Cattle—Cost of production O.S.

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THE COST OF REARING DAIRY HEIFERS FROM BIRTH TO CALVING

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I. INTRODUCTION

Interest in the cost of rearing dairy heifers arises from the commonly accepted fact that, in this country, the average herd life of dairy cows is around four years, so that the upkeep of the national milking herd absorbs considerable resources in land, buildings, labour, machinery, feeds, seeds, fertilizers, and other materials for the rearing of a continuing supply of herd replacements. The cost of all these resources is ultimately a charge against the final product of dairying, i.e., milk. Determination of the cost of rearing dairy heifers and appreciation of the reasons why the costs are what they are, therefore, are matters of material importance in the economics of milk production.

The accountancy aspect of the question is not altogether simple, because of the differences in herd replacement policies on different farms.

If all dairy herds were entirely self-maintained and each herd reared no more heifers than were necessary to keep up herd numbers, so that milk, together with the income from cast cows (away from dairying) were the only revenues, then herd costs would be the costs of milk production, with the proceeds from cast cows as an off-setting by-product.

In the dairying industry as a whole however, there are many herds kept to produce not only milk but dairy cattle, males and females, which may be sold, at various ages, into other dairy herds, or for feeding. In recent years also, a good many herds have turned to the joint production of milk along with beef stores. Particularly amongst the smaller farms there are herds which rely entirely on outside sources for herd replacements in the form of down-calving cows or cows in milk.

Where herd replacements are bought in, the cost of herd replacements is the known price paid for the in-bought heifers or cows, and the cost of maintaining herd numbers is the difference between these prices and the realised prices of the cows discarded.

Where herds depend on home breeding and rearing for their own replacements and at the same time aim at producing cattle for sale, along with milk, accounting problems arise over the division of costs between what are really two separate objectives, viz. stock raising and milk production.

Because of these differences in herd management policies, it is necessary to make distinction between (a) cost of rearing a dairy heifer to calving and (b) cost of herd replacements. The former is the sum of the inputs used in raising a heifer to calving age. The latter is the net cost to the farmer of providing heifers to replace cast or culled cows, after allowance has been made for the costs incurred and the returns received for animals partly reared and disposed of, by sale or death, prior to their reaching calving age. To the farm which is able to sell at good prices, heifers surplus to its own herd maintenance requirements, the proceeds of such sales may substantially offset the total rearing costs of the herd followers, and the net cost remaining to be borne, when attributed to the heifers calved into the herd may be a comparativcly small sum "per heifer calved".

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This report is the third in a series dealing with results emerging from an investigation, begun in the autumn of 1952, into costs of herd replacements on a group of dairy farms in the four northern counties. In order to avoid some of the accounting difficulties referred to above, and also to help a subsequent investigation (now proceeding) into costs of milk production, the heifer rearing study was confined to milk producing farms which reared their own herd replacements, and which were primarily concerned to rear no more heifers than were needed for this purpose, the bull calves being sold soon after birth, and heifers surplus to maintenance requirements disposed of at various ages. The investigation was focussed on the annual cost to the farm of maintaining herd numbers, rather than on the cost of raising individual animals, and the method of accounting to this end was fully described in the two earlier reports.*

The present report, based on the same original material, is concerned with the costs of raising individual animals, beginning with calves born in the autumn of 1952, and calves born in the following spring. These animals have been separately costed up to calving age, and at progressive stages of growth, i.e. at six, twelve, twenty-four months, and at calving. Details of the costing methods are given below.

The numbers of animals costed over the full period were 264 autumn-born calves on 45 farms, and 119 spring-born calves on 36 farms. The number of calves costed on each farm varied from 1 to 31. On most farms the costed animals were run with other cattle and the difficulty of separating the foods fed to the costed animals was met by estimating the total foods consumed from the normal daily rations fed to the different age groups. Grazing costswere calculated from the cost per cow unit day (obtained from the herd replacement scheme) from which also labour costs were assessed.

In all, calves were costed on 53 farms, located in four distinct areas in the Province, i.e., 13 in Tynedale, 14 in south-east Northumberland, 13 in east Durham and 13 in east Westmorland. On all of these farms the sale of milk was the main source of income. Their policy was to rear nearly all the heifer calves and sell the bull calves soon after birth. The herds were either wholly self-maintained or very nearly so.

