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FARM ECONOMICS BRANCH, KING'S COLLEGE,
NEWCASTLE UPON TYNE



COSTS and RETURNS FROM
YARD FATTENED CATTLE 1951-52.

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I. INTRODUCTION

The economic considerations affecting choice of method in cattle feeding are fairly clear and are generally realised amongst cattle feeders. In mixed farming systems, cattle feeding is undertaken with four main objectives, viz., (1) to produce net revenue, (2) to convert into a saleable product fodder crops and roughages which might otherwise be unsaleable, (3) to produce dung for maintaining land fertility, especially where arable crops are a major source of revenue, and (4) to regularise the demand for labour throughout the year by balancing winter demand against the spring and autumn peaks. These considerations affect different farms with varying emphasis, according to the extent and character of the arable cropping and the relative importance of crop and livestock revenue, in the plans of the particular farms. They also give rise to difficult problems in farm cost accounting and the interpretation of costing results. Mixed farming is joint production in which the final assessment of profit or loss turns upon total revenues and total costs. The accounting processes of departmentalizing a farm and seeking to determine profit or loss separately for each department or enterprise unavoidably compel the use of arbitrary or debatable rules and values for items transferred from one department to another within the whole farm economy, and for the allocation to each department of due shares of costs common to more than one department.

Over many years, costings of winter fed cattle have seemed to show that there has been little, if any, direct net profit from this side of farming and, since cattle feeding has continued, it must be concluded that, apart from direct net revenue earning, the other objectives listed above have been achieved with sufficient success - compared with alternative ways of serving the same ends - to justify in the minds of farmers the continuance of cattle feeding.

For example, in the main arable farming districts, i.e. those areas with an established tradition of sale crop production from arable land, the economic value of winter cattle feeding tends to be assessed largely in terms of the cost of dung. Common opinion is that, on the lighter soils almost certainly, and probably on all heavily cropped land whatever its texture, there is no adequate and easily obtainable alternative to muck, with its particular advantages of moisture holding, texture maintenance and encouragement of the soil bacteria necessary to healthy plant development. So long as the need for arable crops ranks as highly as it has done for the past thirteen years and the national need is appropriately expressed through the prices prescribed, plentiful supplies of dung would seem to be essential to sustain crop yield levels.

What dung really costs, however, can never be determined with any precision. The usual accounting practice is to treat the "cost" of dung as the residual amount needed to balance the loss on cattle feeding. The smaller this loss, the cheaper the dung produced. Should the cattle be fed at a profit, apart from the dung, then the dung is an added gain to be valued at whatever figure one cares to put to it.

An alternative way of accounting for dung is to put a value on it and to credit the cattle with this value. How much dung is produced will depend, of course, on how much and what kind of litter is put into the courts and the manurial value will depend on such factors as the composition of the feeding ration, whether the feeding courts are open or closed, to what extent the liquid urine is absorbed or lost by drainage, the period of storage and exposure and so on. Farmyard manure is anything but a standardized product.

Estimates made during a similar costings investigation in 1944/45 provided a figure of approximately 6 cwts. of dung per head per week as an average production of dung from court fed cattle, i.e., about $4\frac{1}{2}$ tons per head for a feeding period of 15 weeks (the average period for the present investigation.)

A rough way of assessing the manurial value is to apply current unit prices of the main manurial constituents (NPK) to the above quantities, on the assumption that one ton of farmyard manure will contain from 9 to 15 lbs. of nitrogen, 9 to 15 lbs. of potash and 4 to 9 lbs. of phosphoric acid. On this basis, $4\frac{1}{2}$ tons of f.v.m. at current unit values might be said to be worth from 50/- to 95/-, according to quality, and without taking account of the additional useful attributes of dung (humus, moisture holding, etc.)

If dung is accounted for in this way, then whatever the credit assigned to the cattle, a similar debit would be chargeable against crops grown on the land to which the dung is applied.

A further point is that, in process of costing the cattle, and before arriving at any measure of the cost of dung, there is the perennial problem of deciding whether the charges to be laid against the cattle for fodder crops fed should be assessed at production cost or at market value or some other value. In so far as there may be no market and therefore no recognised prices for fodder crops such as swedes, mangolds, etc. and for roughages such as straw, beet tops and the like, for which taken by themselves also no precise cost can be determined, it is only by the adoption of some arbitrary rule that any cost figures at all can be arrived at.

