NORTH OF SCOTLAND COLLEGE OF AGRICULTURE,

School of Agriculture, Aberdeen

Agricultural Economics Department

Economic Results from some Barley Beef Units in the North of Scotland 1965/66

by John Clark, B.Sc., N.D.A.

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<u>THE NORTH OF SCOTLAND COLLEGE OF AGRICULTURE</u>

<u>AGRICULTURAL ECONOMICS DEPARTMENT</u>

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<u>IN THE NORTH OF SCOTLAND</u>

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INTRODUCTION

The profit obtained from a farm depends not only on the physical yields per acre, but also on the quality of the crops grown. The outputs from cattle and sheep also depend to a large extent on the crops, so that no matter how well the land is worked the number of acres is a major factor which limits income from these enterprises. Thus the farmer who is working his ground to the best of his ability and who is looking for means of increasing his profit tends to look for some way of increasing his cash turnover. One way of doing this is to keep livestock intensively under a system which makes little or no demand on the farmer's own land and where, if necessary, he can purchase food grown on other acres. It is not a function of this report to consider the relative merits of intensively kept poultry, pigs, or cattle as converters of food into meat. This aspect is important from a national point of view, but does not necessarily enter into an individual farmer's calculations.

Three considerations were found to weigh heavily with the farmer contemplating the addition of an intensive livestock enterprise: firstly, the presumption, on his part, that a worth-while profit would be made; secondly, the question of whether the type of livestock and the system were to his liking; and, thirdly, the amount of capital required and whether this was within his reach.

The main object of the investigation reported on in this study was to enquire into the profitability or otherwise of fattening cattle in the counties of Aberdeen, Kincardine, and Banff under the method pioneered by the Rowett Research Institute, now generally referred to as the barley beef system. This system was introduced on a commercial scale in 1961 and received considerable publicity, due in large measure to its novelty. It was estimated that by 1965, 15 per cent of all fat cattle slaughtered in Great Britain consisted of barley beef animals.[*] In the North-East corner of Scotland, however, the proportion was estimated at 1.7 per cent only,

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[*] Kay, M. British Grassland Society, Occasional Symposium No. 2, page 21. 1965.

against 2.3 per cent for Scotland as a whole.[≭] This small percentage was due

possibly to the fact that this area is by tradition a producer of high quality

fat cattle which find a strong demand when exported in carcase form to

Smithfield and the Midlands of England. As barley beef animals are

slaughtered at approximately 11 months of age on reaching $7\frac{1}{2}$ to 8 cwt.

liveweight, the final product, although uniform in quality and very tender,

is light in colour and is said by many to lack taste and flavour. Nevertheless,

although some sections of the meat trade refuse to handle it, barley beef

producers have had no difficulty in marketing their product.

The barley beef system, under which cattle are reared and fattened on

an all concentrate diet composed mainly of barley plus a protein supplement,

depends for its economic success, presuming that the health of the cattle

remains good, on the cost of the calf, the cost of barley, and the price of

the finished product. Graphs I (a), I (b) and I (c), cover three years from

January 1963, to December 1965, and give the average carcase price of meat

per lb. for grade A steers in Scotland and the average price of barley per

ton also in Scotland. As many calves are brought from the Midlands and

North of England and Wales the average price of male rearing calves has been

obtained from these areas as well as from Scotland.

Broadly speaking the peaks and troughs over the three years, in all

three graphs, occur at similar times of the year. Therefore, as it takes

approximately 12 months to rear and feed a calf to finished weight, it would

have been impossible, on average, to buy at the cheapest time and to sell at

the dearest. For the most recent year (1965) the graph showing the price

of meat did flatten out to a considerable extent. However, the time of

dear meat still coincided with the period during which barley prices were

at their peak and thus animals ready for sale at that time would have consumed

large quantities of dear barley. On the other hand, there could be a slight

advantage in selling barley beef animals at the time of low priced meat

because the time of dear barley would then have occurred at an early age in

the calf's life when its food conversion ratio would have been about half

that during the finishing period. Be that as it may the peaks and troughs

did not occur at regular intervals so that forecasting with any degree of

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≭ McIntosh, F. Scottish Agriculture Vol. 44, No. 5. 1965.

GRAPHS 1 (a), 1 (b) & 1 (c)
Prices for (a) Beef, (b) Barley, (c) Calves 1963 – 1965

Dead Meat Price

(a) Meat price (Scotland) Grade A
     steers. Pence per Lb. deadweight.

Barley Price

(b) Feed barley price (Scotland)
    £ per ton.

Calf Price

(c) Average calf price (England, Scotland
    Wales). Male rearing calves. £ per head

