Cattle - Cost of production O.S.

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COSTS OF BREEDING AND REARING CALVES TO WEANING FROM GALLOWAY AND CROSS-BRED HERDS IN NORTHUMBERLAND 1948-49

By

E.M. Carpenter, M.A.

The breeding and rearing of calves from suckling herds on the kinds of farms represented in this investigation, is a type of farm enterprise which is not easy to reduce to precise costings.

The Farm Economics Branch is therefore particularly glad to acknowledge its indebtedness to the herd-owners whose ready and willing co-operation has made available the material on which this report is based.

Comments and inquiries arising out of the report should be addressed to:-

D.H. DINSDALE,

Provincial Agricultural Economist.

Farm Economics Branch,
King's College,
Newcastle-on-Tyne, 1.

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I.

The following report is the outcome of the first year of an investigation into some aspects of the economics of store cattle raising. It deals with the first stage of beef production, viz., the breeding and rearing of calves, up to weaning.

That beef production, particularly in times of scarcity, is no stereotyped process, is well known. Thus beef stores are now commonly bred not only from dams of accepted beef or dual purpose type but also from animals once regarded as suitable only for dairying. Again, calves may be reared either on the pail, or, as sucklers, either by the multiple or one cow, one calf system.

The present enquiry is confined to beef cows nursing their own calves. Nevertheless, within this definition, systems of breeding and rearing vary not only between farms but also sometimes on the same farm, by reason of breeds of cows and bulls used, methods of wintering, calving dates, and the age and purpose for which calves are intended to mature.

Weaned calves therefore, even if they are all of an age, cannot be considered a homogeneous product in the same way as milk or even fat cattle. In fact they represent only a common stage reached in different ways in the growing of different products, e.g., fat or breeding cattle.

In attempting to assess efficiency of production, some wider considerations of the place of breeding herds in farm economics are needed. In the present enquiry alone, four different general policy objectives in breeding calves, can be distinguished, (i) to maintain or improve the quality of hill sheep grazings, (ii) to obtain revenue from poorer land on farms of high general fertility, (iii) to reduce expenditure on store cattle at a time of high prices, on traditionally feeding farms, and (iv) on arable farms, to make cheaper muck than would be possible were all the yards filled with feeding cattle.

It is perhaps not surprising that what is only a part of the whole cattle enterprise and that often secondary to sheep or corn growing, should occupy in many cases a subsidiary place in the total farm economy. The point is made here because it is very striking in the face of the all too well known shortage of beef supplies. In effect this means that, despite encouragement from high prices and subsidies, unless the incentive is very great, self-rearing will remain, at least on most farms with which this report is concerned, a branch of production to be fitted in rather than tackled as a major enterprise.

II.

This report deals with costs obtained for 1373 breeding cows and their calves on 43 farms in Northumberland. On two farms there were two distinct herds. In addition, cows wintered inside and cows outwintered have been treated separately, thus giving a total of 51 costed herds. The farms supplying information are situated in three districts, two in the south and one in the north of the county.

Fourteen farms with 19 costed herds lie within a few miles of the Roman Wall between the villages of Corbridge and Greenhead. With three exceptions, these are upland or true hill farms with few sale products other than cattle and sheep. They

are however, of varying quality both as to amount of enclosed land and altitude; some have land above 1000 feet.

A further 15 farms supplying costs for 16 herds are situated in and about the North Tyne valley between the villages of Simonburn and Falstone. All these are upland or true hill farms with less variation in type and altitude than those along the Roman Wall. Many of these farms also have land above 1000 feet.

The third district, from which 14 farms gave details for 16 herds, is the area around the market town of Wooler, in north Northumberland (Glendale). The farms here show more variation in their production, but are in the main highly fertile arable holdings with strong supporting cattle or sheep enterprises. Many of these farms have varying acreages of rough, or, in two cases surveyed, hill grazings. Most of the land however, is low lying and nearly all with which this enquiry is concerned is below 600 feet.

Two main breeds of cow are represented in the costs obtained, Galloway, and Aberdeen Angus-Shorthorn Cross. The cross cows are mostly of Irish origin. Other breeds and crosses comprised Blue Grey (White Shorthorn-Galloway Cross) (1 herd), Shorthorn (2 herds), Hereford (1 herd) and Shorthorn-Highland Cross cows (1 herd).

Although in general the pure Galloway herds were located in the first two districts and the Cross cows in Glendale, the costs have been analysed by breed rather than district. Results are therefore presented for two groups: A. Pure Galloway Herds, and B. Cross-bred and other Herds.

The following tables give further details of the types of farms on which the herds in the two groups are kept.

TABLE 1. LAND USE ON FARMS SUPPLYING COSTS

	GROUP A (Galloway Herds) Average of 24 Farms	GROUP B (Cross Herds) Average of 19 Farms
	Acres	Acres
Tillage	16	181
Rotation Hay .	14	47
Meadow Hay ...	33	12
Young Pasture.	8	126
Old Pasture ..	64	117
Rough Grazings	622	254
Waste	3	3
Total Acres ..	760	740
Rent per Acre	10/1d.	22/10d.

TABLE 2. SUBSIDIES DRAWN BY FARMS SUPPLYING COSTS

Number of farms drawing:-	GROUP A (out of 25 farms)	GROUP B (out of 20 farms)
Hill Cattle Subsidy	24	7
Hill Sheep Subsidy at full rate	18	2
Hill Sheep Subsidy at half rate	3	1

TABLE 3. ELEVATION OF FARMS SUPPLYING COSTS.

Number of farms with highest land:	GROUP A	GROUP B
1000 feet or over	10	2
800 - 999 feet	8	4
600 - 799 "	6	2
400 - 599 "	1	5
200 - 399 "	-	7

Note:- In addition to the 24 farms averaged to show land use in Group A, one other farm provided cost information but is excluded from this calculation because of stint rights on common grazing.

In Group B, 20 farms supplied herd costs but acreage detail was obtained for 19 only.

Two farms furnished both Galloway and Cross herd costs and are therefore averaged in both groups.

III.

Mention has already been made of the various ways in which the calf rearing enterprise differed among the herds reviewed in this report. The two groups distinguished in Tables 1-3 also present significant differences in respect of size of herds, and breed of bulls used. Herds in Group A were in general much smaller than in Group B, averaging 19 cows per farm in the former case and 49 in the latter. While this difference is incidental to the breed of cow, the different bulls used are of course closely connected with it. In Group A on the Galloway cows either a Galloway or White Shorthorn was generally used. In Group B, with few exceptions, the Aberdeen Angus was preferred.

This use of bulls demonstrates a further factor in store production. Whereas the Angus and White Shorthorn bulls are used to stamp quality and size respectively on feeding cattle, the Galloway, though also a quality producing sire, lacks size for mating with its own breed to produce beef for any but a luxury trade. In consequence it is used to produce breeding heifers rather than feeding stores. Often indeed Galloway and Shorthorn bulls are used in the same herd to provide both stores and herd replacements.