Even in regard to the labour cost in winter cattle feeding, it may be questioned whether the charging of such labour against the cattle at the contract wages paid truly represents the point in the farm economy at which the burden of labour cost should be borne. Winter cattle feeding is one of several ways in which a regular labour force can be held together during otherwise slack periods against the periods of peak labour demand on the cropping side. With the drying up in recent years of the supply of seasonal workers in certain districts, many farmers have thought it wise to "find" work in slack periods for such seasonal workers as are available, so as to have them on the job when there is more real need for them. Hence between the costing of jobs (at actual wages paid) and the interpretation of costings results, it is necessary to distinguish between the cost and the value of labour according to the purposes for which men are engaged. A cost figure may be decided upon, and the paid wage is an obvious figure to use. Value, on the other hand, is a matter of opinion, an estimation of worth, on which opinions will differ, according to circumstances.

The foregoing discussion is offered as a preface to the presentation of results from an investigation into costs and returns from yard-fed, or winter-fattened cattle on some north country farms in the winter of 1951/52. This investigation was confined to winter fattening, and this is not the dominant practice at the present time, since the majority of cattle feeders prefer to store-winter in improving condition, with a view to finishing the cattle on grass. In the course of similar investigations carried out by the Farm Economics Branch some years ago (1944-45 to 1947-48) it became clear that, with the easing off of the intensive arable cropping programmes demanded during the war years and the corresponding extension of the areas under leys, there was a marked shift of emphasis from yard finishing to the combination of store-wintering with grass-finishing. This shift has persisted. For example, in planning the investigation with which this report is concerned, out of 85 cattle feeders who were first approached, only 19 indicated their intention to undertake yard fattening. Arising out of this situation it may be noted that the farms participating in the investigation were widely distributed between the Tweed and the Tees, and the yard-finished cattle costed were generally selected lots of the more forward cattle which were being wintered. Some elasticity in the scale and intensity of yard feeding is to be expected from year to year according to the supplies of fodder in sight and the forwardness of the store cattle on offer. In the circumstances of most of the farms here concerned, fodder supplies were generally plentiful, store cattle were obtained in forward or reasonably forward condition and in the autumn of 1951 there were good grounds for expecting some advance in the prescribed prices for beef cattle. These anticipations were realised, and prices were in fact raised from the third week in December 1951, by 4/- per cwt.*

II. THE SAMPLE On the 19 farms taking part, 39 separate lots of cattle were costed. The farms, as might be expected, were, in the main, large farms, the average size being 454 acres, with a range from 147 to 1145 acres. They were also farms strongly interested in arable cropping, the average proportion of land under tillage being 39% of the total acreage. Barley was the dominant sale crop, with wheat, oats, and potatoes of lesser importance.

The 39 lots of cattle comprised in all 596 head, made up as follows:-

	<u>Irish</u>	<u>Home-bred</u>	<u>Total</u>
Bullocks	360	105	465
Heifers	<u>58</u>	<u>73</u>	<u>131</u>
Totals	<u>418</u>	<u>178</u>	<u>596</u>

About 85% of the cattle were Angus and Shorthorn crosses, with Hereford and other crosses making up the remainder.

At the time the investigation was closed, 574 of these cattle had been graded, 5 had become casualties and 17 unfinished were transferred out to finish on grass.

* For A+ grade home-bred bullocks and heifers and other grades in proportion.

For calculating total returns and costs over the accounting period, the casualties have been taken into account at their realised values and the unfinished cattle have been taken into account at their estimated values on transfer to grass.

III. LIVEWEIGHT GAINS and FEEDING PERIODS Estimated liveweight gains have been calculated separately for graded cattle and for all cattle.

On this question of liveweight gains, one must accept the fact that the ingoing weights (except for one farm) are estimated weights only, and consequently the calculated gains are subject to any error there may have been in the estimation of the weights when the cattle entered the courts. In our experience it is unusual to find farms on which both ingoing and outgoing weights are recorded. The outgoing weights for graded cattle are of course provided by the grading centre, and, as to ingoing weights, it may be that feeders are content to judge stores by the eye for approximate weight and feeding potentialities, and to be satisfied that the stores are more or less what are wanted and likely to "make the grade". Perhaps the weighbridge at this stage would be too revealing! Its more widespread use however would enable us to report more confidently about liveweight gains, rates of growth and effectiveness of feeding methods, especially when there are such wide differences in the forwardness of the cattle under observation.