There was a predominance of Shorthorn and Ayrshire herds, 21 and 15 respectively. The remainder consisted of 9 Friesian, 2 Channel Island and 6 mixed herds. There were 44 Attested herds, of which 30 produced T.T. milk and 14 ordinary grade milk. All the 9 non-attested herds produced ordinary grade milk. 5 of the ordinary milk producers were accredited up to the time this grade was withdrawn.

II. COSTING METHODS

The various items of input were charged as follows:-

Purchased foods were charged at delivered cost on the farm.

Home-grown food charges were calculated from average provincial costs per acre as ascertained in the Milk Costs Investigation 1951. These figures were adjusted for increases in labour and other costs each year and divided by

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* G 48. Dairy Herd Replacement Costs, 1953/54,
G 50. Cost of Dairy Herd Replacement 1954/55.

the average yield per acre of the various crops on the farms studied.

Grazing costs were calculated on a cow unit basis, using the following equivalents:-

Horses, cows and other cattle over 2 years	1
Cattle between 1 and 2 years	$\frac{3}{4}$
Cattle under 1 year	$\frac{3}{8}$
Sheep (adult)	$\frac{1}{5}$

Milk fed was charged at alternative sale price, i.e. average pool price and quality premiums less transport charges.

Labour. Manual. Minimum wage rates were used plus about 10% to cover overhead labour, overtime rates, sick leave and holidays.

Tractor. 5/- per hour.

Miscellaneous Expenses included a charge for general farm expenses at 5/- per £1 of labour cost and an estimated charge for veterinary and medicines.

III. COST OF REARING FROM BIRTH TO SIX MONTHS

Details of the average cost structure for a calf reared from birth to 6 months are presented in Table 1. Autumn and spring-born calves are shown separately and also together as a simple average of the two. Autumn-born calves had an average cost per head of £20. 10s., which was £2. 14s. higher than the figure for spring-born calves. This difference was due almost entirely to the whole milk fed. This was charged at the net sale price which might otherwise have been obtained, that is, pool price plus quality premiums, less transport charges. Consequently the charge per gallon of milk fed to the autumn-born calves was considerably higher than that fed to the spring-born calves. In fact, a greater average quantity of milk was fed per head to the latter group, no doubt because milk is generally more plentiful about May and June and less cash return is foregone by feeding it to livestock. However, the smaller quantities of milk fed to autumn calves were more than outweighed by the higher price per gallon, so that the ultimate charge for whole milk fed to the autumn-born group was appreciably more than that for the spring-born calves. In each group the charge for milk was more than one-third of the total cost and it is this food that makes the first six months of a heifer's life the most expensive rearing period. The price at which the milk is charged is not the real cost to the farmer in terms of outlays. It is the income foregone by feeding milk rather than selling it. The real cost, in terms of outlays, is the cost of producing the milk, which is normally lower than the price at which it is charged against the calves consuming it.

The other items of cost showed little difference as betwen the autumn- and spring-born groups. In each case £4 was charged for the value of the calf at birth.

All the calves were bucket-fed, except in one or two isolated cases where suckling occurred for short periods. The average amount of milk fed per calf varied from farm to farm and was the main explanation for the

wide range in average costs per calf (Table 3). On some farms whole milk was fed for only 7 to 10 days, after which it was replaced by a milk substitute. On others, no substitutes were used and whole milk was fed, in decreasing amounts, up to 10 to 12 weeks.

It is not the intention in this report to debate whether calves should be reared on whole milk or whether a substitute will produce much the same result. There are several schools of thought on this subject. Table 4, however, does show the comparative costs for rearing on milk and milk substitutes respectively. Here the farms have been grouped according to the length of time whole milk was fed to the calves. It is obvious from these results that introducing a milk substitute at an early age to the exclusion of whole milk is a much cheaper method of rearing than continuing with whole milk during all the bucket feeding stage. The difference in the average cost per calf between groups A (all whole milk) and C (substitute after less than 4 weeks on whole milk) of the autumn-born calves was £6. 12s. The average amount of milk fed per calf was 77 gallons in Group A as against 22 gallons in Group C, the charges for milk being £14 and £4. 2s. respectively, a difference of £9. 18s. If we deduct from the latter the cost of milk substitute used in the C group there is still a saving of £6. 10s. per calf in the liquid feeding, a not inconsiderable amount.* Although the average amount of milk fed per calf in Groups A and C of the spring-born calves was similar to that fed to these groups in the autumn-born calves, the average cost per calf did not show such a wide difference, due again to the lower charge for milk in this period of the year. Nevertheless, the average cost in the C group was £3. 13s. below that of the A group.