TABLE 4.

A. BULLS USED ON GALLOWAY COWS

Number of herds using:		
	Galloways	11
	White Shorthorns	11
	Red Shorthorns	2
	Galloways & White Shorthorns	3
	Galloways and Aberdeen Angus	1

B. BULLS USED ON CROSS COWS

Number of herds using:		
	Aberdeen Angus	16
	Herefords	3
	Galloways	2
	Red Shorthorns	1
	Aberdeen Angus and Herefords	1

The Galloway and White Shorthorn bulls are usually of local origin, certain strains of white bulls being particularly sought after. Several of the Aberdeen Angus and Hereford bulls had been bought at sales as far afield as Perth and Hereford itself.

It follows from the use of cows and bulls already described, that the calves in Group A were mostly either pure Galloway, or Blue Grey, while those in Group B were in the main Aberdeen Angus cross. In both groups they were dropped throughout the costing period from 1st November 1948 to 31st October 1949. Isolated calves which were born late in 1949 and would continue suckling until the spring of 1950 have been excluded from the year's production. A corresponding adjustment has been made to bring into the year's production those calves born shortly before November 1st 1948. By far the greater part of the calves, however, were born in the spring, calvings being on the whole about a month later in the Galloway than in the Cross herds.

TABLE 5. CALVING DATES

	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Total
Galloway Cows	%	%	%	%	%	%	%	%	%	%	%	%	%
Wintered In	8	4	3	6	22	33	14	4	3	1	1	1	100
Wintered Out	1	-	-	2	22	44	28	3	-	-	-	-	100
Total Galloway	5	2	2	4	22	38	20	3	2	1	½	½	100
Cross Cows													
Wintered In	-	-	25	22	28	16	7	1	½	-	-	½	100
Wintered Out	-	1	20	26	36	12	3	1	½	½	-	-	100
Total Cross	-	1	22	24	33	14	4	1	½	½	-	½	100

In each group calves were produced both for sale as weaned calves, and for rearing. In Group A the calves retained will be sold either as strong stores, bulling or calving heifers or, in a few cases, as fat beasts. In Group B the calves kept will mostly be finished on the same farm, with a few going away as forward stores. In Group A just over a quarter of the calves reared were sold as calves. Fourteen farms retained all their calves. In Group B slightly more than half the calves were sold at weaning. Five farms disposed of their entire crop.

The decision whether a herd is to be wintered indoors or run out must compromise between many conflicting reasons. It is not surprising therefore, that there was no very marked difference between the two groups in the proportions treated either way, nor that the separate results for herds in- and out-wintered show no very positive differences in results. Apart from such considerations as making muck, protecting early calves from inclement weather, and the hope of lengthening the cow's useful life, some others are actually contradictory. For example, it has been suggested on the one hand that in-wintered cows become lazy and will not forage for themselves when turned out through the day. On the other hand, it was held that, by giving the cows warmth and shelter at nights from January to April, the necessity of hand feeding is reduced to a minimum. Therefore, although the system of wintering adopted in individual cases may well have some effect both on the cow and her calf, no general verdict can be given in this report.

Of the Galloway herds, 16 were wintered inside, and run out through the day, and 12 stayed out all winter. Among the cross herds, 9 were wintered in. Two of these spent at least part of the winter inside entirely. Fourteen other herds remained out all the time. It should be noted, however, that few of the herds were brought in earlier than December, and some even later. Though most were turned out through the day, this might be at one extreme merely for exercise, or at the other, to forage for themselves a considerable part of their food requirement.

The foregoing should give an idea of the salient differences between the two groups. It remains only to attempt to complete the picture by showing how calf rearing fits into the economy of these farms. On the whole, the enterprise is more specialised and less subsidiary on the farms in Group B than in Group A. Thus, barren cows or cows calving out of turn are in Group B normally culled, while in Group A this is not always the case. For this reason, and particularly of late years following the storm of 1947, the percentage of calves reared from the available breeding cows can be expected to be higher in Group B than Group A.

In Group A, on 15 farms sheep provided more revenue than cattle. On 10 farms cattle provided more revenue than sheep. Actually the differences between revenues from cattle and sheep, including subsidies, were seldom very wide. Differences in revenue, moreover, do not reveal the far greater margin of profit left by the sheep enterprise in all cases, despite the high cattle sales. Furthermore, whereas the turnover in sheep would be mostly from lambs bred on the farms, that in cattle was raised in many cases by purchases of twelve to eighteen months old store beasts.

In Group B, corn was the main source of revenue on 8 farms, followed by sheep or cattle; on 4 farms sheep followed by cattle; on 4 farms cattle followed by sheep and corn; on one farm cattle followed by sheep; on one farm milk followed by cattle and corn; and sheep followed by corn and cattle on one other farm. The farms in this group are in fact less uniform in type than those in Group A. Nevertheless of the 19 farms from which information was obtained on this point, all but four showed corn among their principal sales.

It is difficult to assess the size of a cattle raising enterprise which is arbitrarily taken as finishing at the weaned stage, and where only part of the production is sold. In Group A however, sales of calves per farm amounted to £99 and the value of the calves retained was £234, or a total annual gross production of £333 per farm from the breeding herds.

In Group B equivalent per farm figures were Calves Sold, £698; Calves Retained, £473; Total Annual Gross Production £1171.

IV.

To compute the cost figures included in this report certain conventions have been adopted. First, there is of course no common point at which the rearing of one calf ends and the gestation period for the next begins. The cows normally suckled their calves until early October or late November but would have been bulled again before this from about April to July. The aim is to produce one calf every year. For this reason a cost period of one year is taken from November 1st 1948 to October 31st 1949 to cover the cost of both breeding and rearing the weaned calves. All the expenses in maintaining the herd at the same strength, providing bulls, feeding and grazing, labour and the like during this period are charged against the calves then produced.

The following notes explain the methods used in accounting the items of cost.

(1) Herd Maintenance. Opening valuations were based on original cost depreciated to the date of valuation, November 1st 1948.

Cows bought include cows and first calving heifers bought during the cost period or during 1948. They have been charged into the herd at their original purchase price plus an allowance for keep up to October 31st 1949, unless bought in calf, when they have been brought into the herd at the date of purchase at their purchase price. Appropriate deductions from cost have been made for the rearing of calves brought on to the farm with their dams in respect of cows not entering the herd before October 31st 1949. Similarly hill cattle subsidy received for cows and heifers not entering the herd before that date has been treated as a deduction from their cost as replacements.

Heifers transferred into the herd are home-bred heifers or heifers bought as calves and are entered at estimated cost of production.

Cows transferred out are those transferred out of the herd for feeding.

Constant values have been used in arriving at the closing valuation except where the size of herd has increased, when additional cows have been valued at cost.