-3-
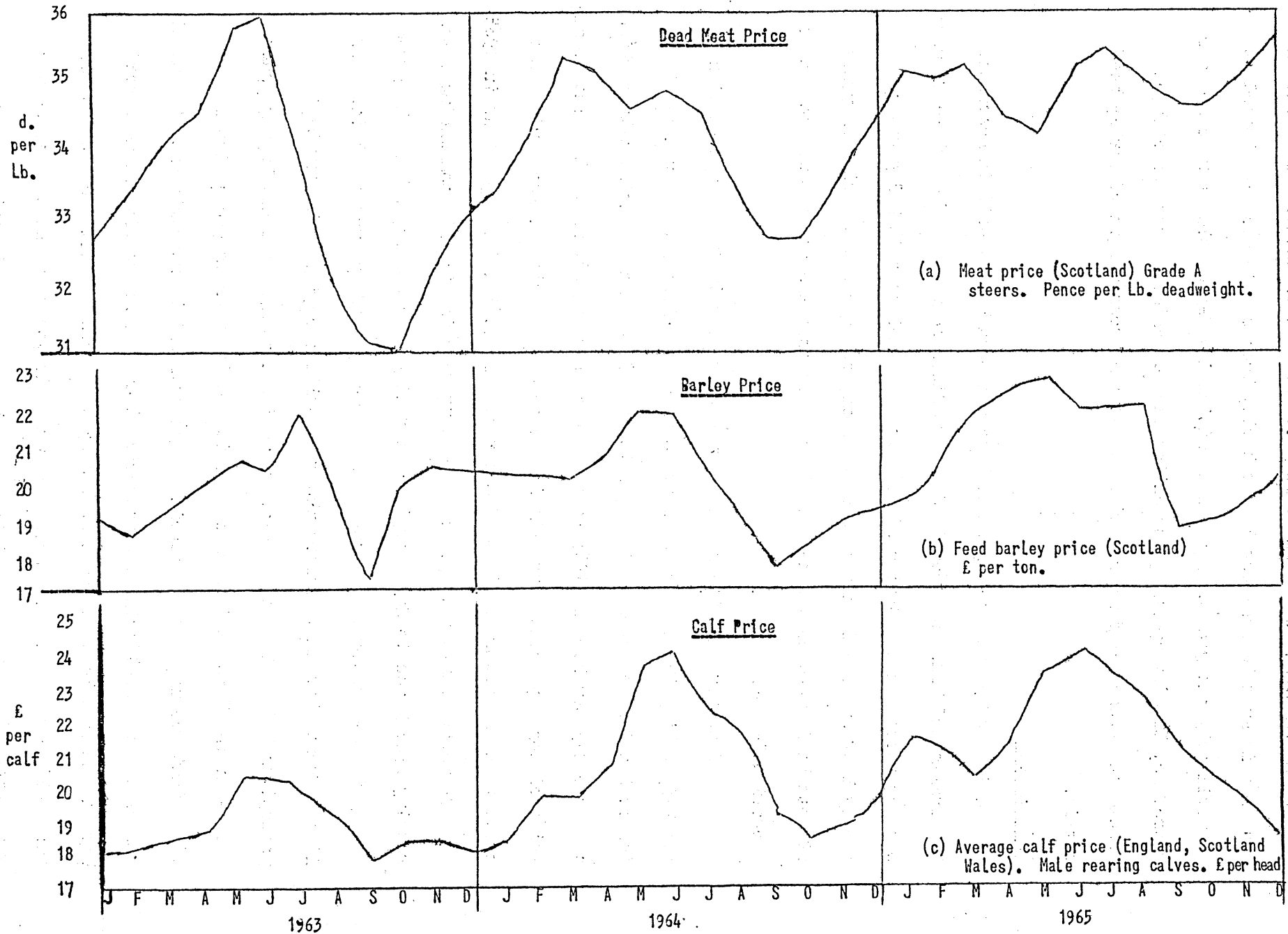
accuracy would have been difficult.

When comparing the profitability of barley beef animals with traditionally fed ones it must be remembered that barley beef cattle are slaughtered at approximately one year of age and traditionally fed cattle at 2 to $2\frac{1}{2}$ years. Therefore, broadly speaking, traditionally fed animals must leave about double the gross margin per head to equal the gross margin of barley beef cattle.

THE SAMPLE

A list of 36 farmers known to have produced barley beef in Aberdeen, Kincardine and Banff was compiled from various sources. When these farmers were contacted in the Spring of 1965 it was found that 14 had given up barley beef or were in the process of doing so, because the rise in price of both barley and calves had convinced them that the process was no longer a profitable one.

As illustrated in Graph I the price of barley in 1964 compared with that of 1963, taking the average over 12 months, had risen 7s. per ton and there followed a further rise of 18s. per ton in 1965. Male rearing calves which averaged £19 per head in 1963 rose to an average of £21 in 1965. The average price of locally bred heavy Friesian steer calves suitable for barley beef production was estimated to be £24 per head in 1963 and £33 per head in 1965.

Of the 20 farmers who started keeping records, 11 with commencing dates ranging from March to May completed a full year's costings. Of the 9 who ceased to keep records only one gave up barley beef production altogether. It was found that many farmers who were still carrying on barley beef production had ceased to buy older weaned calves and were now buying young calves at the 7 to 14 day stage. This modification in production system meant that producers were accruing to themselves the rearer's profit, but at the same time shouldering the rearer's risks. Farmers did not necessarily buy all their calves at one stage, only two purchased all young calves and three all weaned calves. Some had turned to young Ayrshire steer calves which, although having doubled in price since 1963, could still be purchased at around £6 per head. The percentage of Ayrshires handled in each unit is given in Appendix I, Table IV.

In every case farmers were found to be buying and selling animals all the year round and were thus running their units as a continuous process and

not on an "all in, all out" basis.   The question of costing separate
batches of animals from purchase to slaughter was considered, as valuable
information might have been obtained relating to the performance of different
breeds and feeds, but three things militated against this approach.   Firstly,
farmers were unwilling to undertake the extra work involved in keeping
several separate records, particularly those relating to food consumption.
Secondly, comprehensive investigations of the physical aspects of barley
beef production have been carried out on a batch basis in the original
work at the Rowett Research Institute.✳   Thirdly, the batch approach does
not give a particularly reliable picture of the economics of an enterprise
run as a continuous process because the price of fat cattle ruling at
time of sale of a particular batch of animals will materially affect the
profitability of that batch while, in addition, the price of barley during
the last few weeks of fattening, when food consumption is heavy, will also
affect the result.   The method adopted, therefore, was to record all
expenditure and income over a period of 12 months for the barley beef unit
on each farm.   At the same time, all cattle were weighed at the opening
and closing valuation dates as well as all cattle purchased and sold.
Monthly records were kept for the 11 enterprises and taking all cattle at
the opening valuation dates and adding all purchases a total of 2,174 head
of cattle were handled during the year.

