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*Cattle - Cost of prod.*

UNIVERSITY OF NOTTINGHAM

*School of Agri.*  
Department of Agricultural Economics

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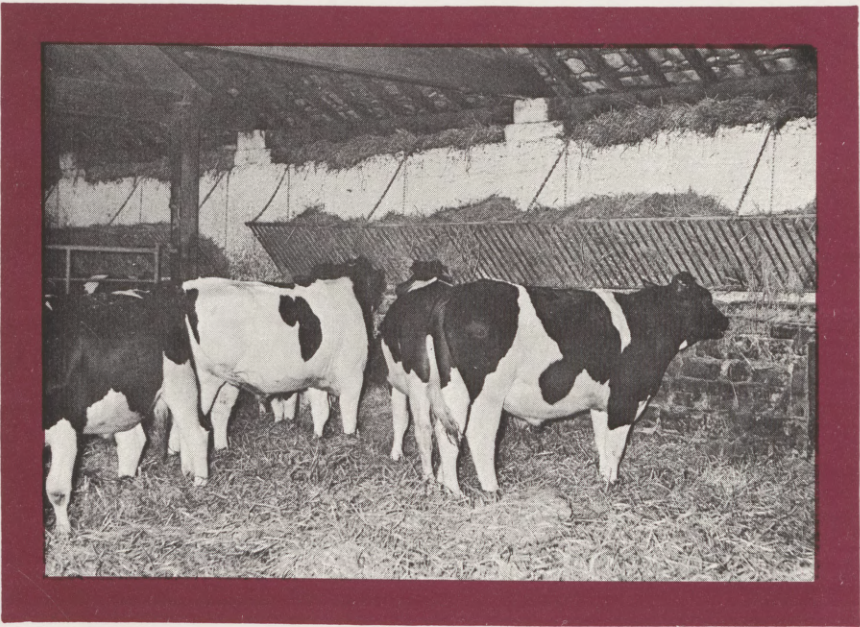


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**SYSTEMS OF  
BEEF REARING AND FATTENING  
THREE EXAMPLES**

R. Bennett Jones and Gwyn E. Jones

# SYSTEMS OF BEEF REARING AND FATTENING THREE EXAMPLES

R. Bennett Jones and Gwyn E. Jones



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*Cover photograph: Cattle prior to sale on Farm A*

UNIVERSITY OF NOTTINGHAM SCHOOL OF AGRICULTURE

Department of Agricultural Economics

Sutton Bonington

Loughborough

April, 1961

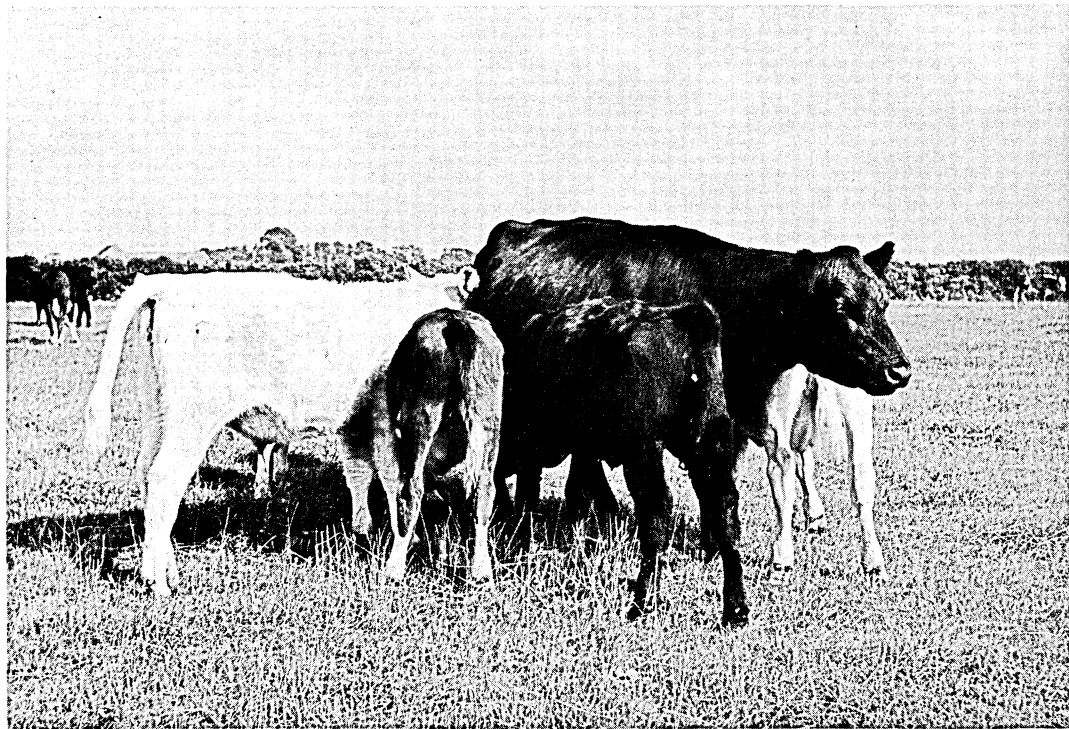
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PLATE 1



*Calves in the "brooder-house" on Farm B.*

PLATE 2



*Multiple suckling at free range on Farm B.  
The fifth calf waits to grab a teat.*

## SYSTEM OF BEEF REARING AND FATTENING

### THREE EXAMPLES

#### Introduction :

The range of beef production systems is very considerable. Some farms carry home bred animals through from birth to the butcher, others support beef animals for only a part of their lives. Some rely on grass and grass products for the feed required. On other farms, arable crops and arable by-products provide the bulk of the maintenance and production rations. Calves may be reared by single or multiple suckling or by bucket-rearing methods. The age at slaughter may vary from a year to two and a half or three years.

Since few farms specialise in beef production, the problem is to decide how best to fit the beef enterprise into the whole farm economy. This is particularly true on arable farms where cash cropping is the main source of income. On many such farms, the winter fattening of cattle in yards provides a way of using arable by-products and of turning straw into muck and, when cash crops yield a good margin of profit, some loss on yarded cattle can be sustained - they are not competing with arable crops for land and many farmers believe that yard muck improves the yield of these crops. Much of the experimental evidence available does, however, suggest that there are cheaper ways of manuring such crops.