(2) Bull Cost includes depreciation, feeding, and grazing, but labour is included in total labour.

(3) Feeding. Bought foods have been charged at actual cost delivered. The following cost of production figures based on average fodder crop costs obtained by this department have been used in calculating the cost of home-grown foods.

Hay	3/9d. per cwt.	Arable Silage	2/- per cwt.
Straw	1/6d. " "	Grass Silage	2/- " "
Turnips	1/8d. " "	Pea & Oat Hay	6/3 " "
Mangels	1/10d. " "	Long Oats	11/6 " "
		Oats	11/- " "

(4) Grazing includes Rent, Manuring, Establishment of Leys, Cultivations and Thistle Cutting. One-third of all hay acreage has been treated as grazing. In order to arrive at a share of total grazing costs chargeable to the cows and calves, the following conversion factors have been used.

Cattle over 2 years	= 1	Ewes & hoggs	= $\frac{1}{4}$
Cattle 1-2 years	= $\frac{3}{4}$	Lambs	= 1/10th
Cattle under 1 year	= $\frac{1}{2}$	Horses	= 1

(5) Labour. All paid manual labour has been charged at actual cost including perquisites; unpaid labour, including occupier's, at cost of equivalent hired labour.

(6) Miscellaneous Costs include cost of horses or tractors carting food (horses charged at 1/2d. per hour, tractors at 3/- excluding driver), Veterinary expenses, Haulage of cows to or from market and auctioneer's commission for cows only.

(7) Total Herd Costs are those involved with the cows and bulls only.

(8) Total Costs include also expenses incurred solely in respect of calves, e.g., replacements of calves, and selling expenses.

(9) Overheads. Total overhead costs other than those directly applicable to particular enterprises were obtained on 16 farms with Galloway herds, and 11 farms with Cross herds. A share of these has been charged according to the proportion of total labour involved in the calf-rearing enterprise. In other cases the average cost per £1 labour of overheads on the farms providing information has been charged per £1 labour involved in the calf enterprises. Average overheads thus charged were calculated separately for Galloway and Cross herds.

Perhaps the main point of principle in accounting methods which calls for comment is concerned with the use of uniform rates of charge for fodder crops and horse and tractor work. Home-grown feeds, as shown later, are the largest single item of cost. Economy in food production and in the use of horse or tractor power are two of the chief directions in which the farmer can prove his efficiency. The flat rates of charge used in this study give no indication whether, in fact, the farmers concerned are producing their fodders economically. Nor is it possible to say whether the work they get out of horse or tractors results in operating costs lower or higher than the flat rates charged here.

To provide actual costs for fodders, and for horse and tractor work farm by farm would have required full costing of these items on each farm. This additional work could not be undertaken, and the simple device of uniform rate is the alternative.

The comparative quantities of foods fed are of course, reflected by the differences in the money figures for the various farms.

V.

The total number of cows in Group A which might have had calves during the period was 462. Of these, 461 were on the farms at November 1st 1948 and one was bought in calf during the year. In Group B there were 890 cows at the start of the period, to which were added later 21 in-calvers, making a total of 911.

The 462 cows in Group A produced 369 weaned calves, while the 911 cows in Group B reared 864 calves. Table 6 sets out these figures as percentages of the total numbers of breeding cows.

TABLE 6

A. CALVES REARED IN GALLOWAY HERDS

	Wintered INSIDE		Wintered OUTSIDE		Total GALLOWAYS	
	No.	%	No.	%	No.	%
Opening Valuation Cows	248	100	213	100	461	100
Breeding Cows added ..	-	-	1	-	1	-
TOTAL BREEDING COWS ..	248	100	214	100	462	100
Calves born alive	206	83	160	75	366	79
Calves set on	3	1	1	-	4	1
Calves died	-	-	1	-	1	-
TOTAL CALVES REARED ..	209	84	160	75	369	80

B. CALVES REARED IN CROSS HERDS

	Wintered INSIDE		Wintered OUTSIDE		TOTAL CROSS	
	No.	%	No.	%	No.	%
Opening Valuation Cows	313	95	577	99	890	98
Breeding Cows added ..	15	5	6	1	21	2
TOTAL BREEDING COWS ..	328	100	583	100	911	100
Calves born alive	307	94	548	94	855	94
Calves set on	4	1	7	1	11	1
Calves died	2	1	-	-	2	-
TOTAL CALVES REARED ..	309	94	555	95	864	95

After allowing for credits and overheads, the total cost of breeding and rearing the 369 calves in Group A was £6562 and the total value of the calves £8363, leaving a margin of £1801. Corresponding figures for the 864 calves in Group B were: Cost £14,610; Value of calves £23,423; Margin £8813. In addition, hill cattle subsidy for the breeding cows amounted to £1656 in Group A and £920 in Group B.

These costs and returns can more easily be comprehended and compared when expressed per breeding cow or per calf as follows:-

	GROUP A GALLOWAY HERDS		GROUP B CROSS HERDS	
	Per Cow	Per Calf	Per Cow	Per Calf
	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Value of Calves ...	18. 2. 0.	22.13. 3.	25.14 3.	27. 2. 2.
Total Cost	14. 4. 0.	17.15. 7.	16. 0. 9.	16.18. 2.
Margin	3.18. 0.	4.17. 8.	9.13. 6.	10. 4. 0.
Hill Cattle Subsidy	3.11. 8.	4. 9. 9.	1. 0. 2.	1. 1. 3.

The main differences in costs and returns between the two groups are apparent from the above figures. The Galloway herds, being run more cheaply, produced fewer calves and calves of lower value than the Cross herds. A more detailed picture of the items of cost is given in Tables 7 and 8, from which the above figures have been extracted.

TABLE 7.