Cropping on the farms concerned was generally simple with a large
acreage in barley as illustrated in Table I.

TABLE I

Cropping, 1965

Farm Code No.	Barley	Grass	Potatoes	Roots	Other Crops	Total Arable	Barley acreage as % of total arable acreage
	acres	acres	acres	acres	acres	acres	%
2	21	21	-	-	-	42	50
3	67	13	-	-	-	80	84
7	64	100	-	-	(100 Rough) Grazing)	164	39
9	31	32	-	-	-	63	49
1	50	-	8	-	-	58	86
5	70	26	16	-	-	112	63
12	181	67	40	3	-	291	62
6	105	51	13	-	6 Wheat	175	60
13	75	164	12	4	20 Oats	275	27
11	150	202	39	-	-	391	38
4	150	219	40	25	66 Peas	500	30

✳ Preston, T. R. et al., Proceedings of Nutrition Society, Vol. 20, page xlii, 1961.

One farm had no grass whilst four had only barley and grass. The livestock carried showed a much greater diversity. Two farms carried dairy herds and all other farms with grass carried either cattle or sheep or both. Some, with small grass acreages, summer-grazed only, whilst on farms with larger grass acreages, silage and hay were made to provide winter keep. Four farms had pig herds and one specialised in hatching eggs.

The frequency distribution of barley beef enterprises according to size, based on the average monthly stock carry, is shown in Table II.

TABLE II

Frequency Distribution of Barley Beef Units by Size
(Based on average monthly stock carry)

Size of barley beef unit (average number of animals)	Number of barley beef units
Up to 25	1
26 - 50	3
51 - 75	-
76 - 100	1
101 - 125	2
126 - 150	3
151 - 175	-
176 and over	1
ALL units	11

COSTS

Figures showing the various cost items as percentages of total costs are given in Table III.

TABLE III

Costs - Percentages

	Average 11 Enterprises
	%
Food	88
Vet., Drugs, Carriage and Miscellaneous	3
Labour	6
Depreciation, Repairs to Buildings and Equipment	3
Total	100

Food is by far the highest item of cost and therefore to achieve a satisfactory surplus it is necessary that all aspects of feeding should be controlled carefully from the young calf stage to the finished animal. As barley accounts for 71 per cent of food cost its price is of great importance. The method used for calculating the price of home grown barley is outlined in Appendix II to this report. The price variation over the costing period is given in Graph II and represents the price paid for barley by local merchants to farmers and includes premiums and deductions on sales. This price averaged over the 12 months amounted to £22 12s. per ton.

GRAPH II

Sale Price of Barley ex Farm,
including premiums and deductions on sales, 1965/66
(Aberdeen Market)
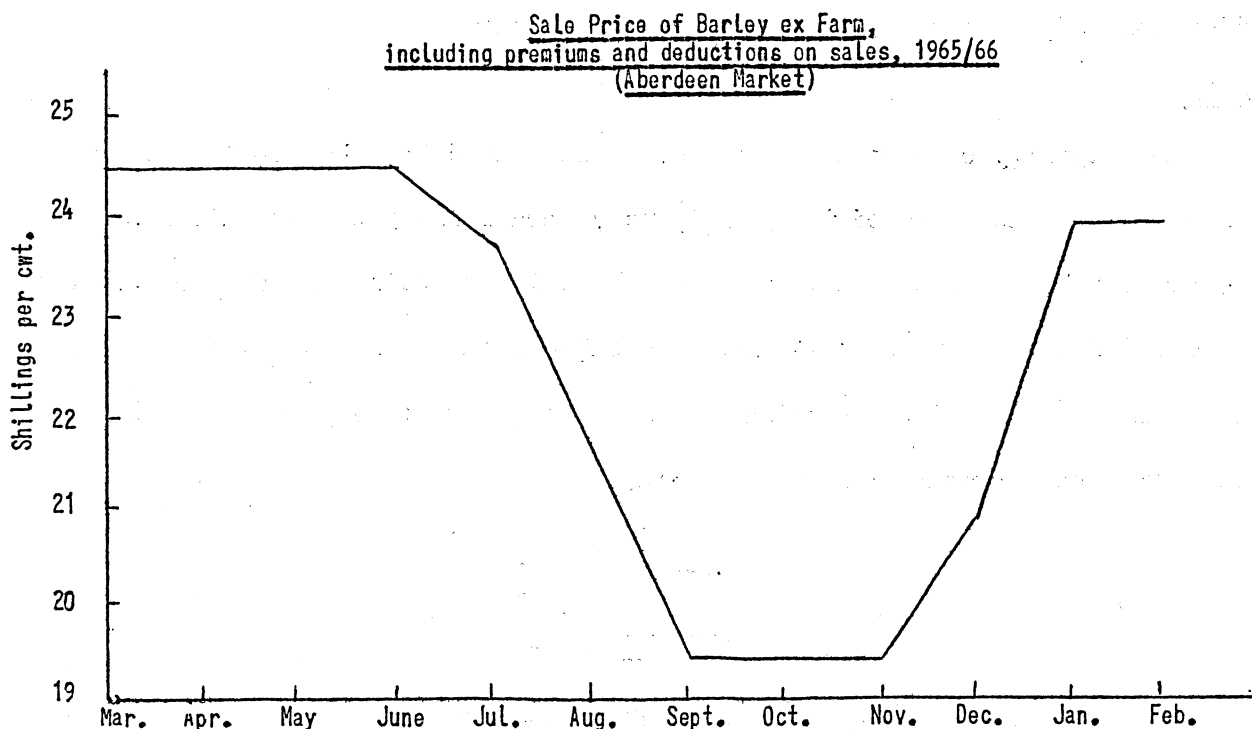
Farmers who had insufficient barley of their own and who had to make heavy purchases tended to do so all-the-year-round and not just during the period when grain was cheap. The reason was largely a storage problem as their silos and grain lofts were full after harvest at the time when grain was low in price. Special storage costing from £10 to £15 per ton of stored grain could be an attractive proposition, but only if the price differential over the year were to remain at its present level.

