IMAGE EVALUATION TEST TARGET (MT-3)

Photographic
Sciences
Corporation

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

**CIHM/ICMH
Microfiche
Series.**

**CIHM/ICMH
Collection de
microfiches.**

Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

© 1983

Technical and Bibliographic Notes/Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- ☐ Coloured covers/
Couverture de couleur
- ☐ Covers damaged/
Couverture endommagée
- ☐ Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée
- ☐ Cover title missing/
Le titre de couverture manque
- ☐ Coloured maps/
Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur
- ☒ Bound with other material/
Relié avec d'autres documents
- ☐ Tight binding may cause shadows or distortion along interior margin/
La reliure serrée peut causer de l'ombre ou de la distortion le long de la marge intérieure
- ☐ Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- ☐ Additional comments:/
Commentaires supplémentaires:

- ☐ Coloured pages/
Pages de couleur
- ☐ Pages damaged/
Pages endommagées
- ☐ Pages restored and/or laminated/
Pages restaurées et/ou pelliculées
- ☒ Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées
- ☐ Pages detached/
Pages détachées
- ☒ Showthrough/
Transparence
- ☐ Quality of print varies/
Qualité inégale de l'impression
- ☐ Includes supplementary material/
Comprend du matériel supplémentaire
- ☐ Only edition available/
Seule édition disponible
- ☐ Pages wholly or partially obscured by errata slips, tissues, etc., have been refilmed to ensure the best possible image/
Les pages totalement ou partiellement obscurcies par un feuillet d'errata, une pelure, etc., ont été filmées à nouveau de façon à obtenir la meilleure image possible.

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
					X						

The copy filmed here has been reproduced thanks to the generosity of:

Library
Agriculture Canada

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol $\rightarrow$ (meaning "CONTINUED"), or the symbol ∇ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:

L'exemplaire filmé fut reproduit grâce à la générosité de:

Bibliothèque
Agriculture Canada

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole $\rightarrow$ signifie "A SUIVRE", le symbole ∇ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.

rrata
co

pelure,
n à

ONTARIO AGRICULTURAL COLLEGE
EXPERIMENT STATION

BULLETIN LXVIII

FEEDING SHORN AND UNSHORN LAMBS IN WINTER.

BY THOMAS SHAW, PROFESSOR OF AGRICULTURE, AND
C. A. ZAVITZ, EXPERIMENTALIST.

PUBLISHED BY THE DEPARTMENT OF AGRICULTURE
Oct. 26, 1891

TORONTO

PRINTED BY WARWICK & SONS

MINISTER OF AGRICULTURE

HON. JOHN DRYDEN, TORONTO.

Oatario Agricultural College and Experimental Farm, Guelph,
under control of the Minister of Agriculture.

JAMES MILLS, M.A.	.. .. .	President.
THOMAS SHAW..	.. .. .	Professor of Agriculture and Farm Superintendent.
A. E. SHUTTLEWORTH, B.A. Sc.	.. .. .	Professor of Chemistry.
J. HOTES PANTON, M.A., F.G.S.	.. .. .	Professor of Natural History and Geology.
F. C. GRENSIDE, V.S.	.. .. .	Professor of Veterinary Science.
H. H. DEAN, B.S.A.	.. .. .	Professor of Dairy Husbandry.
E. LAWRENCE HUNT, B.A.	.. .. .	Assistant Resident and Mathematical Master.
CAPTAIN WALTER CLARKE..	.. .. .	Instructor in Drill and Gymnastics.
C. A. ZAVITZ, B.S.A.	.. .. .	Experimentalist.
H. B. SHARMAN, B.S.A.	.. .. .	Assistant Chemist.
A. MCCALLUM,	.. .. .	Bursar.

ADVISORY BOARD.

C. C. JAMES, M.A., <i>Secretary</i>	.. ..	Deputy Minister of Agriculture, Toronto.
JOHN I. HOBSON, <i>Chairman</i>	.. ..	Mosborough, County of Wellington.

FEED

This
29 fol
the ex
shorn
consum
result
of fee
ration
the w

Th
Octob
that y
broug
the la
to fat
The p
which
selecte
fleeces
this e
viousl
lambs
was n
judgin
of th
short
Oxford
eviden
for pu
ment
sold a
were

BULLETIN LXVIII.