Whether the feeding of all whole milk to a calf produces a better quality animal is a material question, but one which cannot be answered by this investigation, since the calves costed were of different breeds, different genetical make-up and under different management in various respects. Their history as milk producers and mothers, moreover, still lies before them.

TABLE 1. AVERAGE COSTS PER CALF FROM BIRTH TO SIX MONTHS

	Autumn born		Spring born		Simple Average of Autumn and Spring	
No. of calves	264		119		-	
	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.
Value of calf at birth		4. 0.		4. 0.		4. 0.
Purchased foods:						
Milk substitute	2. 2.		1.16.		1.19.	
Cakes and meals	1.10.	3.12.	1.10.	3. 6.	1.10.	3. 9.
Home-produced foods:						
Milk	8.12.		6. 0.		7. 6.	
Grain	14.		16.		15.	
Hay	1. 4.		1. 0.		1. 2.	
Silage	-	-	-		-	
Roots	2.		-		1.	
Grazing		10.12.		7.16.		9. 4.
Manual Labour ...		1.16.		2. 2.		1.19.
Miscellaneous Exs...		10.		12.		11.
Total		20.10.		17.16.		19. 3.

* As noted earlier, milk is here charged at sale value, not cost of production.

TABLE 2. AVERAGE AMOUNTS OF FOODS FED, NUMBER OF COW UNIT GRAZING DAYS AND NO. OF HOURS OF LABOUR

	Autumn born	Spring born	Simple Average of Autumn and Spring-born
No. of calves	264	119	-
	Quantities	Quantities	Quantities
Purchased Foods:			
Milk substitute Cwts.	.6	.6	.6
Cakes & meals "	.7	.7	.7
Home-produced foods:			
Milk ... Gals.	47.1	55.8	51.5
Grain ... Cwts.	1.1	1.1	1.1
Hay ... "	4.4	3.9	4.2
Silage ... "	-	-	-
Roots ... "	.7	.4	.5
Grazing, cow unit days	-	-	-
Manual labour, Hours	13.3	15.6	14.5

TABLE 3. RANGE IN AVERAGE COSTS PER CALF

Cost	Number of farms whose costs were within the stated limits	
	Autumn-born	Spring-born
£13.1 to 16.0	4	7
£16.1 " 19.0	10	20
£19.1 " 22.0	14	8
£22.1 " 25.0	9	-
£25.1 " 28.0	7	1
£28.1 " 31.0	-	-
£31.1 " 34.0	1	-

TABLE 4. FARMS GROUPED ACCORDING TO METHOD OF FEEDING

Average Costs per Calf

	Autumn-born			Spring-born		
Group *	A	B	C	A	B	C
Number of Farms	12	20	13	10	17	9
Number of Calves	62	103	99	42	56	21
	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.
Value of Calf at Birth	4. 0.	4. 0.	4. 0.	4. 0.	4. 0.	4. 0.
Cost Items:						
Purchased foods:						
Milk substitute	-	2. 1.	3. 8.	-	2. 7.	3.14.
Cakes & Meals	1.11.	1. 8.	1.12.	1. 8.	1.12.	1.12.
Home-produced foods:						
Milk	14. 0.	9.13.	4. 2.	8.15.	5.11.	2. 1.
Grain	16.	17.	12.	1. 0.	13.	12.
Hay	1. 2.	1. 2.	1. 4.	19.	1. 2.	1. 3.
Silage	-	-	-	-	-	-
Roots	1	3	1	1	1	-
Grazing	-	-	-	-	-	-
Manual Labour ...	1.16.	1.18.	1.15.	2. 8.	1.18.	1.18.
Miscellaneous Exs ...	10.	11.	10.	13.	11.	11.
Totals	23.16.	21.13	17. 4	19. 4	17.15	15.11.