Hay was fed in small quantities on 6 farms, but was considered more in the nature of a stomach regulator rather than a food. Some farmers pointed out that the cattle, when bedded with straw, could pick up what roughage they required. Hay was fed to 2 units in slats and to 4 units in straw courts. (Appendix I, Table IV).

In none of the cases studied was a completely new building erected for the barley beef enterprise. The cost of adapting existing buildings varied greatly, the lowest cost being £1 per head and the highest £26 per head (Appendix I, Table III). The depreciation charge, with capital written off over 5 years, was low and on average amounted to £1 15s. per head. The cost of new buildings can vary to a wide extent, depending on building standards and locality, but if taken at £40 per head for straw courts and £75 per head for slats with capital written off over 10 years, the depreciation charge would be £4 per head in the first case and £7 10s. in the second. Also in the case of new buildings there would be, in all probability, the added cost of an interest charge on borrowed money.

INCOME

The majority of cattle in the sample were sold "on the hook", payment being made per lb. deadweight. Only very occasionally was an animal sold "on the hoof". These were usually "light weights" being disposed of because of some defect. Prices at Aberdeen throughout the year are given in Graph III. These prices include subsidy and any supplementary payments with slaughter and marketing charges deducted.

GRAPH III

Price per Lb. deadweight, Barley Beef
March 1965, to February 1966.
(Aberdeen)
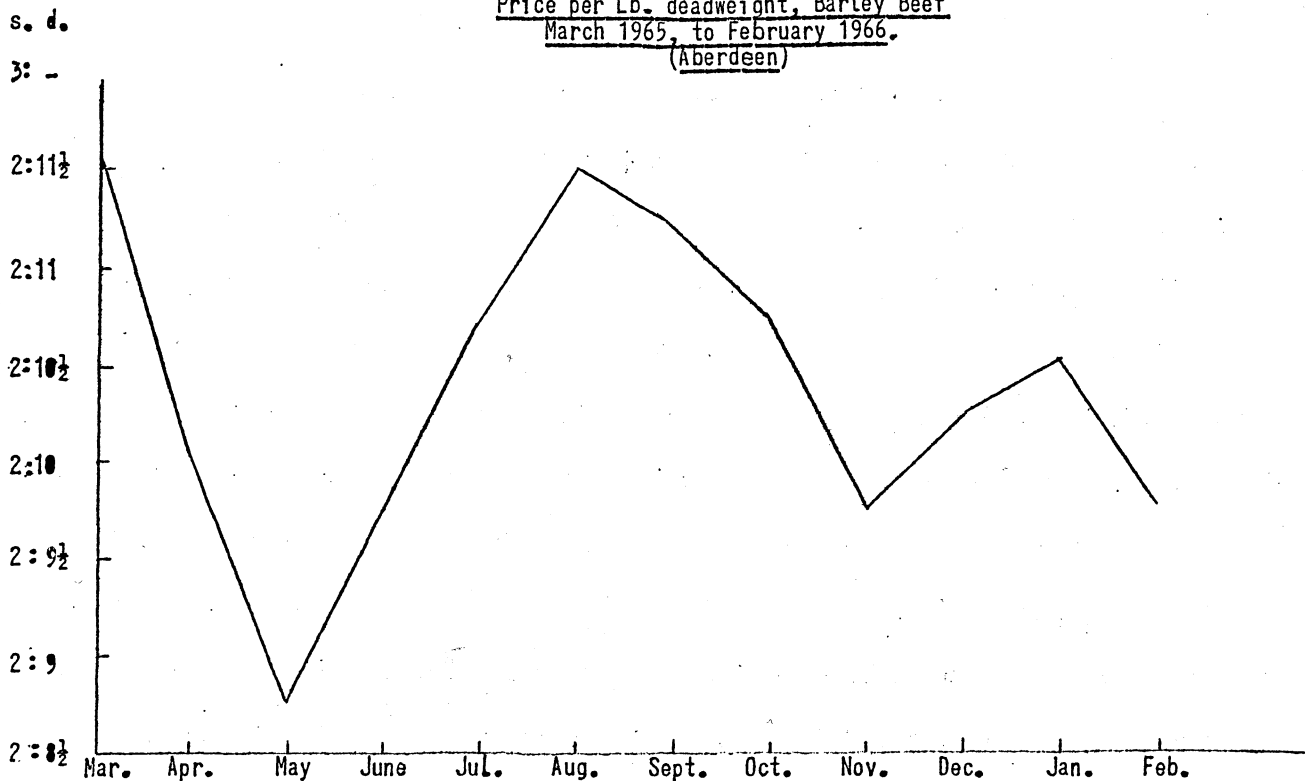
Farmers in the sample sold cattle at all times throughout the year and there was no apparent attempt to regulate purchases with a view to having fat cattle ready for sale when meat was dear. Prices of cattle sold off the 11 farms in the sample varied from 2s. 9¾d. per lb. to 2s. 11¾d. per lb. which on an average carcase of 476 lbs. represents a difference of £3 19s. per head. The average killing-out-percentage was 55.8 per cent, but actual figures varied from 57.4 per cent to 53.8 per cent (Appendix I, Table III). It should be noted that liveweight was taken on the farm, and carcase weight after transportation and slaughter.