FEEDING SHORN AND UNSHORN LAMBS IN WINTER.

This experiment began on January 6, 1891, and closed on April 29 following, thus covering a period of 113 days. The objects of the experiment include the following, viz: 1. To ascertain whether shorn lambs or unshorn lambs will give the best returns for the food consumed in winter. 2. To ascertain the relative gains that will result from liberal feeding at such a time. 3. To ascertain the cost of feeding lambs for fattening purposes in the winter season on the ration used in this experiment. 4. To ascertain the adaptability of the work to the conditions of Ontario.

THE ANIMALS SELECTED. During the early part of October, 1890, as stated more fully in the report of the College for that year (pp. 130-132), 537 sheep and lambs were purchased and brought to the farm to be fattened; of these 505 were lambs. From the lambs 100 were selected and shorn early in October with a view to fattening them for the British market during the winter months. The particulars relating to these will be fully given in a Bulletin which is the complement of this one. Subsequently 20 others were selected, and of these 10 were shorn, the remaining 10 retaining their fleeces until after the close of the experiment. The animals used in this experiment were therefore the second choice, as 100 had previously been selected from the whole lot. They were good grade lambs of both sexes, but the males were all wethers. The breeding was mixed, no accurate particulars were obtained regarding it, but judging from the appearance of the animals they were the offspring of the common ewes, and from pure rams of the various long and short wool varieties used in the country, as the Leicester, Ootswold, Oxford-Down, Shropshire and Southdown, but the Leicester blood evidently predominated. Some of the animals would have passed for pure Leicesters. They were in fair condition at the commencement of the experiment, so much so that they would have readily sold at that time for the American market at the price at which they were valued, viz, 5 cents per pound live weight.

PERIOD OF PREPARATION. At the close of November, 10 of the lambs were shorn. They were all then placed in the same pen on December 2, and were fed together until January 6, when the experiment proper commenced. The long preparatory period to which they were thus subjected gave the animals composing the two lots an even chance on entering the experiment. At the commencement of this preparatory period the weights were as follows:

	Aggregate weight.	Average weight.
20 lambs, shorn and unshorn..	1,936.50 lb	96.83 lb
10 lambs, unshorn.....	1,018.50 "	101.85 "
10 lambs, shorn.....	918.00 "	91.80 "

The wool from the 10 shorn lambs weighed 45.31 pounds and was sold at 13 cents per pound. In development therefore, there was a slight advantage in favor of the 10 unshorn lambs.

CONDITIONS GOVERNING EXPERIMENT. 1. The unshorn and shorn lambs, designated groups 1 and 2 respectively, were put in separate pens on January 6, when the experiment commenced and were kept in these until it closed. These pens were in a closed shed, with ceiling $10\frac{1}{2}$ feet high, and hay loft overhead. The pens were $24\frac{3}{4}$ feet long and $13\frac{1}{2}$ feet wide. The length of manger was $20\frac{1}{2}$ feet, which gave practically 2 feet to each sheep, and this was found to be sufficient. In the rear and front of each there was a window, and also in front were double doors, each 3 feet wide and cut in two across the centre. The top doors were kept constantly shut except on fine sunny days. The bottom doors were kept constantly open for the unshorn lot day and night, unless when very stormy, and for the shorn group they were kept open only in fine weather in the cold months. The pens opened into yards facing the south-west. These yards were $28\frac{1}{2}$ feet long and $13\frac{1}{2}$ feet broad. To have the yards facing the south or south-east would be preferable, but in this instance the play of west and south-westerly winds is arrested by the barn. 2. Both groups were given the same kinds of food and the same quantities throughout the experiment, except in the case of hay, of which they were given all they would take. Of this, however, the two groups took the same amount. 3. The lambs in each lot were weighed monthly throughout the experiment, except in the case of the last weighing, which of necessity had to be made before the month had expired, as these lambs formed part of the lot shipped to England early in May. These weights are given singly in Table 1 of this bulletin.