AVERAGE COSTS AND RETURNS OF CALF REARING PER BREEDING COW

	GALLOWAY HERDS		Total on 462 Galloway Cows	CROSS HERDS		Total on 911 Cross Cows
	Wintered IN on 248 Cows	Wintered OUT on 214 Cows		Wintered IN on 328 Cows	Wintered OUT on 583 Cows	
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
HERD COSTS						
Herd Maintenance.	1.19. 4	1.16. 9	1.18. 2	1. 0. 4	1. 8. 0	1. 5. 3
Bull Cost ...	13. 8.	13. 7.	13. 7.	16. 8.	18. 9.	18. 0.
Feeding:						
Bought	10. 2.	17. 2.	13. 5.	8. 6.	6. 4.	7. 1.
Home-grown..	4.13. 2.	3.14. 7.	4. 4. 7.	6. 5. 9.	5. 8.10.	5.14.11.
Grazing	2.10. 4.	2. 9. 1.	2. 9. 9.	4. 7. 8.	4. 1. 2.	4. 3. 6.
Labour	3. 1. 9.	1.19. 9.	2.11. 6.	1.14. 3.	1.15. 0.	1.14. 9.
Miscellaneous	4. 9.	1. 0. 2.	11.10.	9.11.	16. 3.	14. 0.
TOTAL HERD COST	13.13. 2	12.11. 1	13. 2.10	15. 3. 1	14.14. 4	14.17. 6
ADD Costs on Calves						
Replacements	2. 5	2	1. 5	1. 3	1. 5	1. 4
Selling Expenses	2. 5	2. 1	2. 3	6. 5	6. 7	6. 6
TOTAL COST PER COW	13.18. 0	12.13. 4	13. 6. 6	15.10. 9	15. 2. 4	15. 5. 4.
TOTAL CALVES	18.11.10.	17.10. 8	18. 2. 0	25.11. 5	25.15.10	25.14. 3
Margin	4.13.10	4.17. 4	4.15. 6	10. 0. 8	10.13. 6	10. 8.11
ADD Credits Sundry	1.10	-	1. 0	-	2	2
Hill Cattle Subsidy	3.18. 1	3. 4. 3	3.11. 8	19. 6	1. 0. 7	1. 0. 2
GROSS MARGIN	8.13. 9	8. 1. 7.	8. 8. 2	11. 0. 2	11.14. 3	11. 9. 3
Less Overheads	1. 1. 9	14. 7	18. 6	13. 5	16. 9	15. 7
NET MARGIN (PROFIT) PER COW	7.12. 0	7. 7. 0	7. 9. 8	10. 6. 9	10.17. 6	10.13. 8.

TABLE 8.

AVERAGE COSTS AND RETURNS OF CALF REARING PER CALF REARED

	GALLOWAY HERDS		TOTAL on 369 Calves GROUP A	CROSS HERDS		TOTAL on 864 Calves GROUP B
	Wintered IN on 209 Calves	Wintered OUT on 160 Calves		Wintered IN on 309 Calves	Wintered OUT on 555 Calves	
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
HERD COSTS						
Herd Maintenance	2. 6. 9	2. 9. 2.	2. 7. 9.	1. 1. 7.	1. 9. 5	1. 6. 7
Bull Cost ..	16. 2	18. 2	17. 1	17.11	19. 7	18.11
Feeding:						
Bought.....	12. 1	1. 3. 0	16.10.	9. 0.	6. 8	7. 6
Home-grown	5.10. 7	4.19. 9	5. 5.11	6.13. 5	5.14. 4	6. 1. 2
Grazing	2.19. 9	3. 5. 8	3. 2. 4	4.13. 0	4. 5. 3	4. 8. 2
Labour	3.13. 2	2.13. 1	3. 4. 6	1.16. 3	1.16.10	1.16. 6
Miscellaneous	5. 8	1. 7. 0	14.10.	10. 6	17. 1	14. 9
TOTAL HERD COST	16. 4. 2	16.15.10	16. 9. 3	16. 1. 8	15. 9. 2	15.13. 7.
ADD Costs on Calves						
Replacements	2.10	3	1. 9	1. 4	1. 6	1. 5
Selling Expenses	2.10	2. 9	2. 9	6.10	6.11	6.11
TOTAL COST	16. 9.10	16.18.10	16.13. 9	16. 9.10	15.17. 7	16. 1.11
TOTAL CALVES	22. 1. 3	23. 9. 0	22.13. 3	27. 2.10	27. 1.10	27. 2. 2.
Margin	5.11. 5	6.10. 2	5.19. 6	10.13. 0	11. 4. 3	11. 0. 3
ADD Credits						
Sundry	2. 1	-	1. 3	-	3	2
Hill Cattle Subsidy	4.12. 8	4. 6. 0	4. 9. 9	1. 0. 9	1. 1. 7	1. 1. 3
GROSS MARGIN	10. 6. 2	10.16. 2	10.10. 6	11.13. 9	12. 6. 1	12. 1. 8
Less Overheads	1. 5.10	19. 6	1. 3. 1	14. 2	17. 7	16. 5
NET MARGIN (PROFIT) PER CALF	9. 0. 4	9.16. 8	9. 7. 5	10.19. 7	11. 8. 6	11. 5. 3.

In the following tables showing the range of individual costs, herd maintenance has been excluded. Yearly figures for this item on particular farms vary between very wide limits and may bear no relation to the average annual rate of depreciation on a particular herd. This should not mean, however, that the average cost of herd maintenance for all herds is wide of the mark. Overheads and credits are also excluded from the individual costs shown in the ranges in Tables 9 and 10.

TABLE 9. RANGE OF HERD DIRECT COSTS PER BREEDING COW

GROUP A GALLOWAY HERDS

Lowest Cost £5. 19. 3. Highest Cost £17. 14. 1.
Average Cost £11. 4. 8.

No. of herds with herd cost per cow	Under £8	Between 8-10	10-12	12-14	14-16	16-18	18-20	Over £20
Wintered IN	1	2	5	4	2	2	-	-
Wintered OUT	2	4	2	3	-	1	-	-
Total Galloway	3	6	7	7	2	3	-	-

GROUP B CROSS HERDS

Lowest Cost £7. 17. 0. Highest Cost £20. 4. 4.
Average Cost £13. 12. 3.

No. of herds with herd cost per cow	Under £8	Between 8-10	10-12	12-14	14-16	16-18	18-20	Over £20
Wintered IN	-	3	-	1	2	-	1	1
Wintered OUT	1	1	3	3	2	3	1	-
Total Cross	1	4	4	4	4	3	2	1

TABLE 10. RANGE OF TOTAL DIRECT COSTS PER CALF

GROUP A. GALLOWAY HERDS

Lowest Cost £6. 10. 11. Highest Cost £23. 0. 7.
Average Cost £14. 6. 0.

No. of herds with total cost per calf	Under £10	Between 10-12	12-14	14-16	16-18	18-20	20-22	Over £22
Wintered IN	1	4	3	-	6	1	1	-
Wintered OUT	2	2	2	1	1	3	-	1
Total Galloway	3	6	5	1	7	4	1	1

GROUP B. CROSS HERDS

Lowest Cost £8. 3. 1. Highest Cost £21. 9. 3.
Average Cost £14. 15. 4.

No. of herds with total cost per calf	Under £10	Between 10-12	12-14	14-16	16-18	18-20	20-22	Over £22
Wintered IN	2	1	2	1	1	-	2	-
Wintered OUT	2	2	3	1	3	2	1	-
Total Cross	4	3	5	2	4	2	3	-

Note:- In all the above tables cost per breeding cow is calculated on the maximum number of breeding cows as shown at the head of Section V.

It is a feature of this report that much of the statistical material is inconclusive in showing relative efficiency. This might be expected when two groups of herds so widely different are compared. The following further analysis of the different items of cost may help, however, in assessing the significance of individual results.

VI.

(A) HERD MAINTENANCE.