The figures obtained for estimated store weights and grading weights averaged as follows:-

TABLE 1. AVERAGE WEIGHTS & LIVEWEIGHT GAINS PER HEAD

	ALL CATTLE			GRADED CATTLE ONLY		
	Bullocks	Heifers	Total	Bullocks	Heifers	Total
	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
Finished Liveweight	12.09	9.93	11.61	12.15	9.97	11.67
Store Weight	10.77	8.89	10.36	10.76	8.89	10.35
Liveweight Gain	1.32	1.04	1.25	1.39	1.08	1.32

The foregoing figures are averages drawn from the total sample. In fact the averages give little indication of the wide range in the time spent by the various lots of cattle in the feeding courts. For both bullocks and heifers the average feeding period was practically 15 weeks (14.97 weeks for bullocks and 14.88 weeks for heifers). For individual lots however, the periods varied between 5½ and 26 weeks. The range in feeding periods, by lots, was as follows:-

TABLE 2. RANGE IN LENGTH OF FEEDING PERIOD

	Under 8 weeks	8/10	10/12	12/14	14/16	16/18	18/20	20/22	22/24	Over 24 wks.	Total
	Bullocks	1	-	4	7	3	5	2	2	2	
Heifers	1	-	3	1	3	-	3	1	-	-	12
All Cattle	2	-	7	8	6	5	5	3	2	1	39

These feeding periods are, on the whole, about 3 to 4 weeks shorter for bullocks and 2 to 3 weeks shorter for heifers than the periods observed in previous investigations (1944-45 to 1945-46), probably because of the selection of the more forward stores for court finishing.

Relating the feeding period to the estimated gains in liveweight shows that the bullocks on average gained 9.8 lbs. per head per week and the heifers 7.8 lbs. These figures compare with 11.8 lbs. for graded bullocks and 10.8 lbs. for graded heifers in 1944-45, and 12.0 lbs. and 9.2 lbs. respectively in 1945-46. Here again, however, the smaller apparent rates of growth in 1951-52 probably reflect the more forward condition of ingoing stores. Rates of growth tend to slow down in the later stages of fattening.

IV. GRADING RESULTS The first lots of cattle were graded towards the end of December and, with the exception of the casualties and unfinished cattle referred to earlier, all cattle had been graded by mid-May. The monthly gradings and the numbers qualifying in the various grades are tabulated below. It should be noted that the heavy concentration of gradings in March was due in large part to the clearing of courts on one farm, from which more than half the cattle graded in that month were consigned. As a matter of interest, comparable figures from earlier investigations have been added to the tables.

TABLE 3. NUMBERS OF CATTLE GRADED MONTH BY MONTH

	1951/52		1944/45		1945/46	
	No.	%	No.	%	No.	%
November	-	-	-	-	2	.3
December	6	1.1	26	2.5	13	1.7
January	72	12.5	133	12.8	68	8.9
February	80	13.9	208	20.0	228	29.7
March	252	43.9	276	26.5	209	27.2
April	114	19.9	208	20.0	157	20.5
May	50	8.7	183	17.5	79	10.3
June	-	-	7	.7	11	1.4
Totals	574	100.0	1041	100.0	767	100.0

TABLE 4. ANALYSIS OF GRADINGS

	1951/52		1944/45		1945/46	
	No.	%	No.	%	No.	%
SS	69	11.6	139	12.6	128	16.0
S	185	31.1	386	35.1	338	42.3
A +	225	37.8	330	30.0	208	26.0
A	69	11.6	119	10.8	72	9.0
A -	15	2.5	49	4.4	17	2.1
B +	8	1.3	14	1.3	3	0.4
B	2	0.3	4	0.4	1	0.1
B -	1	0.2	-	-	-	-
Unfinished	17	2.8	54	4.9	26	3.2
Casualties	5	0.8	5	0.5	7	0.9
Totals	596	100.0	1100	100.0	800	100.0

V. FEEDING One would expect that between farm and farm differences would be found in the composition of feeding rations and this proved to be the case. In calculating group averages, however, these differences are concealed and the average consumption of foods per beast given in a later table means that, if all the foods fed to all the cattle under investigation had been divided evenly per head, then each beast would have received the kinds and quantities of foods listed in the table. Even the average daily rations are subject to the same consideration. In practice, of course, on every farm the daily rations are changed from time to time according to what foods are available, the progress of the feeding cattle, and the needs of other stock on the farm.

As noted in the introduction, the prices at which home-grown foods should be charged against the cattle present a perennial problem in costings principles. Choice lies between charging at production cost, at market value (if there is one) or at some other measure of feeding value. Charging at production cost means that, from the farm's point of view, all profit is being attributed to the cattle. Charging at market price means that the profit to the farm is being divided between the crops so charged and the cattle. Theoretical crop feeding values are generally somewhere between production cost and market value and again mean a division of the profit between crops and cattle.