PROFITABILITY

The average gross output per head for the 11 barley beef enterprises is given in Table IV along with average figures for the two farms with the highest and the two farms with the lowest surplus per head figures. (Per head figures for each of the 11 farms are given in Appendix I, Tables II and III).

TABLE IV

Gross Output per Head

	Average 11 Enterprises	Average Two Highest	Average Two Lowest
	£ s.	£ s.	£ s.
Sale Price	69: 4	65:17	68: 6
Calf Subsidy	10: 1	10: 2	10: 2
Sub Total	79: 5	75:19	78: 8
Less Purchase Price	19:17	11:16	25:16
Feeder's Margin	59: 8	64: 3	52:12
Valuation Change	+ -:17	+ 4:11	- 5:15
GROSS OUTPUT	60: 5	68:14	46:17

A large variation occurred in the purchase price of the calf. The lowest price was paid for young Ayrshire steers and the highest for weaned Friesian-cross steer calves. The frequency distribution of calves according to purchase price is given in Table V.

TABLE V

Frequency Distribution of Purchase Price of Calves
(Average price per head paid per barley beef enterprise)

Average price per Calf	Number of barley beef enterprises
Up to £10	2
£10 1s. to £20	3
£20 1s. to £30	5
Over £30	1

Table VI gives the average figures per head for gross outputs, costs, gross margins and surplus along with average figures per head for the two farms with highest surplus and the two farms with highest deficit.

TABLE VI

Average Output, Costs, Gross Margin and Surplus per Head

	Average 11 Enterprises	Average two farms highest surplus	Average two farms highest deficit
	£ s.	£ s.	£ s.
Gross Output	60: 5	68:14	46:17
Food	48: 3	43: 2	47: 7
Vet. and Drugs	-:18	0: 9	1:13
Carriage and Miscellaneous	-:10	-: 8	1: 7
Total Variable Costs	49:11	43:19	50: 7
Gross Margin (Output less Variable Costs)	+10:14	+24:15	- 3:10
Labour	3: 2	3:12	3: 2
Depreciation on Buildings and Equipment	1:15	2: 2	-:14
Repairs to Buildings and Equipment	-: 1	-: 2	-: -
Total Other Costs	4:18	5:16	3:16
Surplus (Gross Margin less Other Costs)	+ 5:16	+18:19	- 7: 6

Economic and physical data are given in Table VII which shows average figures per head for the 11 enterprises and also average figures per head for the two farms with the highest surplus and the two farms with the highest deficit.

TABLE VII

Summary of Financial and Physical Data

	Average 11 Enterprises	Average 2 Farms Highest Surplus	Average 2 Farms Highest Deficit
	lb.	lb.	lb.
Av. live weight per head at time of purchase	149	85	184
Av. live weight per head at time of sale	852	820	854
	%	%	%
Percentage Mortality	3.5	7.1	3.3
	£ s.	£ s.	£ s.
Av. cost of food per ton concentrates	26: 7	27: 4	24:16
	cwt.	cwt.	cwt.
Av. weight of concentrates consumed per head	35	31	36
	lb.	lb.	lb.
Av. weight of concentrates per lb. live weight gain (conversion ratio)	5.56	4.82	5.75
	s. d.	s. d.	s. d.
Av. cost of concentrates per lb. live weight gain	1: 4½	1: 2	1: 4¾
	£ s.	£ s.	£ s.
Av. total cost per cwt. live weight gain	8:14	7:12	9: 2
	%	%	%
Percentage surplus on capital invested	16.6	39.5	—
Av. killing-out percentage	55.8	55.3	55.0
	lb.	lb.	lb.
Av. carcase weight	476	453	470
	s. d.	s. d.	s. d.
Av. price received per lb. dead weight	2:10¾	2:11	2:10¾

When comparing the average figures for the two farms with the good results with the average figures for the two farms with the poor results it was noted that in the case of the good farms:

(a) the feeder's margin was considerably greater, mainly due to the low price paid for purchased calves;

(b) the average live weight of purchases was lower showing that they were younger animals;

(c) the live weight at time of sale was slightly less, which resulted in a better food conversion ratio and in lower total food consumption.

In the above table, those farms which wet-stored their grain had their food conversion ratios adjusted, for comparative purposes, to barley with 16 per cent moisture. However, total food consumption figures in cwt. were not adjusted in this fashion.

The surplus achieved is the resultant of a variety of factors and thus there is only limited correlation between any one single yardstick and surplus when the results achieved on a number of units are compared. This is seen in Table VIII where surplus, feeder's margin, food conversion ratio, and estimated live weight gain per day are tabulated for each of the 11 units. It must be stressed that daily live weight gain is an estimate, calculated by dividing the total live weight gain of each enterprise for the 12 months, by 365 days and also by the average number of cattle. It is only useful for comparative purposes in this table because the same method of calculation was used in all cases.

Enterprises are graded in the table from left to right on the basis of decreasing surplus.

