry fat-free residue (Callow, 1944). Protein in bone was determined as $6{\cdot}25 \times$ nitrogen content estimated by the macro-Kjeldahl method. The energy contents of the edible meat and of the carcass were calculated from the 'fat' and protein content with factors of 9·5 and 5·7 Cal./g for 'fat' and protein respectively (Brody, 1945). The iodine number of freeze-dried subcutaneous fat tissue was determined by the Wijs method as described by Hilditch (1949).

The following measurements, illustrated in Fig. 1, were made on the cold carcass: length of leg (*F*), width of hindquarters (*G*), maximum depth of chest behind the shoulders (*Th*); and on the transverse section of the half-carcass at the last rib, thickness of fat over deepest part of 'eye muscle' (*C*), thickness of fat over spinous process (*D*), thickness of fat over rib (*J*), and area of 'eye muscle' (*E*), determined from

a pencil tracing by a planimeter. The above measurements, with the exception of (E), were first suggested by Pálsson (1939). In addition, the thickness of the subcutaneous fat was measured at the third thoracic vertebra (D_1) and at the last sacral vertebra (D_2).

The ears from the implanted animals were retained after slaughter, and the remaining pieces of the hexoestrol pellet dissected out, dried and weighed.

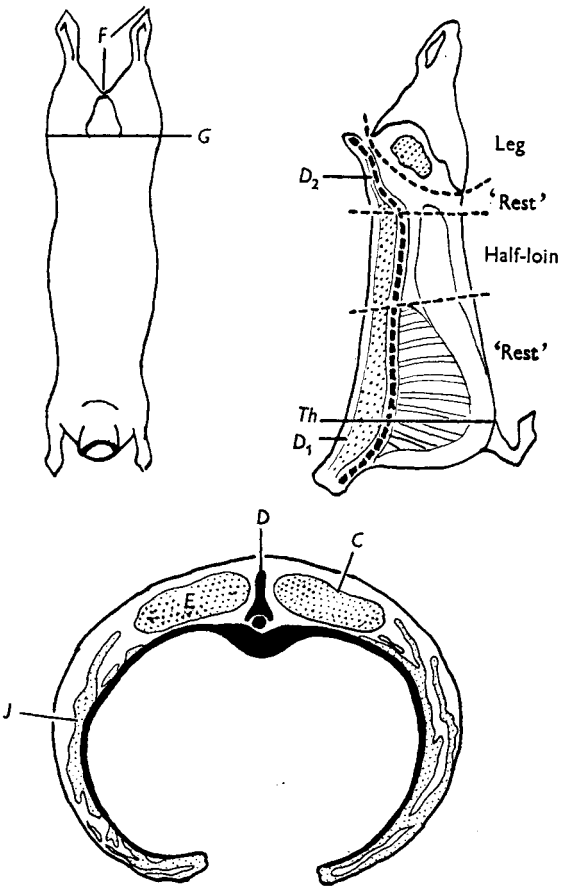

Fig. 1. Diagram illustrating joints and carcass measurements of lambs.

RESULTS

Live-weight gain. The lambs implanted with hexoestrol made significantly greater live-weight gains ($P < 0.001$) than the controls (Table 1).

Dressing out percentage and offal weight. The implanted lambs had a lower dressing out percentage* than the control lambs although the difference was not significant (Table 2). The weights of head, pluck and alimentary tract and its contents were significantly heavier in implanted than in control lambs, although when these values

* The dressing out percentage is the weight, as a percentage of the live weight at slaughter, of the cold dressed carcass after bleeding and the removal of the feet, head, hide, abdominal viscera, lungs, liver, heart, windpipe, and the thyroid and thymus glands.