The cows in the Galloway herds were in general appreciably older than the Cross herds. This was due on the one hand to the inherent long life of the Galloway breed, extended perhaps by none too rigorous insistence on a calf from each cow every year. On the other hand, some of the Cross herds were newly established or increased in recent years, whereas most Galloway herds were of long standing. Table 11 shows the relative ages of cows at the start of the costing period.

TABLE 11. AGE OF COWS IN OPENING VALUATION

	1st-3rd Calvers	4th-6th Calvers	7th-9th Calvers	10th-12th Calvers	Older Cows
	%	%	%	%	%
Galloway herds	33	36	21	9	1
Cross Herds	46	38	15	-	1

Table 12, however, shows that the cost of herd maintenance was higher for the Galloway than the Cross herds, despite the longevity of the former cows.

TABLE 12. COST OF HERD MAINTENANCE

	GROUP A - GALLOWAYS			GROUP B - CROSS		
	TOTAL FOR 28 HERDS		Per Cow on 462 Cows	TOTAL FOR 23 HERDS		Per Cow on 911 Cows
	No.	£. s.d.	£. s.d.	No.	£. s. d.	£. s. d
Opening Valuation	461	14187. 0.0.	30.14.2.	890	26043. 0. 0.	28.11. 9
Cows Bought	17	890. 7.0.	1.18.7.	226	9788.19. 1.	10.14.11
Heifers Transferred	44	1517. 0.0.	3. 5.8.	3	96. 0. 0.	2. 1.
Total	522	16594. 7.0.	35.18.5.	1119	35927.19. 1.	39. 8. 9
Cows Sold	23	557. 5.0.	1. 4.1.	38	1111.19.11.	1. 4. 5.
Cows transferred out	10	275. 0.0.	12.0	17	505. 0 0.	11. 1.
Cows died	16	3.15.0.	2.	11	15. 0.	-
Closing Valuation	473	14877. 0.0.	32. 4.0.	1053	33161. 0. 0.	36. 8. 0.
Total	522	15713. 0.0.	34. 0.3.	1119	34778.14.11.	38. 3. 6.
Cost of Herd Maintenance		881. 7.0.	1.18.2.		1149. 4. 2.	1. 5. 3.

It will be seen that the proportion of the total herds turned over was greater in Group A than B. Some 10% of the Galloway cows left the herds during the year against 7% of the Cross cows. This, despite the higher cost of all replacements at £43 per head in the Cross Herds against £39. 10. 0. for the Galloways, together with the lower average price of culls from herds in Group A, accounts for the higher cost of herd maintenance in the latter group.

A difference in method of replacement is apparent in the above table which shows that more than two-thirds of the incoming cows in the Galloway herds were home-reared against practically none for the cross herds. This may be partly accounted for by the higher prices prevailing for Galloway calving heifers. The average cost per head of bought cows at £52. 7. 6. for the herds costed only partly shows this, as many of these were bought as bulling heifers at a figure far less than that now asked for down calvers. This might be between £60 and £80. Nevertheless home rearing of replacements is an established practice in these herds; indeed the high prices quoted above appear less excessive in the face of an old local dictum that it takes two good calves to pay for one cow, and so their influence on cow replacement practice can, to some extent, be discounted.

The wide range in individual expenses of herd maintenance calculated on one year's experience has very limited significance. It is perhaps of interest, however, that this varied from a credit of 17/- to a debit of £8. 16. 8. per breeding cow.

(B) BULL COST.

In some individual cases bulls kept principally for the breeding herd were also used to serve additional cows. The average bull costs do not therefore derive exactly from total costs of keeping bulls, but are appropriate shares based on the proportion of breeding to total cows served. This, however, does not seriously influence the fact, apparent from Tables 7 and 8, that bull costs were higher in Group B than in Group A. Table 13 shows that this was due to a higher depreciation figure. The lower grazing cost in Group A also affected the result.

TABLE 13. BULL COST PER BULL

	GALLOWAY HERDS	CROSS HERDS
	£. s. d.	£. s. d.
Depreciation	4. 3. 3.	15. 14. 5.
Feeding	7. 10. 11.	7. 5. 4.
Grazing	1. 17. 8.	3. 7. 0.
Total Cost per Bull	13. 11. 10.	26. 6. 9.

The higher prices paid for Aberdeen Angus than for Galloway or White Shorthorn bulls, which are the cause of the higher depreciation in Group B, are shown in Table 14.

TABLE 14. AVERAGE VALUE AND PRICE PER HEAD OF BULLS AT START AND BULLS BOUGHT

GALLOWAYS		WHITE SHORTHORN		ALL BULLS GROUP A		ABERDEEN ANGUS		ALL BULLS GROUP B	
Valuation	Bought	Valuation	Bought	Valuation	Bought	Valuation	Bought	Valuation	Bought
£	£	£	£	£	£	£	£	£	£
43	96	40	42	42	70	70	131	66	111

Apart from this however, it may be that the average working life of four years, assumed in calculating depreciation, is somewhat low for the cross herds, where the question of in-breeding does not apply, and where a heavy bull would be less of a disadvantage.

(C) FEEDING.

A lower feed requirement by the Galloway than the cross cows on account of their smaller size and thriftiness was to be expected. It will be seen however, from Table 16 that, weight for weight of bulk foods at least the Galloway ration was of higher feeding value. Concentrates were only fed to a few herds for short periods in either group. Turnips, on the other hand, were an exception, being almost negligible in Group A. Even so, the feeding of more hay to the Galloways was probably due more to the unavailability of cheap straw on hill farms than to any intention to help the cow in the harder conditions of climate and grazing. Indeed it is true that some of the hay made on hill farms may be little better than good oat straw.

TABLE 15. FEEDING PER COW

A. GALLOWAY HERDS

	WINTERED IN		WINTERED OUT		TOTAL GALLOWAY	
	Per Cow on 248 Cows		Per Cow on 214 Cows		Per Cow on 462 Cows	
HOME GROWN	Cwts.	£. s. d.	Cwts.	£. s. d.	Cwts.	£. s. d.
Hay	22.94	4. 6. 0.	17.78	3. 6. 8.	20.55	3.17. 1.
Straw	2.96	4. 5.	3.24	4.10.	3.09	4. 7.
Roots	1.66	2. 9.	1.32	2. 3.	1.50	2. 6.
Total		4.13. 2.		3.13. 9.		4. 4. 2.
Oats	-	-	0.08	10.	0.04	5.
TOTAL HOME GROWN		4.13. 2.		3.14. 7.		4. 4. 7.
BOUGHT						
Hay	0.05	6.	0.44	5.10.	0.23	3. 0.
Straw	0.80	3. 0.	2.65	10. 3.	1.66	6. 6.
Roots	0.94	2.10.	-	-	0.50	1. 6.
Total		6. 4.		16. 6.		11. 0.
Treacle				3.		2.
Concentrates .	0.22	3.10.	0.02	5.	0.13	2. 3.
TOTAL BOUGHT		10. 2.		17. 2.		13. 5.
TOTAL FOODS PER COW ...		5. 3. 4.		4.11. 9.		4.18. 0.
GRAZING: Cows		2. 5. 9.		2. 4. 9.		2. 5. 4.
Calves		4. 7.		4. 4.		4. 5.
TOTAL GRAZING PER COW		2.10. 4.		2. 9. 1.		2. 9. 9.