In this investigation, the production costs of the fodder crops on the farms concerned were not available. The task of determining them would have added too much to the work involved, both on the farms and in the office. As a working compromise (which does not settle the questions of principle) the charging of home-grown foods has been dealt with as follows. In a first calculation of food costs, all home-grown fodders have been charged at average costs of production as determined from other provincial investigations on lowland farms. These average costs have been applied to all participating farms.

In a second calculation, such foods as oats, barley, hay and beans have been charged at average market prices, while roots, straw, silage, and beet tops, for which there is no regular market, have been charged at presumed costs of production.

Purchased concentrates, of which the quantities fed were quite small, are charged at delivered cost, in both calculations.

The results of these calculations are given in Table 5, into which costs other than feeding have been brought, to show the total average cost per beast over the whole sample.

TABLE 5. SUMMARY OF AVERAGE COST AND QUANTITIES OF FOOD PER HEAD

	Quantity per Head	Food Charged on Cost of Production Basis	Food Charged on Market Price Basis
		£. s. d.	£. s. d.
Value of Store Beast		55.18. 4.	55.18. 4.
<u>Foods:</u>	Tons		
Roots & Silage	2.89	5.14. 2.	5.14. 2.
Hay	0.80	3.13. 7.	9.11. 0.
Straw	0.14	4. 9.	4. 9.
	Cwts.		
Oats	2.93	1.16. 1.	3.14. 4.
Beans	0.34	4. 9.	13. 8.
Barley	0.34	5. 2.	8. 9.
Mixed Corn	0.11	1. 7.	2.11.
Purchased Concentrates	0.64	19. 5.	19. 5.
Total Foods	-	12.19. 6.	21. 9. 0.
<u>Labour & Power</u>	-	2. 6.11.	2. 6.11.
Miscellaneous Charges	--	3.10.	3.10.
Total Cost	-	71. 8. 7.	79.18. 1.

VII. RETURNS and MARGINS

When returns are related to costs, as determined, the following picture emerges.

TABLE 6. RETURNS, COSTS & MARGINS, PER HEAD, GRADED CATTLE ONLY, and ALL CATTLE

	GRADED CATTLE ONLY		ALL CATTLE	
	Bullocks	Heifers	Bullocks	Heifers
	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Average Return	80.14. 6.	64.10.11.	80. 0. 4.	63.13. 1.
Cost of Store	58.11. 5.	46.10. 2.	58.11. 5.	46.10. 2.
Gross Feeding Margin	22. 3. 1.	18. 0. 9.	21. 8.11.	17. 2.11.
Costs, Feeds, Labour				
Power & Miscell...	15.15. 3.	14.12. 7.	15.15. 3.	14.12. 7.
Net Margin	6. 7.10.	3. 8. 2.	5.13. 8.	2.10. 4.

Two sets of figures are given, one for graded cattle only and one for all cattle. As has been indicated, not all the cattle entering the courts made the grade during the feeding period and over the whole operations the reduced returns for non-graded cattle have the effect of reducing the average margin per head. In the cases under review the proportion of un-graded cattle in the total fed was comparatively small, indicating careful selection in the first place.

While the ascertained costs may be debatable, according to the principles used, the gross feeding margin is a fairly definite and determinable figure. It is from this margin that the feeder must recoup himself for all the costs falling against the feeding operations, and it should be noted that the costs, as charged (with all feeds at cost of production basis)

cover only feeds, labour, power and some miscellaneous items. The labour and power included in the above statement of costs include the manual, horse and tractor work involved in preparing and feeding foods, bedding down, and leading from food stores, clamps, etc. to the feeding courts. Miscellaneous costs consisted mostly of cattle transport charges and some veterinary services.

Horse labour was charged uniformly at 1/6d. per hour and tractor work at 4/6d. per hour.

The average returns per head for graded bullocks and heifers, for the unfinished cattle retained (at a valuation) to finish on grass, and for casualty cattle, are summarised below.

TABLE 7. SUMMARY OF RETURNS PER HEAD

	Bullocks	Heifers	All Cattle
	£. s. d.	£. s. d.	£. s. d.
Graded Cattle	80.14. 6.	64.10.11.	77. 2.11.
Cattle Retained	70. 3. 0.	45. 0. 0.	65.14. 3.
Casualties	35.12. 0.	5.18. 9.	29.13. 3.