On many other arable farms, particularly on strong land, the problem is different. On these, the maintenance of soil fertility and texture requires a proportion of the crop rotation to be devoted to grass. This grass may be utilised in a number of ways which may vary both regarding their direct profitability and their effect on the remainder of the crops in the rotation. The farmer may make and sell hay or he may let the grass to his neighbours as summer keep. If he has suitable buildings and some permanent grass that cannot readily be ploughed, the farmer may decide to utilise such grass with his own stock.

In these circumstances, the beef enterprise may easily begin to compete with other arable crops. If the farmer should decide that the cattle would do much better on a few mangolds,

some kale or beans, this may mean that land is transferred from cash crops to fodder crops. When this happens, the two enterprises, beef and cash crops must be compared on the proper basis, i.e. in terms of the margin per acre which each returns. A margin of £20 per bullock is often equivalent to only £5 per acre of land used and compares with margins of over £20 per acre from cash roots or cereals.

Since beef production is commonly a supplementary enterprise, the problem arises of deciding the most appropriate value or price for each input. For example, should labour be regarded as an overhead cost or as a direct cost? On many arable farms, the regular labour force can easily look after a yard of cattle and the labour bill would not be reduced by leaving the yard empty. The cattle should not therefore be burdened with the wages of the man who feeds them. On other farms, where cattle are present at all seasons, the labour is a direct cost - if the cattle were not there, the farm could probably be run with one man less.

Many farmers, when questioned about the rations of their stock, will say "we did give them some hay and some oats, but of course, we had those on the farm" ..... the implication being that these foods were 'free' and should not really be taken into account. In fact most feed has a market value - sometimes a very low one, it is true. This means that every feed has a 'cost' and its true cost is the market value (either to sell or to let) or its cost of production, (whichever is the higher).

These questions of cost must be decided for each individual farm and each of the three examples described in this booklet have been dealt with on their merits from this point of view.

The beef enterprise of each of these three farms occupies a different position with respect to the remainder of the farm. On Farm A, the enterprise makes comparatively little demand on the resources of the farm - its abandonment would have little effect on the rest of the farm economy. On Farm B, the possibility of expanding the dairy herd and the sheep flock and of enlarging the arable area exists. The third farm has an area of permanent grass which cannot readily be ploughed - beef cattle may well be the best way of using such land - but on this farm, the beef enterprise may easily become competitive with high value arable crops.

These three farms, differ greatly in the system of production followed and in their general type of farming. But they have two important factors in common - they are large farms with above average management.

The authors wish to acknowledge their indebtedness to the three farmers concerned for providing the facts and figures used in this bulletin. Mr. R.O. Wood prepared the figures relating to Farm A, and Mr. W. Longrigg, Regional Livestock Husbandry Officer, weighed the cattle on Farm C.



## BEEF ON A NON-MILK DIET

The cattle on Farm A were purchased Friesian steer calves reared on a non-milk diet and fattened in accordance with the methods prescribed by a well-known manufacturer of feedingstuffs.

The farm of nearly 350 acres is mainly arable and consists largely of light and sandy soil. A dairy herd had been dispersed in May 1957 and the farmer was concerned with using a good covered yard, grassland, straw and winter labour. Initially, he decided to rear approximately 100 calves which would spend two winters in yards and one summer grazing and to repeat this each year. No other livestock were to be kept on a commercial scale. Cereal and herbage crops were grown primarily for seed and only their by-products were available for cattle feed.

106 Friesian steer calves were purchased in the autumn of 1957 mainly in two lots - 27 early in October and 75 about three weeks later. Seven died from blackleg and a further four were purchased in January 1958. These were housed during the winter periods in a Yorkshire, space-boarded covered yard, surrounded by stone buildings on three sides and by a stone wall on the south side. Ample supplies of straw were available for bedding and the yards were divided by partitions which were easily moveable to enable tractors to draw out the dung.

99 calves were turned-out to grass at the end of April 1958 for 24 weeks to mid-October. They had the run of 23 acres of old pasture and 33 acres of leys with access to ample water from a spring and a stream. They were brought back into the yards in good condition. One was lost during the winter and the remaining 98 were sold fat from the yards between the 25th February and the 15th June 1959.

For the second group, 90 calves were purchased on the 24th September 1958, approximately a month earlier than the first group. Unfortunately, 16 were lost due to Salmonella and the group as a whole received a set back in the first three months. The remaining 74 calves were turned-out to grass, 37 acres of old pasture and 17 acres of leys, from May to October but one was lost during the summer. 26 reared calves, similar to the group, were purchased on the 9th June 1959, so that 99 were available for winter feeding.

Due to the very dry summer of 1959 this group did not improve well during the grazing period and the cattle were graded towards the end of October into three lots :-

- (1) 34 in good condition expected to finish fat out of the yards by April 1960.
- (2) 26 in fair condition to be kept in forward store condition. These grew well and early in February 1960, the oat and fattening-nut ration was doubled and all were sold fat during May and June.
- (3) 39 in poor condition, not expected to fatten by the following May. It was decided to keep these cheaply on oats, beet pulp and straw, running on grass with access to a yard. An attempt was made to sell them in May 1960 but, at the price offered, it seemed better to retain them to stock the grass.

PURCHASES, LOSSES AND VALUES FOR EACH GROUP

TABLE 1

	TOTALS				PER HEAD			
	FIRST GROUP 1957-59		SECOND GROUP 1958-60		FIRST GROUP 1957-59		SECOND GROUP 1958-60	
	No.	£	No.	£	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Purchases at 1 week	106	1,040	90	1,080	9.16. 3.	12. 0. 0.		
Deaths during weaning	7		16					
Calves surviving at six months	99	1,040	74	1,080	10.10. 1.	14.11.11.		
Purchases at six months	-	-	26	1,030	-	39.12. 3.		
Deaths during summer	1		1					
Yarded second winter	98	1,040	99	2,110	10.12. 3.	21. 6. 3.		