FOOD AND FEEDING. The food fed to the lambs throughout the experiment consisted of hay, grain, bran and roots. The hay was composed of mixed grasses, the common red clover predominating. It was fed uncut. The grain ration was made up of three parts oats, two parts pease, and one part bran, by weight. The oats and pease were fed whole. The roots included both turnips and mangels, but these were not fed together. They were sliced before feeding them. The food was given in two feeds per day, morning and evening. The water was so furnished from taps in the pens, that the lambs could virtually partake of it at will.

ESTIMATED VALUE OF THE FOOD. The food was estimated at the current market values in Guelph, less the cost of marketing from an Ontario farm under average conditions. These conditions relate to the size of the farm, its distance from market, and the state of the roads. The average market price for oats was 40 cents per bushel, for pease 60 cents, for bran \$14.00 per ton, for roots 11½ cents per bushel, and for hay \$7.00 per ton. A careful estimate was made of the cost of marketing under the conditions named above. In the case of the grain it included the cleaning, and also took into account the difference between the quality of grain as usually fed and as prepared for market. The estimate was made on the basis of hired labor for man and team. The cost of marketing these respective foods was thus found to be in the case of oats, 5½ cents per bushel, pease 8 cents, roots 4½ cents, and hay \$2.50 per ton. One cent per bushel was charged for slicing the roots. The home value of the food components was therefore as follows: Oats 54½ cents per bushel, pease 52 cents, bran \$14.00 per ton, roots, when sliced, 8 cents per bushel, and hay \$4.50 per ton.

FOOD EATEN. The total amount of food eaten by the lambs of each group was practically the same during the experiment. Each group consumed 2,136 lb. grain and bran, 2,167 lb. hay, 5,615 lb. roots. The amount of food eaten by each lamb per day on an average throughout the experiment was therefore:

Oats.....	.95 lb.	} 1.90 lb. grain and bran
Pease	.63 "	
Bran	.32 "	
Hay.....	1.91 "	
Roots	5.00 "	
Total	8.81 "	

At the end of the first month or period, a slight increase was made in the quantity of the grain ration given. This was the only change that was made in the quantity of food fed, but it should be remembered that all the hay was given that the lambs would eat.

WEIGHTS. Table 1 gives the weights of individual animals at the commencement and close of the experiment.

Group 1.			Group 2.		
Weight of each animal		Individual increase during the experiment.	Weight of each animal		Individual increase during the experiment.
At commencement of test.	At close of test.		At commencement of test.	At close of test.	
lb.	lb.	lb.	lb.	lb.	lb.
132.5	184.0	51.5	94.0	164.0	70.0
116.0	162.5	46.5	111.0	169.0	58.0
105.0	149.0	44.0	105.5	151.0	45.5
103.5	147.5	44.0	101.0	149.0	48.0
110.5	153.5	43.0	107.5	148.5	41.0
130.0	171.5	41.5	90.0	129.5	39.5
117.5	158.0	40.5	94.0	130.0	36.0
104.0	144.5	40.5	103.5	139.0	35.5
107.0	146.0	39.0	113.0	144.0	31.0
93.0	129.0	36.0	106.0	132.0	26.0

It will be observed that there is a wide difference in the gains made by individual lambs. The highest increase made by one animal during the experiment was 70 lb., a daily gain of .62 lb. The lowest gain was only 26 lb., a daily gain of but .23 lb. The five lambs in each group which gave the highest increase in weight gained .43 lb. per day, and the five which gave the lowest increase gained but .32 lb. per day. The profits therefore in all probability came largely from the lambs which made the best daily gains. But to be quite clear on this point, we would require to know the food consumed by each lamb. The marked difference in the gains, however, emphasises the importance of making careful selections when lambs are to be fattened.

Table 11 gives a summary and an analysis of weights.

---	Unshorn lambs.	Shorn lambs.
	lb.	lb.
Weight at commencement	1119.000	1028.500
Weight at close	1545.500	1456.000
Increase per group	426.500	427.500
Average daily increase per group	3.774	3.783
Average individual increase	42.1650	42.750
Average individual daily increase	.377	.378

The average daily gain of the lambs in the two groups was practically the same, there being but one pound of difference in favor

of the shorn lambs. This difference would probably have been more had the lambs been shorn earlier in the season. The average daily gain of each lamb was .38 lb. or nearly $\frac{3}{8}$ pound per day.