TABLE VIII

Surplus, Feeder's Margin, Food Conversion Ratio and Estimated Liveweight Gain per Day
(per head for 11 enterprises)

	Farm Code Number										
	4	1	6	12	11	3	2	5	13	7	9
	£	£	£	£	£	£	£	£	£	£	£
Surplus	+ 23	+ 15	+ 11	+ 11	+ 7	+ 6	+ 4	+ 2	0	- 2	- 13
Feeder's Margin	69	59	66	58	54	55	76	56	53	64	41
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Food conversion ratio	4.9	4.7	4.9	5.4	5.7	6.0	6.5	5.4	6.3	5.1	6.4
Estimated live weight gain per day	2.01	2.01	2.2	1.84	1.72	1.83	2.12	2.02	1.74	2.12	1.65

A guide to the efficiency of production is the composite yardstick represented by the cost of food per £100 gross output.   Table IX provides figures based on this yardstick.

<div align="center">

TABLE IX

Surplus and Food Costs per £100 Gross Output
11 Enterprises

</div>

	Farm Code Number										
	4	1	6	12	11	3	2	5	13	7	9
	£	£	£	£	£	£	£	££	£	£	£
Surplus per head	+ 23	+ 15	+ 11	+ 11	+ 7	+ 6	+ 4	+ 2	0	- 2	- 13
Food per £100 output	61	65	75	76	77	77	83	83	94	94	110

DISCUSSION

Barley beef production has many advantages:

(i) Calves which are reared under the barley beef system are sold within a year so that the capital involved is turned over rapidly and therefore a lower profit per head is acceptable compared to traditionally reared and fattened animals.   There is also the added advantage, when a farmer's capital is in short supply, that it is easier to borrow money on short term loan.

(ii) In all cases reported on in this investigation, cattle were accommodated in old buildings which required comparatively little capital to convert them for use in a barley beef system.   In the case of farms which have adopted an all grain cropping policy, and therefore have no winter keep for cattle, barley beef feeding allows redundant buildings to be put to good use all the year round.

(iii) As barley was charged to the barley beef enterprises in this investigation at market value, any profit gained was over and above that which would have been obtained by marketing the barley direct.   In effect this system provides an alternative method of marketing barley.

(iv) The labour requirement is very low because feeding is generally accomplished by using self-feed hoppers which hold two or three days' feed. Slats can further reduce man-hour requirements.

(v) As animals are never on grass there are no husk or warble fly hazards.

(vi) Barley beef cattle are reared and finished on similar diets and under similar conditions and therefore the carcase meat is uniform and tender and is very suitable for some sections of the meat trade.

(vii) The feeding of urea and other non-protein nitrogen compounds in the early fattening stages has proved quite successful and reduces feeding costs.

But although the barley beef system has many advantages there are also some disadvantages associated with the process:

(i) Most of these disadvantages are inherent in the system and unless the techniques of feeding an all concentrate diet to ruminating animals is fully mastered, serious trouble can arise largely due to bloat and to kidney trouble. As bloat so often occurs in animals that are at least half grown, a few deaths can make serious inroads into profit.

(ii) There are also difficulties associated with the rearing of young calves, especially if there is no whole milk available, and especially if they have been transported long distances.

(iii) Barley beef carcase meat is pale in colour and is said by many to be somewhat tasteless compared with that from traditionally fed two-year-old animals. Many butchers will not handle it and maintain that it will never have a high place in consumer preference.

(iv) The system is vulnerable because to a great extent it depends on the price of calves and on the price of barley. Even though other grains can be substituted for barley, a rise in price of barley is generally associated with a general rise in all grain prices which makes substitution difficult.

It has been said that the country cannot afford to produce barley beef animals as the carcases produced are marketed at relatively light weights with a consequent loss of meat to the nation. Again it has been said that the food consumed could be put to better use by pigs with their lower food conversion ratio. At the same time it must be remembered that the system has increased the range of calves suitable for beef production.

Barley beef production is no different from other farm enterprises in so far as some farmers are successful while others fail. It will therefore find a place in farming and will attract those who have acquired the necessary technique and who possess managerial ability.

APPENDIX I

TABLE I

Financial Results for 11 Barley Beef Units
1965/66

	Farm Code Number																					
	4		**1**		**6**		**12**		**11**		**3**		**2**		**5**		**13**		**7**		**9**	
	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£
Sales	157	10,074	131	8,855	82	6,150	140	9,780	180	12,638	137	9,061	64	4,569	28	1,860	33	2,441	78	5,834	47	2,907
Calf Subsidy	–	2,363	–	1,510	–	1,183	–	1,468	–	1,554	–	1,350	–	674	–	337	–	281	–	375	–	344
Deaths (Insurance)	12	–	29	289	6	–	11	–	5	3	3	20	14	–	–	–	–	–	2	–	4	–
Closing Valuation	220	9,721	101	5,413	116	5,815	131	6,181	135	6,753	92	3,944	93	3,751	25	1,150	27	1,563	44	1,568	27	1,438
Sub-total (A)	389	22,158	261	16,067	204	13,148	282	17,429	320	20,948	232	14,375	171	8,994	53	3,347	60	4,285	124	7,777	78	4,689
Opening Valuation	204	6,555	135	5,573	75	3,089	126	5,011	131	4,702	107	4,761	89	3,183	36	1,480	24	1,357	78	4,348	33	1,737
Purchases & Home Bred	185	958	126	2,323	129	2,424	156	3,397	189	4,853	125	2,588	82	421	17	340	36	1,116	46	958	45	1,386
Sub-total (B)	389	7,513	261	7,896	204	5,513	282	8,408	320	9,555	232	7,349	171	3,604	53	1,820	60	2,473	124	5,306	78	3,123
OUTPUT (A–B)		14,645		8,171		7,635		9,021		11,393		7,026		5,390		1,527		1,812		2,471		1,566
Food		8,905		5,306		5,754		6,896		8,770		5,429		4,497		1,265		1,699		2,323		1,728
Vet. & Drugs		79		64		183		84		115		156		100		–		11		50		87
Miscellaneous		45		76		49		57		71		34		7		9		1		97		25
TOTAL VARIABLE COSTS		9,029		5,446		5,986		7,037		8,956		5,619		4,604		1,274		1,711		2,470		1,840
GROSS MARGIN (Output less Variable Costs)		5,616		2,725		1,649		1,984		2,437		1,407		786		253		101		1		(–274)
Labour		559		572		340		277		626		450		366		53		56		57		193
Depreciation on Buildings		537		187		52		22		390		269		150		143		32		38		23
Repairs to Buildings		35		6		–		25		34		–		–		–		–		–		–
TOTAL OTHER COSTS		1,131		765		392		324		1,050		719		516		196		88		95		216
SURPLUS (Gross Margin less Other Costs)		4,485		1,960		1,257		1,660		1,387		688		270		57		13		(–94)		(–490)