Feedingstuffs and labour were the greater part of costs at all stages of this cattle enterprise. The cost of each stage,

winter rearing, summer grazing and winter fattening, has been separated and the costs per head calculated from the number surviving at the end of each stage (Table 2). Feed consumption per head is shown in detail in Table 3.

FEED AND LABOUR COSTS OF PRODUCING BEEF CALVES BY PERIODS

TABLE 2

per head

	FIRST GROUP 1957-59	SECOND GROUP 1958-60
<u>Number of calves costed :</u>		
1. From purchase to turn out to grass	99	74
2. Summer grazing	99	100
3. Winter yarding and grazing	98	99
<u>1. From purchase to turn out to grass :</u>	£ s. d.	£ s. d.
Feed : Purchased	13. 12. 8.	17. 2. 5.
: Homegrown	2. 10. 11.	1. 10. 3.
Total	16. 3. 7.	18. 12. 8.
Labour	2. 10. 6.	3. 11. 6.
TOTAL FEED AND LABOUR	18. 14. 1.	22. 4. 2.
<u>2. Summer grazing :</u>		
Grazing	4. 10. 6.	4. 8. 0.
Labour	2. 0.	2. 0.
TOTAL GRAZING AND LABOUR	4. 12. 6.	4. 10. 0.
<u>3. Winter yarding and grazing :</u>		
Feed : Purchased	29. 17. 9.	14. 11. 4.
: Homegrown	4. 9. 10.	12. 13. 9.
Total	34. 7. 7.	27. 5. 1.
Labour	1. 10. 7.	1. 10. 4.
TOTAL FEED AND LABOUR	35. 18. 2.	28. 15. 5.

FEED CONSUMPTION

TABLE 3

per head

	FIRST GROUP 1957-58		SECOND GROUP 1958-60	
	Quantity		Value	
	cwt	lb	£	s. d.
<u>Purchase to turn out to grass :</u>				
Purchased compounds	6	109	13.12.	8.
Purchased oats, etc.	-	-	-	-
Homegrown oats	1	47	1. 8.	3.
Homegrown hay	3	28	1. 2.	8.
<u>Winter yarding and grazing :</u>				
<u>Purchased :</u>				
Compounds	7	62	12.13.	9.
Beet pulp	8	110	10.15.	6.
Maize	1	48	1.15.	8.
Barley	1	48	1.15.	5.
Oats	2	73	2.17.	5.
<u>Homegrown :</u>				
Oats	-	-	-	-
Beans	1	25	1.16.	9.
Potatoes	-	-	-	-
Hay	-	-	-	-
Swedes	0.03	acres	12.	3.
Straw	1.02	acres	2. 0.	10.
			0.71	acres
				1. 8. 4.

Costing conventions :

Purchased foods charged at cost price.

Homegrown oats and beans at selling price on farm :

Oats 1958 crop ... .. £20 Os. per ton.

Oats 1959 crop ... .. £26 Os. per ton.

Beans. ... .. £30 Os. per ton.

Potatoes (stockfeed) ... .. £ 4 Os. per ton.

Other homegrown foods at estimated cost of production :

Seeds hay... .. £ 7 Os. per ton.

Seeds straw. ... .. £ 5 Os. per ton.

Swedes ... .. £20 Os. per acre.

Straw eaten has been valued at a notional £2 per acre.

### Cost of Rearing from Purchase to Turning Out to Grass.

Largely as a result of the losses from the second group during rearing, the average costs of feed, labour and purchase price, all calculated per head of the survivors, were greater for the second group than for the first group. Thus the feed cost was £18 12s. 8d. per head for the second group compared with £16 3s. 9d. per head for the first group whilst labour costs were £3 11s. 6d. and £2 10s. 6d. respectively. The average price paid for the calves for the second group was £12 0s. 0d., that is, £2 3s. 9d. more than for the first group. Altogether, feed, labour, and purchase price amounted to £29 4s. 2d. per head for the first group and £36 16s. 1d. per head for the second group.

### Costs of Summer Grazing.

For the summer grazing period, the costs incurred were 56 acres grassland for the first group and 55 acres for the second group, both at £8 per acre, plus a nominal labour cost of £10. For the first group this amounted to £4 12s. 6d. per head and for the second group to £4 10s. per head.

### Costs of Fattening in Yards During the Final Winter.

During the final wintering periods, the average cost for the first group was £35 18s. 2d. and for the second group £28 15s. 5d. The reduction in cost of £7 2s. 9d. per head was due primarily to modifications introduced into the winter feeding of the second group. The first and second lots drawn from the entire group, 60 in all, were sold fat and consumed 18 cwt per head of concentrates and beet pulp, 5 cwt less than the first group, but they received more hay and stockfeed potatoes. They appeared to fatten as readily upon this apparently lower quality diet which cost about £2 per head less.

The total cost of the first group from purchase to sale was £70 13s. 11d. per head (Table 4). The average return per beast was £76 15s. 3d., and the subsidy £8 11s. 8d. Thus, the margin was £14 13s. 0d.

The 60 fat cattle sold from the second group averaged £75 5s. 11d. The 39 beasts retained on the farm from this group were valued at £50 each during the Spring 1960. Thus

the average return per beast in this group amounted to £65 6s. 7d. and the subsidy to £8 6s. 7d. The total costs were £72 5s. 2d. resulting in a margin of £1 8s. 0d.