Table 1. *Mean initial weight, final weight and weight gain over fattening period of control lambs and lambs implanted with hexoestrol*

	Hexoestrol group (*a*)	Control group (*b*)	Difference (*a* − *b*) Value	Difference (*a* − *b*) S.E.
No. of lambs	11	11	—	—
Initial weight (kg)	37·7	38·6	−0·9	—
Final weight (kg)	61·3	57·2	4·1**	±1·4
Gain over fattening period (kg)	23·6	18·6	5·0***	±1·2
Length of fattening period (days)	96	91	5	±5·6
Daily gain over fattening period (kg)	0·245	0·200	0·045***	±0·010

** Significant at 1 % level. *** Significant at 0·1 % level.

Table 2. *Mean starved weight, carcass weight, dressing out percentage† and weights of head, feet, skin and fleece, heart, lungs and liver, alimentary tract and contents, kidney and associated fat of control lambs and lambs implanted with hexoestrol*

	Sample-slaughter group	Hexoestrol group (*a*)	Control group (*b*)	Difference (*a* − *b*) Value	Difference (*a* − *b*) S.E.
No. of lambs	12	11	11	—	—
Starved weight (kg)	37·5	59·9	55·8	4·1**	±1·40
Carcass weight (kg)	19·4	31·2	29·6	1·6	±0·90
Dressing out percentage	51·9	52·2	52·9	−0·7	±0·80
Weight of head (kg)	1·72	2·34	2·19	0·15*	±0·06
Weight of feet (kg)	0·84	1·01	0·98	0·03	±0·032
Weight of skin and fleece (kg)	3·22	6·99	6·27	0·72	±0·45
Weight of heart, lungs and liver (kg)	1·58	2·29	2·06	0·23*	±0·10
Weight of alimentary tract and contents (kg)	9·09	12·50	11·08	1·42	±0·68
Weight of kidney and associated fat (kg)	0·21	0·48	0·59	−0·11*	±0·044

* Significant at 5 % level. ** Significant at 1 % level. † See p. 331.

Table 3. *Mean external and internal measurements of the carcasses of control lambs and lambs implanted with hexoestrol*

Measurement	Hexoestrol group (*a*)	Control group (*b*)	Difference (*a* − *b*) Value	Difference (*a* − *b*) S.E.
External:				
Length of leg (*F*) (cm)	27·9	27·6	0·3	±0·5
Width of hindquarters (*G*) (cm)	28·1	27·4	0·7	±0·4
Ratio, *G*:*F*	100·4	99·4	1·0	±2·4
Depth of thorax (*Th*) (cm)	31·8	30·9	0·9**	±0·3
Internal:				
Fat over eye 'muscle' (*C*) (cm)	0·89	1·06	−0·17	±0·11
Fat over spine (*D*) (cm)	1·24	1·55	−0·31	±0·18
Fat over rib (*Ŷ*) (cm)	2·44	2·64	−0·20	±0·19
Fat over shoulder (D_1) (cm)	1·28	1·60	−0·32	±0·16
Fat over tail (D_2) (cm)	1·72	2·09	−0·37	±0·27
Area of 'eye muscle' (*E*) (cm^2)	18·32	16·84	1·48	±1·10

** Significant at 1 % level.

Table 4. *Mean weights of joints as percentages of half-carcass weight, and weights of subcutaneous fat, 'flesh' and bone as percentages of joint weight and half-carcass weight of control lambs and lambs implanted with hexoestrol*

	Weight of joint as percentage of half-carcass weight			Weights of subcutaneous fat, 'flesh' and bone as percentage of joint weight or half-carcass weight								
				Subcutaneous fat			Flesh			Bone		
Part	Sample-slaughter group	Hexoestrol group	Control group	Sample-slaughter group	Hexoestrol group	Control group	Sample-slaughter group	Hexoestrol group	Control group	Sample-slaughter group	Hexoestrol group	Control group
Joint:												
Leg	24·4	21·8	21·8	10·1	12·9	15·1	72·1	71·9	70·4	16·9	14·8	14·2
Half-loin	11·5	12·6	13·7	15·4	24·5	26·5	72·2	66·2	64·8	11·8	8·9	8·1
'Rest'	64·1	65·6	64·5	11·2	16·6	19·3	68·3	67·3	65·6	19·8	15·4	14·3
Half-carcass	—	—	—	11·4	16·8	19·3	69·7	68·2	66·5	17·9	14·4	13·5