APPENDIX I

TABLE II

Financial Results for 11 Barley Beef Units
Per Head Figures

	4	1	6	12	11	3	2	5	13	7	9	Average
	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
OUTPUT	74: 6	63: 3	66:15	57:19	57: 9	56:12	78: 1	58:19	55:15	53:13	40: 1	60: 5
Food	45: 3	41: -	50: 6	44: 6	44: 4	43:15	65: 2	48:17	52: 6	50: 9	44: 4	48: 3
Vet. and Drugs	-: 8	-:10	1:12	-:11	-:12	1: 5	1: 9	-: -	-: 7	1: 2	2: 5	-:18
Miscellaneous	-: 5	-:12	-: 9	-: 7	-: 7	-: 5	-: 2	-: 7	-: 1	2: 2	-:13	-:10
TOTAL VARIABLE COSTS	45:16	42: 2	52: 7	45: 4	45: 3	45: 5	66:13	49: 4	52:14	53:13	47: 2	49:11
GROSS MARGIN (Output less Variable Costs)	28:10	21: 1	14: 8	12:15	12: 6	11: 7	11: 8	9:15	3: 1	-: -	(-7: 1)	10:14
Labour	2:17	4: 8	2:19	1:16	3: 3	3:13	5: 6	2: 1	1:14	1: 5	4:19	3: 2
Depreciation on Buildings and Equipment	2:15	1: 9	-: 9	-: 3	1:19	2: 3	2: 4	5:10	1: -	-:16	-:12	1:15
Repairs on Buildings and Equipment	-: 3	-: 1	-: -	-: 3	-: 4	-: -	-: -	-: -	-: -	-: -	-: -	-: 1
TOTAL OTHER COSTS	5:15	5:18	3: 8	2: 2	5: 6	5:16	7:10	7:11	2:14	2: 1	5:11	4:18
SURPLUS (Gross Margin less Other Costs)	22:15	15: 3	11: -	10:13	7: -	5:11	3:18	2: 4	-: 7	(-2: 1)	(-12:12)	5:16

N.B. Farms have been graded from left to right on basis of decreasing surplus per head.

APPENDIX I

TABLE III

Individual Financial and Physical Results for 11 Barley Beef Enterprises

| | Farm Code Number | | | | | | | | | | | |
	4	1	6	12	11	3	2	5	13	7	9	Average
	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Av. sale price per head	64: 3	67:12	75: —	69:17	70: 4	66: 3	71: 8	66: 8	73:19	74:16	61:17	69: 4
Av. calf subsidy per head	10: 4	10: 1	10: 2	10: 2	9:15	10: —	10: 1	9:18	10: 5	10: 2	10: 2	10: 1
Av. purchase price per head	5: 4	18: 9	18:16	21:16	25:14	20:14	5: 3	20: —	31: —	20:17	30:16	19:17
Av. feeder's margin (including calf subsidy)	69: 3	59: 4	66: 6	58: 3	54: 5	55: 9	76: 6	56: 6	53: 4	64: 1	41: 3	59: 8
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Av. live weight per head at time of purchase	70	101	99	205	210	150	73	97	266	120	249	149
Av. live weight per head at time of sale	803	836	902	878	837	821	850	837	902	893	815	852
	%	%	%	%	%	%	%	%	%	%	%	%
Percentage Mortality	3.1	11.1	2.9	3.9	1.6	1.3	8.2	0	0	1.6	5.1	3.5
	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Av. cost of food per ton concentrates	27:19	26: 9	26: 1	27: 7	27: 9	24:10	28:16	27:10	26:15	25:16	23:17	26:12
	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.
Av. weight of concentrates consumed per head	32	31	35	32	33	36	45	38	36	39	33	35
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Av. weight of concentrates per lb. live weight gain (conversion ratio)	4.94	4.70	4.86	5.36	5.67	5.98	6.50	5.38	6.28	5.06	6.45	5.56
Av. cost of concentrates per lb. live weight gain	1s. 2¾d.	1s. 1¼d.	1s. 3d.	1s. 3¾d.	1s. 4¼d.	1s. 4½d.	1s. 8d.	1s. 3¾d.	1s. 7¾d.	1s. 3½d.	1s. 6d.	1s. 4¼d.
	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Av. total cost per cwt. live weight gain	7:18	7: 6	7:16	7:18	9: —	8:11	10:14	8:12	9:15	8: 1	10: 4	8:14
	%	%	%	%	%	%	%	%	%	%	%	%
Percentage surplus on capital invested in livestock and buildings	46.0	32.9	27.7	29.1	23.3	13.7	7.0	3.7	0.8	—	—	16.7
	£	£	£	£	£	£	£	£	£	£	£	£
Av. Capital invested per head in buildings and equipment	9	7	2	1	13	11	9	26	6	5	4	8
	%	%	%	%	%	%	%	%	%	%	%	%
Av. killing out percentage	54.8	55.8	56.1	55.9	57.4	55.5	56.7	55.5	55.7	56.2	53.8	55.8
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Av. carcase weight	440	467	506	490	481	460	482	464	502	502	433	476
Av. price received per lb. dead weight	2s. 11d.	2s. 10¾d.	2s. 11½d.	2s. 10¼d.	2s. 11d.	2s. 10½d.	2s. 11½d.	2s. 10¼d.	2s. 11¼d.	2s. 11¼d.	2s. 9¾d.	2s. 10¾d.