COSTS AND RETURNS FOR THE WHOLE PERIOD

TABLE 4

per head

	FIRST GROUP 1957-59		SECOND GROUP 1958-60	
	£	s. d.	£	s. d.
Number of beasts	98		99	99
<u>COSTS</u> : Feed	55. 5.11.		45.12. 6.	50. 5. 9.
Labour	4. 3. 8.		4. 6.11.	5. 3.10.
Vet. and medicines	12. 1.		19. 6.	19. 6.
	60. 1. 8.		50.18.11.	56. 9. 1.
Purchased calves	10.12. 3.		21. 6. 3.	15.16. 1.
<b>TOTAL</b>	70.13.11.		72. 5. 2.	72. 5. 2.
<u>RETURNS</u> : Calf subsidy	8.11. 8.		8. 6. 7.	8. 6. 7.
Fat and store beasts	76.15. 3.		65. 6. 7.	65. 6. 7.
<b>TOTAL</b>	85. 6.11.		73.13. 2.	73.13. 2.
<b>MARGIN</b>	14.13. 0.		1. 8. 0.	1. 8. 0.

The observant reader will note that the feed and labour figures in Table 2 do not add up to the totals shown in Table 4. For columns 1 and 3 of Table 4, the explanation lies in the death of a yearling beast in each group. The cost of rearing this beast must be borne by the number actually sold. The figures in Table 4 are therefore, slightly greater than those in Table 2.

Some of the figures in column 2 of Table 4 are not comparable with those in column 1 because the farmer changed his policy - he bought calves at six months old to replace losses by death at the weaning stage and to augment the total number of calves for summering and wintering. In other words,

he bought calves on which someone else had already expended a good deal of feed and labour. The reduction in feed costs from £55 5s. 11d. for Group 1 to £45 12s. 6d. for Group 2 was achieved, not by a reduction in the quantity and price of feed used, but by buying in older calves. An attempt has been made in column 3 to adjust the figures to allow for this change of plan. The changes in costs between column 1 and 3 of Table 4 are therefore, consistent with those shown in Table 2.

The two groups differed in their grading results at sale. In the first group, 66 beasts were graded A, 31 graded B and one graded C underweight (422 lb). The average carcass weight was 549 lb with a range from 467 lb to 636 lb (Table 5).

SUMMARY OF SALES

TABLE 5

	FIRST GROUP		SECOND GROUP	
	Number	Price per head <sup>1</sup>	Number	Price per head <sup>1</sup>
		£ s. d.		£ s. d.
<u>Grading :</u>				
A.CT.	66	80. 5. 3.	32	77. 9. 1.
B.CT.	31	70. 2. 5.	28	72. 5. 5.
C.	1	51.10. 0.	-	-
TOTAL SOLD FAT	98	76.15. 3.	60	75. 5.11.
<u>Gross carcass weight sold :</u>				
Total		53,849 lb		32,949 lb
Average		549 lb		549 lb
Average price per lb gross carcass weight		2s. 9½d.		2s. 9d.

<sup>1</sup> Handling charges have been deducted.

After the initial experimental draws, subsequent lots average between 550 lb and 565 lb. The price per lb for grade A varied between 2s. 10 $\frac{1}{4}$ d., and 2s. 11 $\frac{3}{4}$ d., and grade B was 2 $\frac{1}{2}$ d. per lb less. Beasts over 600 lb were  $\frac{1}{4}$ d. per lb or 12s. 6d. per head cheaper.

The fat cattle sold from the second group did not grade as well, only 53 per cent being Grade A, compared with 67 per cent for the previous group. The gross carcass weight of both lots of fat beasts in the second group averaged 549 lb with a return of 2s. 9d. per lb gross carcass weight.

The first group made a margin of £1,436, but the second group provided a margin of only £139.

This reduction in margin was partly due to an increase in expenditure of £1 11s. 3d. a head, but the main reason was a drop of £11 13s. 9d. in total average returns per head. This was made up by a fall of £1 3s. 0d. in market returns ( $\frac{1}{2}$ d. per lb d.c.w.), of 5s. 2d. in calf subsidy and £10 5s. 7d. due to the failure of 39 head to fatten. Another way of explaining the drop in margin is to say that for the first group an expenditure of £70 13s. 11d. yielded on average about 930 lb of liveweight. The second group cost £72 5s. 2d. per head but the average weight was only about £790 lb. The increase in cost per lb of liveweight was from 18.24d to 21.95d or 20 per cent.

Three factors contributed to cause this 20 per cent increase in cost - a higher market price for week old calves, deaths due to disease and unthriftiness among the survivors.

Margin per head fell by £13 5s. 0d. The market price of calves can be blamed for £2 4s. 0d. of this and the price of beef for a further £1 3s. 0d. Ignoring the calf subsidy change (due to the differences in the sex ratio), the remainder of the decline in margin, £9 18s. 0d. per head, can be mainly attributed to extra mortality and unthriftiness in the second group.

The project required a considerable capital investment and the initial capital was available from the sale of the dairy herd. The average investment has been estimated for each six months and interest rates calculated at six per cent per annum thus :-



	<u>Average</u> <u>Investment</u>	<u>Total</u> <u>Interest</u>
	£	£
October 1957 to March 1958	2,000	60
April 1958 to September 1958	3,000	90
October 1958 to March 1959	6,000	180
April 1959 to September 1959	1,600	48
October 1959 to March 1960	6,000	180
		—
		£ 558
		—

By the time sales commenced in March 1959, the outlay was approximately £8,000 but income from sales reduced this to approximately £1,000 by the middle of June 1959. In the same way the outlay rose to between £6,000 and £7,000 before the spring sales commenced in 1960, to be reduced to £2,700 in early June 1960 as a result of the sales.

After allowing £70 as the interest charges for a third group of calves reared October 1959 to March 1960, the interest charges on the first two groups have been estimated at £488 for 197 cattle, approximately £2 10s. per head. This must be set against the overall margin for the two groups of £1,575.

## CALF REARING FOR BEEF ON AN ARABLE FARM

An intensive method of calf rearing for beef production is being followed on Farm B. The farm, of 600 acres, is primarily devoted to cereal production and to leys which support 200 dairy cattle and about 200 breeding ewes and their lambs.

The calf rearing system revolves around three main practices - the purchase of suitable calves, an unorthodox method of multiple suckling, and the careful management of the 50 acres of grazing which are allotted to the calf rearing unit.