Table 5. *Mean percentage composition of subcutaneous fat, 'flesh' and bone in the joints and half-carcass of control lambs and lambs implanted with hexoestrol*

		Leg			Half-loin			'Rest'			Half-carcass		
Tissue	Chemical components	Sample-slaughter group	Hexoestrol group	Control group	Sample-slaughter group	Hexoestrol group	Control group	Sample-slaughter group	Hexoestrol group	Control group	Sample-slaughter group	Hexoestrol group	Control group
Subcutaneous fat	Fat	77·8	78·6	82·4	74·7	84·1	86·3	75·4	82·7	84·6	76·7	82·3	84·5
	Protein	3·2	4·0	3·5	3·8	3·2	2·6	4·2	3·2	3·2	4·1	3·4	3·2
	Ash	—	0·1	0·1	—	0·1	—	—	0·2	0·1	—	—	0·1
	Water	18·5	16·7	13·6	21·1	12·4	10·9	19·1	13·7	11·8	19·0	14·0	11·9
'Flesh'	Fat	9·8	9·6	10·4	18·0	22·6	24·9	24·0	26·5	28·4	19·6	22·1	23·8
	Protein	18·0	17·8	18·1	16·4	16·2	15·3	14·9	14·6	14·1	15·8	15·5	15·1
	Ash	1·0	0·9	0·9	0·9	0·8	0·8	0·8	0·7	0·7	0·8	0·7	0·8
	Water	71·5	70·7	69·5	65·2	59·5	58·7	60·4	57·4	56·2	63·8	60·7	59·3
Edible meat*	Fat	17·9	20·0	23·0	27·8	39·0	42·7	31·2	37·5	41·0	27·5	33·9	37·4
	Protein	16·0	15·7	15·5	13·8	12·7	11·7	13·3	12·4	11·7	14·0	13·1	12·5
	Ash	1·0	0·8	0·8	0·7	0·6	0·6	0·8	0·6	0·6	0·7	0·6	0·6
	Water	64·1	62·6	59·7	56·7	46·9	44·4	54·0	48·8	45·8	56·8	51·7	48·5
Bone	Fat	22·7	25·0	26·3	14·4	13·7	18·5	18·6	18·4	22·9	19·2	19·5	23·3
	Protein	18·9	20·0	19·7	18·1	19·3	20·3	19·6	18·9	18·4	17·9	19·2	19·0
	Ash	28·3	27·3	27·3	23·1	23·4	23·6	22·1	22·9	22·5	23·6	24·0	23·7
	Water	27·9	29·8	28·3	41·0	43·8	38·0	38·2	38·7	35·3	35·6	37·3	34·0
Total†	Fat	18·7	20·8	23·5	26·2	36·8	40·6	28·7	34·6	38·4	26·0	31·8	35·5
	Protein	16·5	16·4	16·1	14·3	13·3	12·3	14·1	13·4	12·6	14·7	14·0	13·4
	Ash	5·5	4·7	4·6	3·4	2·6	2·4	4·9	4·0	3·7	4·9	4·0	3·7
	Water	58·2	57·7	55·2	54·9	46·6	43·9	51·1	47·3	44·5	53·1	49·5	46·6

* For convenience in presenting the results subcutaneous fat and 'flesh' together are referred to as edible meat.
† Subcutaneous fat + 'flesh' + bone.

were expressed as percentages of the live weight of the animal at slaughter there was little difference between the two groups.