VALUES. Table III gives the financial results of the experiment.

	Unshorn lambs.	Shorn lambs.
Value of animals at commencement of test.	\$55 95	\$51 42
Cost of Shearing .....	.....	50
Cost of Food	31 45	31 45
Cost of attendance.....	2 82	2 82
Total Cost	\$90 22	\$86 19
Value of animals at close of test	\$108 18	\$101 92
Value of wool .....	.....	5 93
Value of manure.....	8 48	8 48
Total Value	\$116 66	\$116 33
Gain	26 44	30 14
Gain per cent. on Investment.....	29.31	34.97

The lambs were valued at five cents per pound at the commencement of the experiment, as stated elsewhere. At its close they were valued at seven cents per pound, as we were offered this sum by Mr. L. O. Barber, live stock dealer, of Guelph. It is only fair to state here that this is more than has hitherto been paid for lambs at that season of the year. The offer was refused, as we desired to ship some of them to Great Britain, along with a number more fed for that purpose, to make the number so shipped an even hundred. Full particulars are given regarding the feeding of these lambs and the shipment of the same in bulletin LXIX.

The manure was valued at $\frac{3}{4}$ of a cent per day per lamb. This estimate is based upon the results of an experiment conducted by Prof. I. P. Roberts, of Cornell University experiment station, New York, wherein the value of the manure made from one sheep per day is reckoned at one and a half cents. For reasons which we do not stay to mention now, we consider the estimate referred to too high to apply to Ontario conditions. We have therefore put the value of the manure as stated above.

The cost of attendance was reckoned on the basis that one man would feed and care for 400 lambs per day under ordinary conditions when the food has all been made ready. This estimate is probably very near the truth. At all events it is not an extravagant one, as anyone who has engaged in this work must know very well. It will be observed that the gain on the shorn lambs was \$3.70 more

than on those unshorn. But too much should not be made of this at present, as in the offer for the lambs no distinction was made between those shorn and unshorn. It is important, however, to note that the shorn lambs shipped better than the unshorn, as will be more fully stated in the bulletin relating to the whole lot which were exported to Great Britain. The total average gain on the investment during the 113 days which the experiment lasted, viz., 32.07 per cent., is a very satisfactory one.

A few of the lambs in this experiment were sent to England, to take the place of others in the larger experiment which were not considered suitable, hence the difficulty of giving the actual returns realised. Should the price offered for these lambs be considered unduly high, the reader can estimate values based upon the current prices in his neighborhood.

CONCLUSIONS. The following are the chief of the conclusions to be deduced from this experiment:

1. That good grade lambs when being fattened in winter will make satisfactory gains on a daily ration of 1.90 lb. grain and bran, 1.91 lb. hay and 5 lb. roots, or a total of 8.81 lb.

2. That lambs when properly fed and cared for in the winter, the ration being the same as that used in this experiment, will make an average gain per day of .38 or nearly 2.5 lb.

3. That good grade lambs may be made to gain .38 lb. per day at an outlay of 2.78 cents per day for food, when the prices are the same as those charged in this experiment.

4. That there is some advantage to be derived from shearing lambs in autumn for winter feeding, although the extent of the advantage was not very marked in the experiment.

5. That about 12 per cent. represents the relation which the value of the wool when shorn bears to that of the animal under conditions similar to those which relate to this experiment.

6. That when good grade lambs are fattened in winter, the prices of mutton and food being the same as in this experiment, a profit of 32.07 per cent. may be realised on 113 days' feeding.

7. That as the lambs in this experiment cost \$3.76 when laid down at the farm and would bring \$10.80 per head at the close of the experiment, the advance in value was \$7.04 per head, that is to say, they were worth nearly three times as much as they cost in the first place.

8. Inasmuch as the opinion has very generally prevailed among farmers that lambs cannot be fattened in the winter at a profit, in view of the above this opinion should be carefully reconsidered.