Foods Consumed per Calf

Purchased foods:	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
Milk Substitute	-	.8	.9	-	.9	1.0
Cakes & Meals	.8	.6	.8	.7	.8	.8
Home-produced foods:						
Grain	1.2	1.2	.9	1.5	.9	.9
Hay	4.4	4.1	4.7	3.6	4.0	4.3
Roots	.4	1.3	.4	.3	.5	-
	Gals.	Gals.	Gals.	Gals.	Gals.	Gals.
Milk	77.0	52.8	22.2	76.1	54.6	18.6

* Group A. Whole milk fed - no substitute.

" B Whole milk fed 5-8 weeks, then substitute.

" C Whole milk fed 4 weeks or less, then substitute.

IV. COST OF REARING FROM 6 to 12 MONTHS

The average cost per animal during this period was much lower than during the first six months. This was especially so in the autumn-born group, where the average cost was only £5. 14s. as against £20. 10s. in the first period, making a total of £26. 4s. by the end of the first year. In comparison, the spring-born calves, which showed a lower cost than the autumn calves in the first six months, had an average cost of nearly twice that of the latter calves during the second six months, the total cost at the end of the twelve months being £28. 16s. per animal.

The reason for the low cost of the autumn-born calves in this period was that they could be turned out to graze for two or three months during their first summer, with a consequent saving of hand-feeding and labour. The spring-born calves, on the other hand, were not out during their first summer and thus spent the whole of their first year indoors, except for one or two calves which were outside for short periods during the day.

There was still a small amount of gruel being fed during this period on some of the Westmorland farms, where, in some cases, gruel feeding is continued until the animals are about twelve months old. This is not normal practice in the other areas where calves were costed. In these areas bucket-feeding was generally discontinued after about three or four months.

The indoor feeding was mainly of mixtures of rearing nuts and oats with hay. Only small amounts of roots and silage were fed.

TABLE 5. AVERAGE COSTS PER HEAD FROM 6 to 12 MONTHS

	Autumn-born		Spring-born		Simple Average of Autumn and Spring-born	
	264		119		-	
Cost Items:	£. s.	£. s.	£ s.	£. s.	£. s.	£. s.
Purchased Foods;						
Milk Substitute	2.		10.		6.	
Cakes & Meal	1. 2.	1. 4.	2. 2.	2.12.	1.12.	1.18.
Home-grown foods:						
Grain ...	10.		1.14.		1. 2.	
Hay	1. 6.		3. 0.		2. 3.	
Silage ...	-		2.		1.	
Roots ...	2.		16.		9.	
Grazing ...	1. 8.	3. 6.	2.	5.14.	15.	4.10.
Manual Labour		18.		2. 2.		1.10.
Miscellaneous Ex.		6.		12.		9.
Total ...		5.14.		11. 0.		8. 7.

TABLE 6.

AVERAGE AMOUNTS OF FOODS FED, NUMBERS OF COW UNIT GRAZING DAYS, AND HOURS OF LABOUR PER ANIMAL BETWEEN 6 and 12 MONTHS

		Autumn-born	Spring-born	Simple Average of Autumn and Spring-born
No. of animals		264	119	-
Purchased Foods;				
Milk substitute	cwts	.1	.2	.1
Cakes & meals	"	.6	1.2	.9
Home-grown Foods				
Grain	"	.8	2.5	1.6
Hay	"	5.1	11.1	8.1
Silage	"	.1	1.7	.9
Roots	"	.5	7.4	4.0
Grazing - Cow unit days		44.8	2.2	23.5
Manual labour - hours		6.7	15.6	11.1

V. COST OF REARING FROM 12 to 24 MONTHS

The average cost per heifer during the second year of life was £17. 12s. or £16. 14s. for autumn heifers and £18. 10s. for spring-born. Details of the costs are given in Table 7.

When comparing costs for autumn- and spring-born heifers, the following considerations apply.

1. In addition to grazing, both groups were fed mainly on hay and roots supplemented with silage, straw and small quantities of purchased foods.