Carcass measurements. External and internal carcass measurements are set out in Table 3. There were no significant differences in any of these measurements between implanted and control lambs, with the exception of the depth of chest (*Th*) which was significantly greater ($P < 0{\cdot}01$) for the implanted group, but all the measurements indicated a thinner fat covering and a greater muscle development in implanted lambs. The ratio, $100\ G:F\left(\frac{\text{width of hindquarters} \times 100}{\text{length of leg}}\right)$, considered to be a good index of the compactness of the hindquarters (Pálsson, 1939), was almost identical in the implanted lambs and in the controls.

Carcass composition. Weights of the joints, leg, half-loin and 'rest', expressed as a percentage of the half-carcass weight, and the weights of the tissues, subcutaneous fat, 'flesh' and bone expressed as a percentage of joint weight and of the half-carcass weight are shown in Table 4. The chemical composition of the tissues from the joints and the half-carcass is given in Table 5.

The proportion of half-loin was greater and of the 'rest' smaller in the control than in the treated lambs; there was no difference in the proportion represented by the leg. In each joint, and thus in the half-carcass, there was a greater percentage of 'flesh' and of bone, but a lower percentage of subcutaneous fat, in the implanted lambs than in the controls. The implanted and control lambs showed consistent differences in the composition of the subcutaneous fat, 'flesh' and bone tissue. With the exception of the percentage of protein in the 'flesh' of the leg, the subcutaneous fat, 'flesh' and bone from implanted animals contained a greater percentage of protein and water, and a lower percentage of 'fat' than the same tissues from control lambs. There were only minor differences in the ash contents of the tissues from the two groups.

The iodine numbers of the freeze-dried subcutaneous fat tissue from the three joints, leg, half-loin and 'rest', are presented in Table 6.

Table 6. *Iodine number of freeze-dried subcutaneous fat from sample-slaughter lambs, lambs implanted with hexoestrol and control lambs*

(Mean values for groups of eleven animals)

	Sample-slaughter group	Hexoestrol group	Control group	Standard deviation*
Leg	34·6†	38·6	39·4	±2·87
Half-loin	30·7	33·9	37·2	±3·86
'Rest'	35·6‡	39·5	39·4	±3·42

* Standard error of difference between two means of 11 is S.D. × 0·43, between two means of 11 and 8 is S.D. × 0·46 and between two means of 11 and 12 is S.D. × 0·42.

† Mean for eight animals.

‡ Mean for twelve animals.

The iodine numbers of the subcutaneous fat in treated and control animals were significantly higher than the value for the sample-slaughter group. Though there was no difference between iodine numbers for the leg and 'rest' from controls and implanted lambs, there was a suggestion of a higher iodine number for the loin fat in the

control group ($P < 0{\cdot}10$). In all three groups the loin fat had a lower iodine number than the fat from the leg and 'rest'. It would appear that the softness of fat in implanted animals reported by several workers and also noted in this experiment is not the result of a greater degree of unsaturation and may be accounted for by the increased water content (Table 5).

Estimated increases in constituent parts of the carcass during fattening. The values for the sample-slaughter group were used to obtain prediction equations relating nine carcass measurements to live weight. These equations were used to predict the composition of the half-carcasses of lambs in the implanted and control groups at the beginning of the fattening period. Since compositions of the carcasses from these groups at the end of the experiment were known, it was possible to calculate the increases in the various components of the carcasses over the treatment period as set out in Table 7. The increases in carcass weight, edible meat and bone were significantly greater in the implanted than in the control lambs. There were significantly

Table 7. *Mean values (g) for increase in bone, edible meat and carcass and increase in 'fat', protein and moisture of the edible meat and of the carcass during the fattening period of control lambs and lambs implanted with hexoestrol*

	Hexoestrol group (*a*)	Control group (*b*)	Difference (*a* − *b*) Value	Difference (*a* − *b*) S.E.
Carcass	12,180	9860	2320**	±724
Edible meat	11,120	9400	1720*	±634
Bone	1,056	460	596***	±152
'Fat' in edible meat	4,860	5160	−300	±420
'Fat' in carcass	5,114	5192	−78	±498
Protein in edible meat	1,320	950	370**	±102
Protein in carcass	1,582	1056	526***	±124
Moisture in edible meat	4,820	3200	1620**	±434
Moisture in carcass	5,240	3140	2100***	±440

* Significant at 5 % level.
** Significant at 1 % level.
*** Significant at 0·1 % level.

greater increases in protein and moisture in the edible meat and in the carcass of the implanted lambs; on the other hand, the increase in fat was greater in the controls.

