

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

CANNON BONES
SOME DIMENSIONS, HERITABILITIES
AND
RELATIONSHIPS TO CARCASS QUALITY
IN
ROMNEY WETHER LAMBS

A Thesis

Presented in Partial Fulfillment of the

Requirements for the Degree of

M. Agr. Sc.

by

A.H. Hughes

1957

TABLE OF CONTENTS

Introduction

<u>Chapter</u>		<u>Page</u>
1	<u>Review of Literature</u>	
	Development of Long Bones	1
	Factors Effecting Development of the Cannon Bone	4
	Carcass Quality	13
	Heritability of Body Characters	22
	Conclusions	23
2	<u>Materials and Methods</u>	
	Experimental Animals	24
	Cambridge Block Test	30
	Data used in this Study	32
3	<u>Methods of Analysis</u>	
	The Mathematical Model	36
	Estimation of Heritability	43
	Estimation of Genetic Correlations	46
	Estimation of Environmental Effects	48
4	<u>Results</u>	
	Estimates of Environmental Effects	49
	Estimates of Heritability	59

<u>Chapter</u>	Page
4 (Cont.)	
Estimates of Phenotypic Correlations	61
Estimates of Genetic Correlations	63
5 <u>Discussion</u>	
Effects of Environmental Factors	67
Genetical Variation	70
Genetical Covariation	73
Conclusion	74
<u>Summary</u>	77
<u>Bibliography</u>	80
<u>Appendices</u>	

ACKNOWLEDGMENTS

This study was prompted by Professor A.L. Rae to whom the author is sincerely grateful for, without his advice, help and continued enthusiasm, this thesis would not have been written.

Thanks are also due to Mr. R.A. Barton for advice on carcass quality aspects, also to Miss M.G. Campbell and the Library Staff, Massey Agricultural College for their help in obtaining references from interloan sources.

Finally the author wishes to acknowledge his gratitude to Mrs A.W. Warren for typing this thesis.

INTRODUCTION

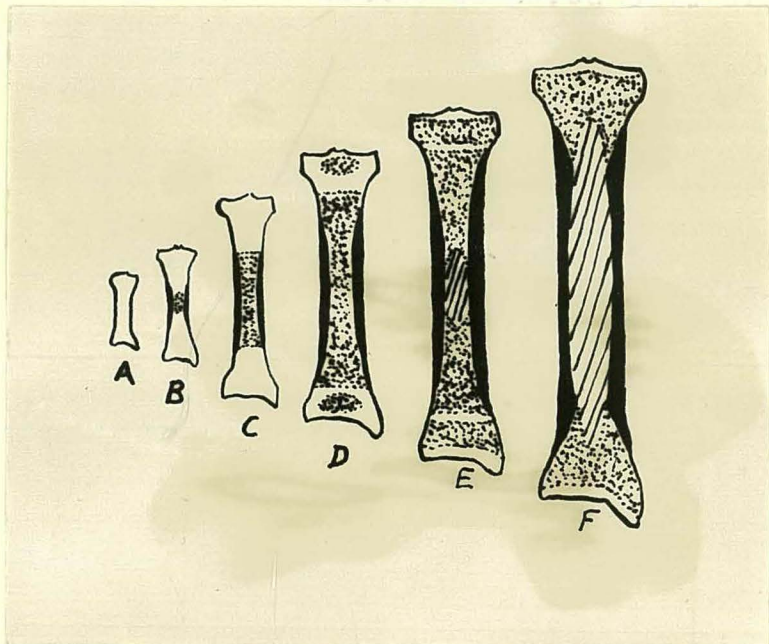
In the past and to a certain extent at the present time sheep breeders have paid considerable attention to the dimensions of the cannon bones of their animals in the belief that this bone serves as a good indicator of the quality of the conformation and constitution of their animals. Scientific workers interested in meat and carcass quality have also attached considerable importance to the cannon bone as an index of carcass composition and hence of carcass quality.

The origin of the sheep breeders beliefs is no doubt due to years of farmer observation supported to some extent by the findings of the scientific workers, who of necessity, using relatively small numbers of animals, have established relationships between the dimensions of the cannon bone and other characters of economic importance.

The existence at Massey Agricultural College of complete records, concerning cannon bone dimensions and carcass quality, collected from a relatively large number of animals, prompted this present study which was intended to yield more accurate results than those previously reported. At the same time this study was designed to yield estimates of the heritability of cannon bone dimensions and their relationship to carcass quality thus providing a basis on which breeders might decide whether or not they would continue to place the present amount of emphasis on the cannon bone in their selection practices.

Evolution

The evolution of the horse is a classic example of adaptive radiation. It shows how a single lineage can diversify into many different forms as they adapt to different environments and ecological niches. The fossil record provides a clear sequence of changes in the horse's anatomy over time, from small forest-dwelling animals to large open-land grazers.



These diagrams illustrate the process of natural selection. As the horse's environment changed from forest to open grasslands, the selection pressure favored individuals with longer, stronger legs that could run faster and cover greater distances. Over time, these traits became fixed in the population, leading to the modern horse's anatomy.

The fossil record shows a clear progression of these changes, with each stage representing a different point in the horse's evolutionary history. The transition from a small, forest-dwelling animal to a large, open-land grazer is a testament to the power of natural selection and the adaptability of life.