Most of the calves reared are purchased pure Friesian and beef-sired calves. These are bought at Western markets in lots of between 25 and 30 at approximately monthly intervals between October and July. On arrival at the farm the calves are housed in a "brooder-house", a converted wooden poultry house, which is well ventilated. The calves are fed night and morning with 3 lb milk, with 20 per cent water added. From the time of arrival on the farm, they are encouraged to eat palatable dry concentrates and high quality hay to stimulate rumen development. After 20 days in this brooder-house they are abruptly weaned. The winter purchased calves are thereafter yarded until February and are fed entirely on dry food with a continuous supply of water available.

In February, the first group of calves is taught to suckle. For a week they are introduced to a polled Shorthorn cow, yielding about  $2\frac{1}{2}$  gallons per day, while still in the yard. After a few days she leads the group out to grazing with a group of 23 newly calved Blue-Grey cows suckling their own calves (which are sired by a Hereford bull). This procedure is repeated with each group of calves, the period between early weaning and learning to suckle being shortened as the season proceeds. The final group of calves remains with the original foster mother.

Within the 50 acres of summer grazing which are allotted to the calf rearing unit, 18 acres are allocated to the Shorthorn foster mother and her group of calves, and to the wintering of the Blue-Grey nurse cows. The remaining 32 acres are grazed by the Blue-Greys and the calves which suckle them. This area is divided by high-tensile wire fencing into eight paddocks of four acres each. Rapid use of the grass is crucial to the management

of the enterprise. The cows and the growing number of calves remain for six to eight days on each paddock, with the calves being given access to creep feeding and by passing under the electric fence, grazing forward before the cows. Suckling ceases in October/November, and the cows continue to occupy the same acreage until the following January. Bulk and concentrate feed is provided, and the calves are yarded at night during the winter.

The calves are sold in mid-April, although a few of the older and better developed beasts may be sold in the autumn. More intensive concentrate feed is provided during the month immediately prior to sale. When sold, the calves range in age from 10 to 18 months, the average age being about  $13\frac{1}{2}$  months.

The data for this case-study refer to the period October 1957 to April 1959. 165 calves were purchased in six lots between October 1957 and July 1968. The price per calf in these lots ranged from £10 to £20, the purchase price for the entire group of 165 calves being nearly £15 per head. The calf-unit was supplemented by 14 calves transferred from the dairy herd at an average of under £7 per head, their estimated market value. 19 calves were also born to the Blue-Greys, but no cost has been assessed to these calves as the upkeep of their dams has been allowed for.

Eight ten-month old beasts were sold in September 1958, and the remaining 166 were sold in mid-April 1959. Total costs for the enterprise were available separately for the twelve months up to October 1958, and for the final six months to April 1959. The rearing costs per calf have been calculated for these two periods and then aggregated (Table 6). The average costs per calf are a mean for calves which differ in age by up to eight months.

Food costs amounted to about 80 per cent of total production costs, and labour to somewhat over 10 per cent. The main food cost items are milk, milk substitute and baby calf foods (17 per cent of total production costs) incurred during the first 20 days of the calf's life on the farm; rearing and grazing nuts (over 12 per cent) incurred entirely within the period ending October 1958; hay (12 per cent) and concentrates (31 per cent) both incurred largely during the final wintering period.

REARING COSTS (TO NEAREST 3d.)<sup>1</sup>

TABLE 6

per head reared

	October 1957 to October 1958	October 1958 to April 1959	Total
	£ s. d.	£ s. d.	£ s. d.
Whole milk "Calfweana", calfmeal, rolled oats, linseed meal, milk sub- stitutes	2. 0. 0.	-	2. 0. 0.
	2. 16. 3.	-	2. 16. 3.
Purchased straights	2. 13. 6.	3. 11. 0.	6. 4. 6.
Homegrown cereals	1. 3. 6.	1. 6. 6.	2. 10. 0.
Feeding straw	-	11. 0.	11. 0.
Homegrown hay	16. 3.	2. 11. 3.	3. 7. 6.
Sugar beet pulp	-	2. 6.	2. 6.
Wet pressed pulp	-	1. 1. 3.	1. 1. 3.
Rearing and grazing nuts	3. 9. 9.	-	3. 9. 9.
Grazing (rent, fertilisers and fencing)	10. 0.	6. 6.	16. 6.
<b>TOTAL FOODS</b>	<b>13. 9. 3.</b>	<b>9. 10. 0.</b>	<b>22. 19. 3.</b>
Labour	1. 13. 6.	1. 10. 6.	3. 4. 0.
Carriage	3. 6.	3. 6.	7. 0.
Veterinary require- ments, etc.	12. 0.	6. 3.	18. 3.
<b>TOTAL LABOUR AND MISCELLANEOUS</b>	<b>2. 9. 0.</b>	<b>2. 0. 3.</b>	<b>4. 9. 3.</b>
<b>TOTAL</b>	<b>15. 18. 3.</b>	<b>11. 10. 3.</b>	<b>27. 8. 6.</b>

<sup>1</sup> Including keep of nurse cows, but excluding cost of bought calves.

The total average costs of rearing the calves to sale amounted to nearly £42 with an average sale realisation price of slightly over £49 10s. (Table 7). The average margin per calf is about £7 10s., but to this must be added the calf rearing subsidy and attestation bonus with which the enterprise can be credited. These subsidies amount to over £9 per calf. The net margin per calf is thus nearly £17. All the cattle were sold as stores, the estimated average liveweight being  $5\frac{3}{4}$  cwt.

COSTS, RETURNS AND MARGINS

TABLE 7 per head reared

	£	s.	d.
Purchase price and value of calves transferred in	14.	11.	0.
Cost of rearing	27.	8.	6.
Total cost	41.	19.	6.
Sale price	49.	11.	0.
Margin	7.	11.	6.
Subsidies	9.	5.	3.
Total net margin	16.	16.	9.

A COMPARISON OF CALF REARING BY SUCKLING AND  
BUCKET-REARING METHODS

Farm C is a large arable farm of 545 acres. Much of the land on this farm tends to be heavy, and one object of rearing cattle is to provide a supply of farm yard manure for the benefit of the potato crop. A further reason is that a limited acreage of permanent grassland is available.