Food consumption and efficiency of food utilization. There were no significant differences in daily consumptions of hay and concentrates (Table 8) between implanted and control lambs and it was thus possible to combine these two feeds in the calcu-

Table 8. *Mean food consumption of control lambs and lambs implanted with hexoestrol*

	Hexoestrol group	Control group
Concentrates: total (kg)	110·69	105·47
daily (kg)	1·14	1·14
Hay: total (kg)	8·35	7·50
daily (kg)	0·09	0·08

lation and express food intake in terms of total organic matter and crude protein. Efficiencies of food conversion were calculated per unit of organic matter consumed for increases in live weight, edible meat and total carcass, and for increases in energy (calories) in edible and total carcass. Protein-conversion efficiency, i.e. increase in protein in edible and total carcass per unit of protein consumed, was also determined (Table 9).

Table 9. *Mean values for efficiencies of food conversion in control lambs and lambs implanted with hexoestrol*

	Hexoestrol group (*a*)	Control group (*b*)	Difference (*a* − *b*) Value	S.E.
Increase in weight/organic matter consumed:				
Live weight (kg/kg)	0·236	0·191	0·045**	±0·0094
Carcass weight (kg/kg)	0·122	0·105	0·017*	±0·0067
Edible meat (kg/kg)	0·112	0·100	0·012	±0·0066
Increase in energy/organic matter consumed:				
Edible meat (Cal. × 10^3/kg)	0·539	0·580	−0·041	±0·0472
Whole carcass (Cal. × 10^3/kg)	0·578	0·592	−0·014	±0·0560
Increase in protein/protein consumed:				
Edible meat (kg/kg)	0·0764	0·0576	0·0188*	±0·0070
Whole carcass (kg/kg)	0·0910	0·0646	0·0264**	±0·0079

* Significant at 5 % level. ** Significant at 1 % level.

The implanted lambs made greater increases in live weight, carcass weight and edible meat per unit of organic matter consumed than did the controls. Implanted lambs were 33 % more efficient in converting food protein to muscle protein and 41 % more efficient in converting food protein to protein in the total carcass. On the other hand, efficiency of energy conversion did not differ significantly between treated and control animals.

DISCUSSION

The significantly greater live-weight gains and slightly lower dressing out percentages of implanted as compared with control lambs are in agreement with the findings of the majority of workers in this field.

Clegg *et al.* (1955) found no advantage in implanting 36 mg stilboestrol instead of 12 mg. Perry, Andrews & Beeson (1951), Stephens & Thompson (1952) and Jordan (1953*a*) found that repeated implants throughout the trial period gave no additional response. In our experiment, dissection of the ears of the implanted lambs at slaughter showed that, with the exception of two animals, the first pellet had been completely absorbed and a considerable portion of the second had also been used. The total absorption of hexoestrol over the fattening period averaged 24·3 mg.

The results of physical and chemical analyses on the half-carcass, supported by the carcass measurements, show that hexoestrol implantation alters carcass composition. Carcasses from treated animals were characterized by more bone, more 'flesh' and less subcutaneous fat, each of these tissues in turn containing more protein, more moisture and less ether-extractable material ('fat') than carcasses from control lambs.

These results confirm the earlier findings of O'Mary *et al.* (1952) and Wilkinson *et al.* (1955), which were based on limited analyses of small samples of the carcass.