2. For the autumn-born heifers, the animals were on winter rations during the first half of their second year, when they were rising from 12 to 18 months. The spring-born heifers were on winter rations during the second half of the year, when they were rising from 18 to 24 months. This is the main reason for the larger quantities of fodder consumed by the spring-born group.

3. Although on one or two farms the heifer stirks were at pasture throughout the year (receiving supplementary food during the winter) the general practice was to house or yard the heifers and winter inside.

TABLE 7. AVERAGE COSTS PER HEAD FROM 12 to 24 MONTHS

	Autumn-born		Spring-born		Simple Average of Autumn and Spring-born	
No. of animals	264		119		-	
Cost Items:	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.
Purchased Foods:						
Cakes & Meal		1. 0.		12.		16.
Home-grown Foods:						
Grain	1.10.		1. 4.		1. 7.	
Hay	4.14.		6. 4.		5. 9.	
Silage ...	4.		1. 2.		13.	
Straw	4.		10.		7.	
Roots	1.16.		1. 6.		1.11.	
Grazing ...	4. 0.	12. 8.	4.10.	14.16.	4. 5.	13.12.
Manual Labour ...		2.12.		2. 8.		2.10.
Miscellaneous exs.		14.		14.		14.
Total cost ...		16.14.		18.10.		17.12.

TALBE 8. AVERAGE AMOUNTS OF FOODS CONSUMED, NUMBERS OF GRAZING UNITS AND HOURS OF LABOUR PER HEAD

Purchased foods cwts.	.5	.3	.4
Home-grown			
Grain "	2.2	1.6	1.9
Hay "	18.1	22.0	20.0
Silage "	2.8	11.8	7.3
Straw "	2.2	3.3	2.7
Roots "	17.4	11.3	14.2
Grazing: cow-unit days	139.3	144.2	141.7
Manual labour: hours	18.1	17.0	17.6

VI. COST OF REARING FROM 2 YEARS TO CALVING (Average of approximately 9 months).

For the months after reaching two years of age up to calving date, the average cost per head of the autumn-born group was £17. 16s. and for the spring-born group £13. 8s. Most of this period was summer for the spring-born heifers, whereas for the autumn-born heifers the greater part of it was wintor. This is one reason for the difference in costs. More bulky foods were fed to the autumn lots and much of this food was consumed on the pastures as several of these in-calf heifers were wintered out. The amount of concentrates fed per head showed little difference. On the majority of the farms the heifers were "steamed up" to a certain extent prior to calving - usually for three to four weeks, but the daily rations fed per heifer varied greatly from farm to farm.

The higher average cost per head of the autumn group during this final stage counterbalanced the lower average cost at two years old, in comparison with the spring-born group. At calving the two lots of heifers showed the same average cost per head.

TABLE 8. AVERAGE COSTS PER HEAD FROM 2 YEARS TO CALVING
(Average of approximately 9 months)

	Autumn-born		Spring-born		Simple Average of Autumn and Spring-born	
No. of animals	264		119		-	
Cost Items:	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.
Purchased Foods:						
Cakes & Meal		1. 4.		18.		1. 1.
Agistment		1. 4.		-		12.
Home-grown Foods:						
Grain	1. 2.		1. 0.		1. 1.	
Hay	5. 0.		3.18.		4. 9.	
Silage ...	1.10.		4.		17.	
Straw	6.		4.		5.	
Roots	1. 8.		1. 4.		1. 6.	
Home Grazing ...	3.12.	12.18.	4. 4.	10.14.	3.18.	11.16.
Labour: Manual	1.10.		1. 6.		1. 8.	
Tractor	10.	2. 0.	2.	1. 8.	6.	1.14.
Miscellaneous Exs.		10.		8.		9.
Total Cost ...		17.16.		13. 8.		15.12.

TABLE 9. AVERAGE AMOUNTS OF FOODS CONSUMED, NUMBERS OF GRAZING UNITS AND HOURS OF LABOUR PER HEAD.