TABLE 15. FEEDING PER COW

B. CROSS HERDS

	WINTERED IN		WINTERED OUT		TOTAL GALLOWAY	
	Per Cow on 328 Cows		Per Cow on 583 Cows		Per Cow on 911 Cows	
HOME GROWN	Cwts.	£. s. d.	Cwts.	£. s. d.	Cwts.	£. s. d.
Hay	10.17	1.18. 2.	9.62	1.16. 0.	9.82	1.16.10.
Straw	12.72	19. 1.	14.59	1. 1.11.	13.92	1. 0.10.
Roots	32.62	2.14.11.	23.42	2. 0. 2.	26.73	2. 5. 6.
Arable Silage.	2.26	4. 7.	2.89	5.10.	2.67	5. 4.
Grass Silage .	-	-	1.71	3. 5.	1.10	2. 3.
Pea & Oat Hay	1.20	7. 6.	0.11	8	0.50	3. 1
Long Oats			0.04	6.	0.03	4.
Total		6. 4. 3.		5. 8. 6.		5.14. 2.
Oats	0.13	1. 6.	0.03	4.	0.07	9.
TOTAL HOME GROWN		6. 5. 9.		5. 8.10.		5.14.11.
BOUGHT						
Hay	-	-	-	-	-	-
Straw	0.23	1. 1.			0.08	4.
Total		1. 1.				4.
Concentrates .	0.45	7. 5.	0.38	6. 4.	0.40	6. 9.
TOTAL BOUGHT		8. 6.		6. 4.		7. 1.
TOTAL FOODS PER COW		6.14. 3.		5.15. 2.		6. 2. 0.
GRAZING						
Cows		3.15. 9.		3. 9. 2.		3.11. 6.
Calves		11.11.		12. 0.		12. 0.
TOTAL GRAZING PER COW		4. 7. 8.		4. 1. 2.		4. 3. 6.

The Galloway cows on average were fed longer but less generously than the Cross herds. Table 16 should be read with this in mind.

TABLE 16. AVERAGE FOODS PER COW PER DAY FEEDING

	GROUP A - GALLOWAY			GROUP B - CROSS		
	Wintered IN	Wintered OUT	Total	Wintered IN	Wintered OUT	Total
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Hay	16.4	14.0	15.3	8.8	8.9	8.8
Straw	2.7	4.5	3.5	11.2	13.4	12.6
Total Hay & Straw	19.1	18.5	18.8	20.0	22.3	21.4
Arable Silage	-	-	-	2.0	2.7	2.4
Grass Silage	-	-	-	-	1.6	1.0
Total Silage	-	-	-	2.0	4.3	3.4
Roots	1.9	1.0	1.5	28.1	21.6	24.0
Pea, Oat & Bean Hay	-	-	-	1.0	0.1	0.4
Long Oats	-	-	-	-	0.0	0.0
Total	-	-	-	1.0	0.1	0.4
Oats	-	0.1	0.0	0.1	0.0	0.1
Bought Concentrates	0.1	0.0	0.1	0.4	0.3	0.4
Total Concentrates	0.1	0.1	0.1	0.5	0.3	0.5
Average No. days feeding	153	145	150	138	128	132

(D) GRAZING.

The much higher cost of grazing for the cross herds is notable, the more so since this is the direct result of rearing on land which some would regard as too highly rented for the purpose. It must be remembered however, that several of the cross herds were highly specialised undertakings, producing calves of high cash value. Some bullocks indeed made more than £40 per head. Even so, this factor probably reflects a tendency to rear rather than feed high priced in-bought stores on land of feeding quality. At the same time, although allowance has been made for the fact that some herds were normally run on the poorer fields of generally highly rented farms, the difficulty of assessing exactly the share of grazing chargeable to any one enterprise is well known, and may have brought about a slight over-statement in Group B or understatemen in Group A.

(E) LABOUR.

The charges for labour were arrived at by pricing labour time at an hourly rate. Much of the work involved in looking after suckling herds, however, permits of considerable latitude in the disposition of time, and in the intensity of effort demanded. For example, the time spent in "looking" the herd depends partly on what other farm work is going forward and partly on the lay-out of the farm and the accessibility of the stock. Under these conditions, the pricing of labour at a uniform rate per hour is too artificial to provide a satisfactory measure of labour efficiency.

The higher labour charge per cow among the Galloway herds might be expected for small units, but it is by no means certain that this is the reason. Too much depends on the factors mentioned above.

There is also the accounting difficulty of splitting off from the total time spent on cattle or even both sheep and cattle, the due proportion applicable only to the cows. In any case, since the heaviest call by the cows on the farm staff is in winter, when other enterprises are less exacting, the chief factor the farmer has to consider is the availability of individual workers rather than the number of hours spent on any one enterprise.

(F) MISCELLANEOUS COSTS.

Miscellaneous Costs are affected in the same way as labour by the accessibility of the herds. Thus outwintered herds, those on hill farms in particular, show higher costs under this heading owing to more horse or tractor work being involved.

(G) COSTS ON CALVES.

In a few cases where the home-bred calf died at an early stage, another was bought for the cow to rear. These are included as replacements. Calf selling expenses, including commission, are included here, so that prices where they appear are gross.

VII.

As already stated, calves were produced both for sale and to retain on the farm. The calves sold went through four principal special sales at St. Boswells, Wooler, Bellingham and Haltwhistle. The last two served the farms in South Northumberland. Most calves were sold with the subsidy still to collect, which should therefore be covered by the prices shown. Where the calves had already been ear-punched an adjustment has been made to include the subsidy in the sale price. Valuations of calves remaining on the farm at the end of the period have been made on the same basis.

Table 17 shows the disposal of total weaned calves produced. The item Calves Transferred includes those calves which, for one reason or another, were taken off their dams and put on the pail at their estimated value at the time of transfer.