The general cattle policy of the farm is to produce forward stores for sale in spring at 15 to 17 months of age, but a small proportion may be sold fat from the yard.

The breeding herd of 40 - 45 cross-bred cows are run with a Hereford bull, the cows being expected to calve down during January or February while they are in yards. Extra calves are purchased and suckled alongside the home-bred calves. The cows and calves are turned out as soon as grass is available but the calves are fed a small quantity of concentrates in a creep. They remain with the cows throughout the summer, and are weaned shortly before they are taken into partly covered yards for the winter.

Calves for rearing on the bucket are purchased in lots during October and early November from local markets. On arrival at the farm they are given a drink of glucose, and on the following day they are introduced to a milk substitute. Each lot is early weaned at 35 days and the calves are then given hay and calf rearing pencils only, to which they have been introduced before weaning. In summer these calves are turned out to grass. At the beginning of winter, the calves reared under both systems are run together in large partly covered yards and fed as a single group.

The costs of rearing the calves and the returns received are available for two groups, viz., the October 1957 to April 1959 lots, and the October 1958 to April 1960 lots. The data received for the two periods are not comparable in every detail, so that information on certain aspects is available for one year only.

A summary of the numbers of calves involved during the two periods is presented in Table 8.

TABLE 8

	SUCKLED		BUCKET-REARED	
	1957-59 group	1958-60 group	1957-59 group	1958-60 group
Number of calves born on farm	36	34	-	-
Number of calves purchased	10	32	22	23
Number of mortalities	2	4	2	1
Number of calves reared	44	62	20	22

The size of the bucket-reared group was almost identical for the two periods but the number of calves suckled was increased by nearly 50 per cent in 1958-60 compared with 1957-59 by the purchase of an additional 20 calves for dual-suckling on the beef cows.

Table 9 shows the costs of rearing the calves up to yarding - that is, up to the time the calves were brought into the yards at the beginning of their second winter. At this time, the bucket-reared calves were approaching 12 months of age, while the suckled calves were only eight or nine months old. The suckled calves were weaned from their nurse cows only a few days before being brought in for the winter. In 1958, the bucket-reared and suckled calves were grazed on separate fields during the summer. In 1959, however, the two groups of calves were grazed together, so that the bucket-reared calves were also to suckle and make use of the creep feed provided. In both years, the two groups were housed together in a large yard for the winter. No great difference in the size of the animals in each group was noticeable at this stage, despite the fact that the bucket-reared calves were three to four months older than the others. This was confirmed by weighing most of the calves in October 1959, (Table 10), although the winter-purchased calves for suckling were markedly lighter than the bucket-reared on the suckled home-bred calves.

COST OF REARING CALVES FROM BIRTH TO YARDING

TABLE 9

per head reared

	SUCKLED		BUCKET-REARED	
	1957-59 group	1958-60 group	1957-59 group	1958-60 group
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Feed : Purchased and homegrown	12. 5. 0.	13. 9. 4.	10.18. 8.	15. 1. 5.
Hay and silage	3.14. 0.	13. 0.	16. 6.	13. 0.
Grazing <sup>1</sup>	6. 6. 4.	8.18. 9.	2.14. 5.	8.18. 9.
<b>TOTAL FOODS</b>	<b>22. 5. 9.</b>	<b>23. 1. 1.</b>	<b>14. 9. 7.</b>	<b>24.13. 2.</b>
Labour	7. 1. 9.	5.10. 0.	5.15. 2.	6. 0. 0.
Depreciation of nurse cows	5. 7. 3.	- <sup>2</sup>	-	-
Cost of bought calves	3. 6. 9.	9. 0. 4.	11. 0. 7.	17. 4. 6.
Miscellaneous	-	-	6. 6.	10. 0.
<b>TOTAL</b>	<b>38. 1. 6.</b>	<b>37.11. 5.</b>	<b>31.11.10.</b>	<b>48. 7. 8.</b>

<sup>1</sup> In 1958 hay for the calves was not provided exclusively from the grazing area. In 1959 all hay and silage for calves was provided from the grazing area, and only the cost of making hay and silage is included. The assessment of grazing cost in 1958 may be open to a certain degree of error due to credits given for hay and silage cut from the grazing area and fed to other animals.

<sup>2</sup> Three barreners were sold for a total of £45 above their book value, so that a slight herd appreciation occurred. This has been ignored in the present costing.

In October 1958, some of the most forward bucket-reared calves were sold before wintering, fetching an average price of £38 lls. 11d. Allowing for subsidies (an additional £10 per head), the average return over direct costs was £17 per head for these calves.



AVERAGE LIVEWEIGHT OF CALVES IN THREE GROUPS

14TH OCTOBER 1959

TABLE 10

	Heifers	Steers	Total	Number
	lb	lb	lb	
Bucket-reared calves	604	597	601	22
Own calves suckled	568	639	600	31
Dual-suckled calves (purchased)	529	533	531	24
All calves	570	589	579	
Number	40	37		77

Comparing the average costs of rearing calves by suckling and bucket-rearing in 1957-59 and 1958-60 it is clear from Table 9 that little change occurred in the cost of rearing suckled calves. Due to the larger number of suckled calves, labour costs per head were lower in 1958-60 than in 1957-59, while no depreciation charge occurred in 1958-59, (see footnote <sup>2</sup> Table 9). Feed costs varied little between the two groups. The greater proportion of calves purchased and the higher price per head, however, resulted in the average cost of buying calves for suckling to be over £5 10s. Od. more in 1958-60 than in the previous period.

A pronounced increase occurred in the cost, up to the end of their first summer, of rearing calves on the bucket. The total cost in 1958-60 was £17 greater than in the previous year. This can be accounted for by higher feed costs, particularly grazing, by slightly greater labour costs, and by an increase of over £6 per head in the purchase price of week-old calves.

Table 11 summarises the costs incurred during the two wintering periods. No distinction can be made in either year between the bucket-reared and suckled calves at this stage since the two groups are combined.