Purchased foods cwts.	.6	.4	.5
Home-grown			
Grain "	1.4	1.2	1.3
Hay "	17.7	13.2	15.5
Silage "	15.6	1.8	8.7
Straw "	3.2	2.8	3.0
Roots "	12.0	10.9	11.4
Home Grazing cow days	126.7	147.3	137.0
Manual labour - hours	11.0	9.6	10.3

VII. THE COST OF REARING A DAIRY HEIFER FROM BIRTH TO CALVING

By adding together the sectionalised costs so far discussed, total cost per heifer calved is obtained, and the results appear in Table 10. Separate figures are given for autumn-born and spring-born heifers respectively. Although at intermediate stages of growth the average costs between the two groups show divergencies, the final cost per calved heifer was identical in both groups. The intermediate divergencies, as already indicated, were largely due to the incidence of winter and summer periods. This is illustrated diagrammatically on page 13.

The structure of costs in detail is set out in Table 11, again with separate figures for autumn- and spring-born heifers. Between farm and farm there was a wide range in cost per heifer, the extremes for autumn-born heifers being £47. 6s. and £81. 4s. and for spring-born heifers £47. 14s. and £79. 16s. Approximately three-quarters of individual farm costs for autumn-born heifers fell between £55 and £70. Two-thirds of the costs of spring-born heifers fell within the same limits.

Although the overall average age at calving was 2 years 9 months, there was a range in calving ages between 2 years and just over 3 years (see Table 15). The average calving age for autumn-born heifers was slightly higher than that for spring-born heifers. On individual farms differences in age at calving for individual heifers were found to vary within a range of 4 to 5 months.

In table 14 the farms were grouped according to the average age at which the heifers calved and in Table 13 according to the method of feeding adopted in the calf stage. As one would expect, the cost per heifer rose as the calving age increased and declined as whole milk was replaced by milk substitute. To see the full effect of either calving age or method of calf feeding on cost per heifer, the two should be combined into one table of nine groups. There were, however, insufficient farms to do this with any certainty of obtaining reasonably reliable figures.

The individual farm figures showed that on the farm with the highest average cost per calved heifer (£81. 4s.), whole milk was fed throughout the bucket stage and the heifers calved at about 2 years 10 months, whereas, on the farm with the lowest cost (£47. 6s.) the heifers calved at 2 years 7 months and milk substitute replaced whole milk after about 14 days.

From this study it seems apparent that the cost of rearing a heifer up to calving could be lowered appreciably on some farms, firstly by the introduction of a substitute in place of whole milk during the first or second week. This is being done on a few farms in the sample, with quite satisfactory results. One pound of a recognised milk substitute will replace approximately one gallon of milk and even at £5. 10s. per cwt. or about 1/- per lb., is a cheaper method of rearing than feeding all whole milk, which could be sold at anything from 2/0d. per gallon in May to about 3/8d. in December plus any quality premiums that are due.

Secondly, calving heifers at an earlier age would also reduce reduce rearing costs. At the commencement of this investigation the majority of co-operators stated that they calved their heifers at $2\frac{1}{2}$ years or under. It was found, however, that the heifers that were being costed were nearly $2\frac{3}{4}$ years old when they calved. This seems to indicate that some farmers are under the impression that their heifers are calving at $2\frac{1}{2}$ years old when in fact they are two or three months older. If this is the case then a closer check on ages should be adopted, as the two or three months longer keep before calving would probably raise the cost by £3 or £4 per head.

The introduction of calving heifers at an earlier age, and of rearing during the initial months on milk substitute, should result in an appreciable lowering of the final cost per heifer.