N.B. Farms have been graded from left to right on basis of decreasing surplus per head.

APPENDIX I

TABLE IV

Some Physical Details for 11 Barley Beef Units

	Farm Code Number										
	4	1	6	12	11	3	2	5	13	7	9
Average Stocking - Number of Barley Beef Animals	212	126	107	132	148	124	84	28	25	41	30
Percentage Ayrshires	100	10	nil	76	34	16	62	nil	30	14	10
Number of Cattle sold	157	131	82	140	180	137	64	28	33	78	47
On Slats or Straw	Slats	Slats	Straw	Straw	Slats	Slats	Straw	Straw	Slats	Straw	Straw
Method of Grain Storage	Dry	Dry	Wet, Silo	Dry	Dry	Dry	Wet, sacks	Dry	Dry	Wet, Silo	Wet, sacks
Roughages fed	Nil	Hay	Nil	Hay	Hay	Nil	Hay	Nil	Nil	Hay	Hay

APPENDIX II

Notes on Methods of Costing

Food

Home-grown barley is a readily saleable product and therefore was charged to the barley beef cattle at market value. Market value, however, can be interpreted in different ways. It can be argued that where storage facilities exist which allow the barley to be held over for sale late in the grain season when prices tend to rise and when premiums on sales are highest, then the price obtained at time of sale should be charged. However, this method was considered to be unfair to the cattle enterprise. If grain is to be held over until the price rises then the farmer should purchase barley for the cattle during this time of waiting when, presumably, the barley price was low. Therefore for this investigation home-grown barley was charged to the cattle at the local market price prevailing during the month in which it was consumed, plus premiums on sales applicable at the time.

In addition to the above price a processing charge for bruising or crimping of 15s. per ton was added.

Wet stored grain presented another problem. In this case the estimated cost of drying was subtracted from the market value and the cost of storage added. Capital expenditure on storage plant was written off over a period of 10 years.

Another problem posed by wet grain was in relation to conversion ratios between wet and dry grain. If wet barley, with a moisture content of 26 per cent, is dried down to 16 per cent before feeding, the food conversion ratio could be altered from $5\frac{3}{4}$ to 1, to 5 to 1. This reduction in moisture makes a difference of 13.4 lb. in every cwt. of barley.

Hay was charged at the sale price which could have been obtained on the farm.

Purchased food was charged at purchase price delivered on the farm.

Farmyard Manure and Sludge Disposal

Following usual farm accounting procedure bedding straw was not charged against the enterprise, the value of straw to the cattle being taken to equal the value of farmyard manure to the land. Slats were not necessarily installed

because of scarcity of straw. In one particular case the alternative to burning the straw was heavy capital expenditure on machinery - baler, dutch-barn, manure loader and spreader - while in addition considerable annual costs would also have been incurred in terms of man and tractor hours. On a budgeted basis it was found that slats and a sludge cart were a better proposition. In all cases which were studied, the enterprises were already functioning and were integrated with the general farm policy. There was no case of a large "Factory Unit" where sludge might well have been an embarrassment and where its disposal would be a direct charge against the enterprise.

Capital Expenditure and Depreciation on Buildings and Equipment

The capital involved in buildings and equipment was taken to be the average of the written down value at the opening and closing dates. As no new buildings were included and as it is not usual to depreciate an old steading, only costs incurred in adapting existing buildings were taken into account. Capital expenditure including feed bins, water bowls and other necessary equipment was written off over 5 years.

Overhead Charges

The majority of overhead charges are incurred whether the barley beef enterprise does, or does not, exist and it is the place of barley beef cattle within the farm economic structure which was being examined. Thus all charges which could not easily be allocated were not taken into account.

Calculations "Per Animal"

It is not easy to calculate "per head" figures because the animals, at the opening, and closing valuation dates of the costing year, are at various stages of growth. Their output can be calculated from estimated market value based on their live weight, but the recording of inputs of food, labour and other costs on partly grown animals within the herd is too involved for some commercial undertakings. Sufficient data were available, however, to calculate the liveweight gain for 12 months for each enterprise as a whole. The trading account items can then be divided by this total gain to produce output, costs, and surplus figures per unit of liveweight gain. The required results per animal can then be obtained by multiplying these figures by the average liveweight gain per head obtained from weights of animals

purchased and sold throughout the year. As only the calves purchased at the beginning of the period and the calves on the farm at the opening valuation date will complete their whole feeding life within the 12 months costed, the average liveweight gain per head will be a near approximation, but only provided that the policy of the enterprise is not changed. The disadvantage of using "per batch" figures to interpret a continuous process was discussed earlier in this report. In contrast to this, the method outlined above has the great advantage that the results are based on the trading account which incorporates all inputs and outputs of the enterprise as a whole.

Sale Price of Fat Cattle

The sale price of fat cattle takes into account slaughter and/or marketing charges. Guarantee payments are included.