In his theory of differential growth in the sheep, Hammond (1932) showed that the various anatomical regions and tissues attain their maximum rate of growth with age in a definite order: (1) central nervous system, (2) bone, (3) muscle, and (4) fat. In the present experiment the implanted animals gained 130% more bone, 48% more muscle (protein and moisture), but 6% less 'fat' than the controls. It would appear that hexoestrol implantation stimulates development of the earlier-maturing tissues, namely bone and muscle, at the expense of the later-maturing fat tissue. This increase in muscle and bone growth is supported by the findings of Whitehair, Gallup & Bell (1953) who showed that retention of calcium, phosphorus and nitrogen in lambs was greatly increased 10 days after stilboestrol implantation. Despite the marked increase in bone growth in lambs implanted with hexoestrol relative to the controls, it should be pointed out that bone comprises only a small part of the increase in carcass weight, ranging from 4% in control to 9% in treated lambs. To express these findings in practical terms, it can be shown (from calculations based on Table 4) that a 65 lb. carcass from an implanted lamb would contain 9·4 lb. bone, 44·3 lb. 'flesh' and 10·9 lb. subcutaneous fat, compared with 8·8 lb. bone, 43·2 lb. 'flesh' and 12·5 lb. subcutaneous fat in a 65 lb. carcass from an untreated lamb.

In agreement with the observations of other workers (Andrews *et al.* 1949; Jordan, 1950; O'Mary *et al.* 1952; and others) implanted lambs were more efficient than control lambs in converting food into live weight. But calculations of efficiency based on live-weight measurements only cannot be considered satisfactory unless the exact composition of the weight increase is known. The detailed evaluation of the carcasses made possible by the design of the present experiment showed that implanted lambs were 33% more efficient in converting food protein into muscle protein and 41% more efficient in converting food protein into protein in the carcass. On an energy basis there was no significant difference in conversion efficiency between the two groups, in fact the implanted lambs were, if anything, slightly less efficient than the controls in the production of calories in both edible meat and total carcass, which indicates that the carcass and edible meat have a lower calorific value in implanted than in untreated animals. The advantage of hormone treatment would appear to lie in its effect on the animal's capacity to convert food protein to muscle protein. Since the main justification for maintaining meat-producing animals is the provision of animal protein, hormone administration can be said to provide a means of increasing the efficiency of that process.

This experiment was not designed to elucidate the mode of action of synthetic hormones in ruminants. Nevertheless, the results provide some information on this question. The increases in the carcasses of implanted animals had a greater proportion of the early-maturing tissues, bone and muscle, and a lower proportion of late-maturing fat than the increases in the control animals. Such changes are normally associated with the early stages of growth rather than with the final stage of fattening and imply that hexoestrol implantation may indirectly increase the natural output of growth hormone from the anterior-pituitary body. On the other hand, treated

animals were significantly deeper in the chest, which is a male characteristic, and at the same time they showed greater mammary development and relaxation of the pelvic ligaments, which are female characteristics. From this it would appear that oestrogens and androgens may contribute both directly and indirectly to altering the conformation and the composition of implanted animals.

SUMMARY

1. A comparative slaughter technique was used to determine the effect of hexoestrol implantation on carcass composition and efficiency of food conversion in an indoor trial with thirty-six lambs penned individually: twelve lambs were slaughtered at the beginning of the experiment; twelve were implanted with 15 mg hexoestrol; the remainder were controls. The lambs treated with hexoestrol and the controls were slaughtered at the end of a 90-day fattening period.

2. The daily live-weight gain over the fattening period was 23% greater in hexoestrol-implanted than in control lambs. Dressing out percentage did not differ significantly between the two groups.

3. Carcasses from implanted animals contained more bone, more 'flesh' and less subcutaneous fat, and these tissues in turn had a greater percentage of protein and moisture and a lower percentage of 'fat' (ether extract) than tissues and carcasses from control lambs.

4. Hexoestrol implantation significantly improved protein-conversion efficiency but had no effect on the efficiency of energy conversion.

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