COSTS FROM YARDING TO MARKETING

(i.e. October to April)

TABLE 11 per head reared

	ALL CALVES					
	1957-59 group			1958-60 group		
	£	s.	d.	£	s.	d.
Feed : Purchased and homegrown	14.	7.	11.	15.	4.	6.
Labour	1.	0.	7.	1.	3.	10.
<b>TOTAL WINTERING COSTS</b>	<b>15.</b>	<b>8.</b>	<b>6.</b>	<b>16.</b>	<b>8.</b>	<b>4.</b>

Total costs were about £1 greater in the second winter, largely due to higher feed costs. An analysis of this feed for the two years is provided in Table 12. Since the average ration in the two wintering periods differs in detail it is impossible to assign the increased feed bill to any particular item.

The average weight of all calves at the commencement of the 1959-60 wintering period was 579 lb (Table 10). By mid-February 1960 the average weight was 754 lb. This gain of 175 lb is equivalent to a daily liveweight gain of 1 lb 6½ oz. It has been possible to estimate the food costs at £13 14s. 11d. per head for the period 14th October to 17th February. This is equivalent to 1s. 6¾d. per lb liveweight gain.

The 1957-59 calves were sold in April 1959 at an average ascertained weight of just over 7¼ cwt. The 1958-60 calves were sold in four batches between early February and early April 1960. A comparison of the total costs and returns is presented in Table 13. The total costs of rearing suckled calves were almost identical in the two periods. The reduction of over £11 per head in the net return in 1960, compared with a year earlier, was due entirely to lower prices. The net return on the bucket-reared calves fell drastically by nearly £29 per

FEED CONSUMPTION DURING THE WINTERING PERIODS

1958-59 AND 1959-60

TABLE 12

per head

	QUANTITY				VALUE <sup>1</sup>					
	1957-59 group		1958-60 group		1957-59 group		1958-60 group			
	cwt	lb	cwt	lb	£	s.	d.	£	s.	d.
H.P. concentrates	-		1	35	-			2.10.	0.	
Cattle nuts	1	90	-		3.	0.	0.	-		
Sugar beet pulp	2	84	2	70	2.14.	10.		2.15.	0.	
Rolled wheat	-		1	35	-			1.12.	9.	
Rolled oats	3	24	2	70	3.13.	5.		3. 5.	6.	
Cut pig potatoes	-		2	70	-			5.	3.	
Rolled beans		25	-				5.	8.		
Hay	11	77	12	0	4.14.	0.		4.16.	0.	
<b>TOTAL</b>	-		-		14.	7.11.		15.	4.	6.

<sup>1</sup> Costing conventions :-

Purchased feedingstuffs have been charged at the actual price paid by the farmer.

Homegrown feedingstuffs :

	<u>1958-59</u>	<u>1959-60</u>	
	£ s. d.	£ s. d.	
Rolled oats	22.10. 0.	25. 0. 0.	per ton
Cut pig potatoes	-	2. 0. 0.	per ton
Hay	8. 0. 0.	8. 0. 0.	per ton
Grazing (rent only)	4. 2. 6.	4.10. 0.	per acre

(Cost of fertiliser has been added in arriving at full grazing cost).

No charge has been made for straw and no credit given for F.Y.M.

head between the two years. This partly reflects the reduction in returns of over £11, but of more importance was the increase of nearly £18 in rearing costs and in the higher price of purchased calves, incurred almost entirely in the first year of life (see Table 9).

TOTAL COSTS AND RETURNS

TABLE 13

per head reared

	SUCKLED		BUCKET-REARED	
	1957-59 group	1958-60 group	1957-59 group	1958-60 group
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
<u>COSTS :</u>				
Birth to yarding	38. 1. 6.	37.11. 5.	31.11.10.	48. 7. 8.
Yarding to marketing	15. 8. 6.	16. 8. 4.	15. 8. 6.	16. 8. 4.
<b>TOTAL COSTS</b>	<b>53.10. 0.</b>	<b>53.19. 9.</b>	<b>47. 0. 4.</b>	<b>64.16. 0.</b>
<u>RETURNS :</u>				
Sale price <sup>1</sup>	71.11. 6.	61. 8. 4.	71.11. 6.	61. 8. 4.
Calf subsidy <sup>2</sup>	8. 0. 0.	8. 0. 0.	8. 0. 0.	8. 0. 0.
Attestation bonus	2. 0. 0.	1. 0. 0.	2. 0. 0.	1. 0. 0.
<b>TOTAL RETURNS</b>	<b>81.11. 6.</b>	<b>70. 8. 4.</b>	<b>81.11. 6.</b>	<b>70. 8. 4.</b>
<b>Net returns</b>	<b>28. 1. 6.</b>	<b>16. 8. 7.</b>	<b>34.11. 2.</b>	<b>5.12. 4.</b>
Number of calves costed	44	62	62	22

<sup>1</sup> Less delivery charges.

<sup>2</sup> Assuming equal numbers of each sex.

The above tables illustrate the costs and returns from two systems of calf rearing over two years, but the modifications

which have been introduced during this period make detailed comparisons difficult and possibly misleading.

In the 1957-59 group, only ten calves were purchased, some as replacements and the remainder to take the surplus milk from the nurse cows, and the bucket-reared calves were not added until the suckled calves were weaned and yarded. The farmer was encouraged by the success of suckling these extra calves and in 1958-60 bought a calf for dual suckling with every home-bred calf. Furthermore, the bucket-reared calves were added to the herd at the beginning of the grazing season, and the majority quickly learned to steal milk from the dams of the home-bred calves.

In 1957-59, net returns from the bucket-reared group were more than £6 per calf higher than from the suckled group, but in 1958-60, suckled calves averaged a net return of nearly £11 per head more than bucket-reared calves. A reduction in returns per head was common to both groups but movements in costs were very different.