TABLE 10. THE COST OF REARING A DAIRY HEIFER FROM BIRTH TO CALVING

Summary of Average Costs per Head as shown in the foregoing Tables

Average cost per head for different periods		Cumulative cost per head at different ages	
Autumn-born calves			
	£. s.		£. s.
Winter. Birth to 6 mths.	20.10.	At 6 months	20.10.
Summer. 6 mths. " 12 "	5.14.	" 12 "	26. 4.
Winter. 12 " " 18 "	11.14.	" 18 "	37.18.
Summer. 18 " " 24 "	5. 0.	" 24 "	42.18.
Mainly 24 " " calving Winter.	17.16.	" Calving	60.14.
Spring-born calves			
Summer. Birth to 6 mths.	17.16.	" 6 months	17.16.
Winter. 6 mths. " 12 "	11. 0.	" 12 "	28.16.
Summer. 12 " " 18 "	5.14.	" 18 "	34.10.
Winter. 18 " " 24 "	12.16.	" 24 "	47. 6.
Mainly 24 " " calving Summer	13. 8.	" Calving	60.14.
Average of Autumn and Spring-born Calves			
Birth to 6 months	19. 3.	At 6 months	19. 3.
6 mths. " 12 "	8. 7.	" 12 "	27.10.
12 " " 18 "	8.14.	" 18 "	36. 4.
18 " " 24 "	8.18.	" 24 "	45. 2.
24 " " calving	15.12.	" Calving	60.14.

Showing Costs for Different Periods and at Different Ages

TABLE 11. COST STRUCTURE OF THE AVERAGE TOTAL COST OF REARING A HEIFER FROM BIRTH TO CALVING

	Autumn-born		Spring-born		Simple Average of Autumn and Spring-born	
No. of animals	264		119		-	
	£. s.	£. s.	£. s.	£. s.	£. s.	£. s.
Value of calf at birth		4. 0.		4. 0.		4. 0.
Purchased Foods:						
Milk substitute	2. 4.		2. 6.		2. 5.	
Cakes & meals	4.16.	7. 0.	5. 2.	7. 8.	4.19.	7. 4.
Agistment		1. 4.		-		12.
Home-produced Foods:						
Milk	8.12.		6. 0.		7. 6.	
Grain	3.16.		4.14.		4. 5.	
Hay	12. 4.		14. 2.		13. 3.	
Silage	1.14.		1. 8.		1.11.	
Straw	10.		14.		12.	
Roots	3. 8.		3. 6.		3. 7.	
Grazing	9. 0.	39. 4.	8.16.	39. 0.	8.18.	39. 2.
Labour - Manual ...	6.16.		7.18.		7. 7.	
Tractor ...	10.	7. 6.	2.	8. 0.	6.	7.13.
Miscellaneous exps.		2. 0.		2. 6.		2. 3.
Total Cost ...		60.14.		60.14.		60.14.

Average Total Amounts of Foods Consumed, Numbers of Grazing Units and Hours of Labour per Head

Purchased Foods:				
Milk substitute	Cwt.	.7	.8	.7
Cakes & meals	"	2.4	2.6	2.5
Home produced foods:				
Milk	Gals.	47.1	55.8	51.5
Grain	Cwts.	5.5	6.4	5.9
Hay	"	45.3	50.2	47.8
Silage	"	18.6	15.3	17.0
Straw	"	5.4	6.1	5.7
Roots	"	30.6	29.7	30.1
Grazing: cow unit days		310.8	293.7	302.2
Manual labour - hours		49.1	57.8	53.5

TABLE 12. FARM TO FARM RANGE IN THE AVERAGE COST OF REARING A HEIFER TO CALVING

Range	No. of farms whose average cost is within the stated ranges	
	Autumn-born	Spring-born
£45 to £49.9	1	2
£50 " 54.9	3	5
£55 " 59.9	10	9
£60 " 64.9	15	8
£65 " 69.9	9	7
£70 " 74.9	6	4
£75 " 79.9	-	1
£80 " 84.9	1	-

TABLE 13. FARMS GROUPED ACCORDING TO THE CALF REARING METHOD ADOPTED

Average Cost per Heifer Calved

Calf-rearing method	Whole milk only - no substitute	Whole milk 5-8 weeks, then substitute	Whole milk 4 weeks or less, then substitute
	Autumn-born calves		
Number of farms	12	20	13
No. of heifers	62	103	99
Av. cost per heifer	£65.10s.	£62. 9s.	£56. 1s.
	Spring-born calves		
Number of farms	10	17	9
No. of heifers	42	56	21
Av. cost per heifer	£62. 2s.	£60. 9s.	£58. 7s.