Of the 524 cattle graded up to the 4th May 1952, 467 earned the quality premium of 3/- per cwt. After this date the premium was raised to 4/9d. per cwt. - the qualifying conditions being made rather more selective - and out of 50 cattle graded after May 5th, 39 qualified for the premium.

It may be noted also that two increases in the prices paid for graded cattle occurred during the feeding period, a general increase of 4/- per cwt. in December 1951 and 10/- per cwt. at the end of March 1952 for grades A+ upwards. Had these increases not occurred, the average Net Margin per head over all cattle would have been 5/- when foods are charged at cost. If foods were charged at market values, this small positive margin would have been changed to a negative £8. 14. 5. per head. In so far as the yard-fed cattle may be expected to carry a share of general farm overheads; provide an interest return on the capital locked up in them while on the farm, and remunerate management, before profit is assessed, it is from the Net Margins as calculated that these further charges must be sought.

As with most agricultural averages, the average returns mask a considerable range between the results for individual lots of cattle. This range in Net Margins, for bullocks and heifers respectively, was as follows:-

TABLE 8. RANGE IN NET MARGIN PER HEAD FOR SEPARATE LOTS OF CATTLE

Nos. of Lots for which the Net Margin was within the indicated limits

£	N e g a t i v e					P o s i t i v e					Total	
	Over 12	9-12	6-9	3-6	0-3	0-3	3-6	6-9	9-12	12-15		15-18
Bullocks	1	-	1	-	-	7	5	4	4	3	2	27
Heifers	-	-	-	2	1	2	5	2	-	-	-	12
All Cattle	1	-	1	2	1	9	10	6	4	3	2	39

The margins as presented in Tables 7 and 8 are arrived at after charging foods at cost of production or purchase, and without giving credit for the manure produced.

Had the marketable foods been charged at average market prices (as discussed on page 2) the effect over all cattle fed (including the non-graded cattle) would have been to turn the average net margin from a positive £4.19.10. per head to a negative £3.9.8. This is merely transferring the margin from the cattle to the crops. The financial effect to the farm as a whole is precisely the same in either case.

Perhaps one of the most striking features of the results is the apparent steadiness of the relation between the realised price for the graded beast and the price paid for the store. In 1951/52 the average store price was 73.2% of the average selling price. In 1944/45 it was 72.75% and in 1945/46, 73.9%. With each increase in the prices for graded cattle the prices of stores have absorbed a substantial part of the increase. There would still appear to be keener buyers than sellers in the market for beef store cattle.

So far as dung production affects the financial results, perhaps enough was said on pages 1 and 2 to indicate why no precise measure of the credit to be assigned to this by-product of yard feeding has been included in the tables presenting financial results. There can be little question that the value of the dung is substantial and is so regarded in the minds of feeders. On the basis of the costing method used here, any value assigned to dung will be an addition to the average net margin as calculated. Had the alternative method of pricing marketable feeds been used, the resulting negative net margin would be reduced by any value assigned to dung.

Unfortunately we have not sufficient data available for fodder crop production costs in 1944/45 and 1945/46 to enable us to compare results for these years with the 1951/52 results on the same basis of accounting principles, in precise figures. Knowing what we do of the general advances which have taken place in farming costs since those years, it is probably not far from the truth to suggest that yard fattened cattle, on the whole, were only slightly, if at all more profitable in the accounting sense in 1951/52 than they were six or seven years ago. This refers strictly to yard finished cattle and to average results for such cattle. From the range in net margins given earlier it is clear that, in the winter 1951/52, some feeders did reasonably well out of yard finishing, particularly when the full contributions of yard-fed cattle to arable farming systems are given their due weight. And, although most cattle feeders can be expected to prefer the alternative, if slower method of beef production by store-wintering and grass finishing, there will still be those who can see advantages in careful selection of batches of more forward stores for yard finishing.

Meanwhile it remains to be seen to what extent the inducements offered to stimulate beef production and calf rearing will bring about the desired increase in the numbers of home-bred stores. The trend in the past two years has been discouraging, as can be seen from the graphs on page 10, in which are plotted the farm populations of male and female cattle in the rearing ages, in England and Wales since 1946 (June 4th each year). Official statistics do not distinguish between dairy and beef cattle, nor between home-bred and imported and it is a matter for speculation how the decline in numbers being reared is divided between the dairy and beef sides of the industry. The general implication is that supplies of stores for feeding are likely to meet with firm demand for the next year or two at least.

NUMBERS OF CATTLE

Other than BULLS & COWS and HEIFERS in milk or calf

ENGLAND & WALES

1946-1952

Males

00,000's

Females