TABLE 17. DISPOSAL OF CALVES

	GROUP A GALLOWAY HERDS				GROUP B CROSS HERDS			
CALVES SOLD	No.	%	£. s.d.	%	No.	%	£. s.d.	%
Bullocks	56	15.2	1296. 5.0	15.5	217	25.1	7393.17. 2	31.6
Heifers	53	14.3	1173.10.0	14.0	258	29.9	6562.19. 9	28.0
Total Sold	109	29.5	2469.15.0	29.5	475	55.0	13956.16.11	59.6
CALVES RETAINED								
Bullocks	118	32.0	2802.10.0	33.5	201	23.3	5424 0.0	23.1
Heifers	137	37.1	3042. 0.0	36.4	187	21.6	4027.10.0	17.2
Total Retained	255	69.1	5844.10.0	69.9	388	44.9	9451.10.0	40.3
CALVES TRANSFERRED								
Bullocks	5	1.4	49. 0.0	0.6	1	0.1	15. 0.0	0.1
Heifers	-	-	-	-	-	-	-	-
TOTAL TRANSFERRED	5	1.4	49. 0.0.	0.6	1	0.1	15. 0.0	0.1
TOTAL CALVES REARED	369	100	8363. 5.0.	100	864	100	23423. 6.11	100
Average age of calves sold and retained	Months 6.3				Months 7.4			

Average prices and values of calves sold and retained were as follows:-

		Galloway Herds	Cross Herds
		£. s. d.	£. s. d.
Sold:	Bullocks	23. 3. 0.	34. 1. 0.
	Heifers	22. 3. 0.	25. 9. 0.
	Total Sold	22.13. 0.	29. 8. 0.
Retained:	Bullocks	23.15. 0.	27. 0 0.
	Heifers	22. 4. 0.	21.11. 0.
	Total Retained	22.18. 0.	24. 7. 0.

As both Blue Grey and pure Galloway calves made up most of the total production in Group A, and as there were a few other crosses in this group, and in Group B, where Aberdeen Angus cross calves were the rule, the foregoing analysis is, in respect of breed, incomplete. In fact the figures do not disclose the very different prices obtainable for a Galloway against a Blue Grey bullock, or the difference between these and Aberdeen Angus calves. Tables 18 and 19 attempt to make good this deficiency. Two points should however be remembered, viz., the small number of calves making up the averages for some breeds, and the nature of the calf sales. These, with the exception of St. Boswells, are influenced very much by the bids of individuals who come year after year to a particular sale with calves of a definite type or even off a particular farm in view. This is not to say any more than that what happens in the ring is governed to some extent by chance, except perhaps that calf sales are more liable to such hazards than some others.

TABLE 18. AVERAGE BREED PRICE PER HEAD OF CALVES SOLD

PURE GALLOWAY		BLUE GREY		ABERDEEN ANGUS CROSS	
BULLOCKS Average of 18 Calves	HEIFERS Average of 7 Calves	BULLOCKS Average of 32 Calves	HEIFERS Average of 36 Calves	BULLOCKS Average of 212 Calves	HEIFERS Average of 255 Calves
£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
15.19. 0.	20.14. 0.	26.15. 0.	23. 1. 0.	34. 8. 0.	25.10. 0.

TABLE 19. RANGE OF PRICES BY BREED OF CALVES SOLD

A. BULLOCKS

No. Calves Sold	Under £15	Between 15-20	20-25	25-30	30-35	35-40	Over £40
Galloway	9	7	2	-	-	-	-
Blue Grey	1	2	7	11	10	-	-
Aberdeen Angus X	1	-	20	36	34	71	50

B. HEIFERS

No. Calves Sold	Under £15	Between 15-20	20-25	25-30	30-35	35-40	Over £40
Galloway	-	2	4	-	1	-	-
Blue Grey	-	4	20	11	1	-	-
Aberdeen Angus X	3	40	50	144	2	16	-

Tables 18 and 19 do not, of course, refer to the total production given in Table 17, from which it can be seen that 70% of all the calves weaned were retained at a valuation in Group A and 45% in Group B. The addition of these, the few calves transferred out, and other cross calves sold gives the final average returns per calf shown in Table 8 of £22. 13. 0. for the Galloway and £27. 2. 0. for the Cross herds, made up of Bullocks at £23. 3. 0. and Heifers at £22. 4. 0. in Group A and Bullocks at £30. 13. 0. and Heifers at £23. 16. 0. in Group B.

VIII.

It will have been noticed that Hill Cattle Subsidy received in respect of the cows in the herds has been included in Tables 7 and 8 as a credit. This is for convenience only, as it might well have been treated as a deduction from grazing costs when it is a condition of its payment that a part (of the order of 60%) must be used in manuring and other improvements. It is worth noting, however, that in the past farmers have been given some freedom in the way they used this grant, manuring of hay ground rather than hill grazings often being allowed.

Other credits, which in the averages are not great enough to be significant, arise from two herds where some of the cows nursed an extra calf for a short period, and represent the estimated quantity of milk consumed in this way at estimated cost of production.

Allowing for these items and also for overheads, Tables 20 and 21 give the ranges in net margin or profit on the calf rearing enterprise to compare with the averages in Tables 7 and 8.

TABLE 20. RANGE OF NET MARGIN (PROFIT) PER COW

Lowest Margin Galloway ... - £6. 4. 7. (Loss)
Cross ..... + £1.10. 7.

Highest Margin Galloway ... + £18.14.10.
Cross ..... + £17.19. 7.

Herds with net margin	-£7 & 0 (Loss)	Between £0-3	3-6	6-9	9-12	12-15	15-18	Over £18
Galloway Herds	3	-	7	9	3	4	1	1
Cross Herds	-	1	4	1	8	4	5	-

TABLE 21. RANGE OF NET MARGIN (PROFIT) PER CALF

Lowest Margin Galloway ... - £10.13. 7. (Loss)
Cross ..... + £ 1.12. 0.

Highest Margin Galloway ... + £18.19. 2.
Cross ..... + £18. 0. 2.

Herds with net margin	-£11 & 0 (Loss)	Between £0-3	3-6	6-9	9-12	12-15	15-18	Over £18
Galloway Herds	3	-	3	7	6	6	1	2
Cross Herds	-	1	3	2	6	5	5	1

Finally it may be of interest to consider the average net margins or profits in relation to the capital investment represented by the cows and bulls.

TABLE 22. PER CENT. RETURN ON CAPITAL IN COWS AND BULLS

	GALLOWAY	CROSS
	£	£
Average of Opening and Closing Valuation, Cows	14,532	29,602
" " " " " " Bulls	1,116	2,134
Total Capital (Cows and Bulls)	15,648	31,736
Net Margin	3,457	9,733
Net Margin % of Capital	22	31

These figures compare very favourably with what is known about cattle feeding; for example, a return before charging overheads of 15% was shown for some store wintered grass finished cattle in Northumberland in 1947-48.