Total costs per calf for the suckled group remained practically unaltered as increases in feed costs and in calf buying costs were offset by savings in labour and herd depreciation costs. The savings in labour were very real - it is evident that the one man available was looking after more cattle. The true costs of herd depreciation, (or herd maintenance), are more difficult to assess - particularly with reference to a particular year. Depreciation arises only when cows die or become casualties, since barreners are easily disposed of at prices which approximately equal their replacement value. Three were sold during the year at £65 a piece. Fifteen heifers were retained as herd replacements and valued at £63 each - roughly at the price per live hundredweight at which the remaining cattle were sold.

The higher cost of grazing was due in part to a rent increase and in part to an expansion of the acreage devoted to the calves - 1.00 acres per calf in 1958-60 compared with 0.85 acres per calf in 1957-59 - largely owing to the dry summer of 1959. Another factor tending to increase rearing costs was the average buying price of calves - this was nearly £6 per head greater for the second group.

The cost of the bucket-reared calves was nearly £18 per head higher in 1958-60 than in 1957-59. About £6 of this increase was due to higher calf prices. Grazing costs were also up by over £6 per head, due to a higher rent and to an extension of the grazing area from about 0.50 acres per head to 1.00 acres per head. Feed costs were also higher because the calves in the second group had access to creep feed.

No accurate figures are available regarding the weights or value of the various groups of calves in each year. In both years, the bucket-reared calves were three to four months older than the other calves. It is interesting to note that of the 15 heifers retained in the herd, nine were from the bucket-reared group and three from each of the other two groups.

## DISCUSSION

The financial results of the three enterprises are summarised in Table 14. The importance of subsidies in determining the total margins realised is evident from the figures shown. Two groups would have shown a loss but for these subsidies.

The margin in the final column of the table is not a measure of net profit as no allowance has been made in costs for general farm overheads or for interest on the capital invested. The estimates made for Farm A that interest charges could well amount to £2 or £3 per calf reared is probably applicable to other farms where cattle are sold at about 18 months.

The margins obtainable from beef production enterprises of the types described above are influenced by many variables but, apart from food, the chief are - the price of bought calves, the mortality rate suffered and the selling price of the finished product. In recent years calf prices of week old calves have varied substantially from year to year, from market to market and according to the type of calf purchased. Disease is also a real problem in any system of intensive calf rearing and it is significant that substantial losses of calves have been suffered by farmers who are good stockmen and who pay careful attention to hygiene and feeding methods. Returns can also be very variable - this was true on Farm C where the cattle in the second year fetched £1 per live cwt less than in the first year although they were as well grown.

Another point to note regarding the three enterprises described here is that the end product is different in each. On Farm A, all the cattle were sold fat in the first year at a liveweight of about  $8\frac{1}{2}$  cwt. In the second year only 60 per cent of the beasts were sold fat - the remainder were retained on the farm. On Farm B all the cattle were sold as stores at an estimated liveweight of  $5\frac{3}{4}$  cwt. On the third farm where the cattle averaged about  $7\frac{1}{4}$  cwt liveweight; some were sold fat but others, sold as stores, could have been sold fat.

The cattle on Farm A were about 18 months of age when sold, those on Farm B averaged only 13 months; the suckled calves on Farm C were about 15 months old when sold and the bucket-reared calves about 18 months. The margins shown in

SUMMARY OF FINANCIAL RESULTS

TABLE 14

per head reared

	Costs	Returns	Margin (excluding subsidies)	Subsidies	Margin
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
FARM A 1957-59	70.13.11.	76.15. 3.	(+) 6. 1. 4.	8.11. 8.	14.13. 0.
1958-60	72. 5. 2.	65. 6. 7.	(-) 6.18. 7.	8. 6. 7.	1. 8. 0.
FARM B 1957-59	41.19. 6.	49.11. 0.	(+) 7.11. 6.	9. 5. 3.	16.16. 9.
FARM C 1957-59					
Suckled	53.10. 0.)		(+) 18. 1. 6.)		28. 1. 6.
Bucket-reared	47. 0. 4.)	71.11. 6.	(+) 24.11. 2.)	10. 0. 0.	34.11. 2.
All calves	51. 9. 6.)		(+) 20. 2. 0.)		30. 2. 0.
-----					
FARM C 1958-60					
Suckled	53.19. 9.)		(+) 7. 8. 7.)		16. 8. 7.
Bucket-reared	64.16. 0.)	61. 8. 4.	(-) 3. 7. 8.)	9. 0. 0.	5.12. 4.
All calves	56.16. 4.)		(+) 4.12. 0.)		13.12. 0.



Table 14 have been earned over varying periods of time but, in this instance, recalculation on a margin per head per annum basis does not alter the ranking of the figures. Farm C (in 1957-58) shows the highest margin with Farm B in second place but the difference between the farms has been reduced. A margin of £20 for keeping a beast for two years is no more than £10 on a beast kept for one year - an obvious fact which is sometimes ignored.

Another question of interest is the acreage per head required for various systems of beef production. It is possible to record the acreage of grass and homegrown fodder used by the cattle and to make a rough estimate of the acreage equivalent of purchased concentrates. Such an estimate implies that all purchased concentrates could be grown on the farm in question although this may not always be entirely realistic. For present purposes, the acreage equivalent of purchased concentrates has been calculated by dividing the total cost in £'s by £30 (assuming one acre yields the equivalent of £30 worth of purchased feed).

The approximate acreage required to provide the feed utilised by the costed cattle was  $2\frac{1}{4}$  acres on Farm A, 1 acre on Farm B and 2 acres on Farm C. It is clear therefore that in per acre terms, the margin earned was highest on Farm B.

The acreage a farmer devotes to his beef enterprise is determined both by his choice of system of production and by the amount of feed he buys. Some intensive systems can be based almost entirely on purchased feeds and the size of the productive unit will in many instances be determined by the capital available. It has already been indicated that the interest on capital charged for bucket-reared calves sold at 18 months of age is just over £2 10s. Od. per head. The interest charge for single suckled calves of the same age would be about £4 10s. Od. per head.

Beef production remains a somewhat speculative enterprise. The risk of disease, the changes in prices and costs which occur have caused many farmers to temper enthusiasm with caution and look again at their plans for the future.