TABLE 14. FARMS GROUPED ACCORDING TO AVERAGE AGE AT WHICH HEIFERS CALVED

Average Cost per Heifer Calved

	2 yrs. to 2 yrs.4 mths.	2 yrs.5 mths. to 2 yrs.8 mths.	2 yrs.9 mths. and above
	Autumn-born calves		
Number of farms	7	8	30
No. of heifers	24	62	178
Av. cost per heifer	£57. 1s.	£60. 9s.	£61. 4s.
	Spring-born calves		
Number of farms	3	10	23
No. of heifers	8	47	64
Av. cost per heifer	£53. 4s.	£59.18s.	£62. 4s.

TABLE 15. DISTRIBUTION OF FARMS BY AVERAGE AGE AT WHICH HEIFERS CALVED

Age - Months	24	25	26	27	28	29	30	31	32	33	34	35	36 & over
Autumn-born No. of farms	1	-	1	2	3	1	4	2	1	2	11	13	4
Spring-born No. of farms	1	-	-	1	1	1	3	2	4	9	7	5	2

VIII. LAND USED FOR REARING

From the figures of foods consumed (Table 11) it is possible to make an approximate measure of the acreage of land used when heifers are home-reared.

The figures in Table 11 are, of course, averages for all the farms taken together, and by using average yields per acre for the various crops fed, an average measure of land used to rear a heifer can be calculated. Such a calculation is made in the following table.

TABLE 16. CONVERSION OF FOODS FED PER HEIFER TO ACREAGE PER HEIFER

	Average Quantity Fed Cwts.	Average Yield per Acre or other Conversion Ratio	Acres per Heifer Reared
Purchased:			
Milk Substitute	.7	1 lb. = 1 gal. milk	.381
Cakes & Meals	2.5	20 cwts. = 1 acre	.125
Home-Produced:			
Milk (Gals.)	51.5	206 gals. per acre	.250
Grain	5.9	23.6 cwts. per acre	.250
Hay	47.8	30.8 " " "	1.552
Silage	17.0	113.2 " " "	.150
(Straw)	(5.4)		
Roots	30.1	312.0 " " "	.096
Grazing (Cow unit days)	302.2	135 c.u.dd. " "	2.239 / 5.043 over $2\frac{3}{4}$ years = 1.834 acs. per year

The average crop yields are derived from separate costings studies, not necessarily on the farms on which the heifer costings were made. The average yield of milk per acre was determined by an earlier study on milk producing farms*. No acreage is assigned to straw which is produced from the grain acreage.

On average therefore, according to the practices followed by these rearing farms, the produce of approximately 5 acres of land was used in raising a heifer from calf to calving in $2\frac{3}{4}$ years, or an average of between $1\frac{3}{4}$ and 2 acres per year. The output from this acreage was the heifer, with a sale value of perhaps £70, which, again averaged over $2\frac{3}{4}$ years, is equal to £25. 10s. per year, or £13. 18s. per acre per year.

A gross output of nearly £14 per acre per year is a low figure compared with alternative ways of using land, and explains why many farms with small total acreage prefer flying herds, buying in ready-made cows as and when needed.

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* M 36. Milk Production per Acre - 1947-1952.

Admittedly there are risks in this method of herd maintenance and farmers are quick to point them out, but recent years have seen considerable improvement in the supply of tested cattle and in the control of the common diseases which dairy farmers are so anxious to avoid. Moreover, if the majority of small milk producing farms decided to give up home rearing of herd replacements, the stronger demand for down-calving cows and cows in milk would raise their price and perhaps so far as to make rearing a profitable business in itself.

Nevertheless it is as well that the many small farmers who choose to rely on home rearing of replacements for their dairy herds should be clearly aware that, in itself, on a costs and returns basis, the rearing of commercial dairy heifers gives a comparatively poor return for the use of land.

The average figures quoted here to illustrate the argument will not apply to each and every farm. Where crop yields are better; where grazing is made to give more than 135 cow unit days of grazing per acre, and so on, proportionately less land will be absorbed by rearing, though somewhat higher expenditure on fertilizers and harvesting operations may also be necessary.

The quoted averages may at least give a guide to individual farmers as to the lines on which they can make their own assessments of the acreage absorbed by their rearing operations.

It hardly needs to be emphasised that the longer the herd life of the cows themselves, the fewer will be the heifers needed to keep up herd numbers and the greater the release of land and other resources for other lines of production.

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