The emphasis to-day however is on increased beef production from home sources and this means either more or larger herds, or the rearing of more calves per cow. If additional cows had to be bought however, the probable return would be appreciably lower than the percentages quoted above, which have been calculated on herds valued as going concerns. By substituting average valuations based on the same number of cows, but valued at the cost of cows bought on these farms during the cost period, i.e. £52 per head for the Galloways and £43 for the Cross herds, the figures in Table 23 can be adjusted to give the probable results from newly established herds of in-bought cows as follows:-

	Galloway	Cross
Total Capital Cows and Bulls	£25,400	£43,908
Net Margin (as Table 22) ...	3,457	9,733
Net Margin % Capital	14	22

There are of course certain objections to assuming the same profit from a herd of younger cows, but the figures none the less make the point that the incentive for increase in this type of production is not so great as might at first be thought. Further, on hill farms at least, new herds or additional cows might well represent new capital rather than transference from another enterprise. The provision of new capital, however, would not end with additional cows and bulls. Though Galloway herds are often described as "no trouble" or "looking after themselves", the period between weaning and 18 months is another matter, and many farms would need to consider provision of extra calf pens, assuming that their available hay and other fodders would allow them to contemplate such additional investment.

IX.

Mention has already been made of the difficulty of assessing relative efficiency of production between the groups, and the same is true between farms in the same group. No apology is made therefore that Table 23, which attempts to spotlight factors affecting profitability, is in many respects inconclusive.

TABLE 23. FACTORS AFFECTING PROFIT

A. GALLOWAY HERDS

OUT OF 13 HERDS WITH A NET MARGIN ABOVE AVERAGE, WHICH WAS £9.7.5. PER CALF,

8 Reared more than the average NUMBER OF CALVES per cow, which was 80%

11 Had total HERD COSTS per cow below average, which was £13.2.10.

7 Had HERD MAINTENANCE COSTS per cow below average, which was £1.18.2.

8 Had FEEDING COSTS per cow below average, which was £4.18.0.

4 Fed SOME CONCENTRATE.*

7 Had GRAZING COSTS per cow below average, which was £2.9.9.

9 Had LABOUR COSTS per cow below average, which was £2.11.6.

6 Were Wintered INSIDE.

4 Produced PURE GALLOWAY CALVES.

9 Produced BLUE GREY CALVES.

9 Had RETURNS FROM CALVES above average, which was £22.13.3.

B. CROSS HERDS

OUT OF 11 HERDS WITH A NET MARGIN ABOVE AVERAGE, WHICH WAS £11.5.3. PER CALF,

7 Reared more than the average NUMBER OF CALVES per cow, which was 95%.

7 Had TOTAL HERD COSTS per cow below average, which was £14.17.6.

10 Had HERD MAINTENANCE COSTS per cow below average, which was £1.5.3.

9 Had FEEDING COSTS per cow below average, which was £6.2.0.

4 Fed SOME CONCENTRATE.*

7 Had GRAZING COSTS per cow below average, which was £4.3.6.

9 Had LABOUR COSTS per cow below average, which was £1.14.9.

4 Were Wintered INSIDE.

4 Had RETURNS FROM CALVES above average, which was £27.2.2.

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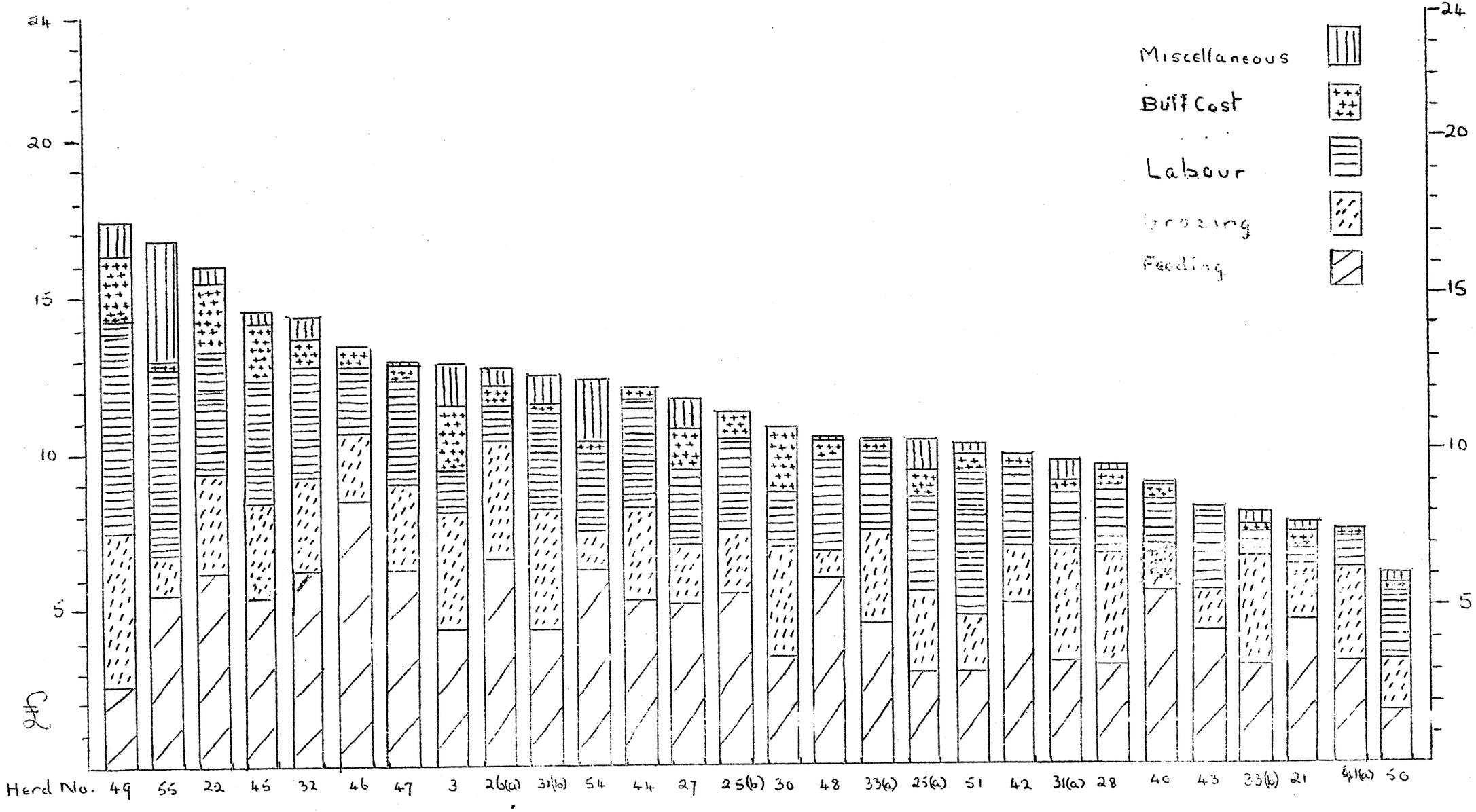
* In Group A, Concentrates were fed in only these 4 herds,

" " B, " " " " 8 herds only.

RANGE AND MAKE UP OF INDIVIDUAL HERD DIRECT COSTS PER COW

GALLOWAY HERDS



RANGE AND MAKE UP OF INDIVIDUAL HERD DIRECT COSTS PER COW

CROSS HERDS