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Cattle - Cost of production



NORTH OF SCOTLAND COLLEGE OF AGRICULTURE

School of Agriculture, Aberdeen

Agricultural Economics Department

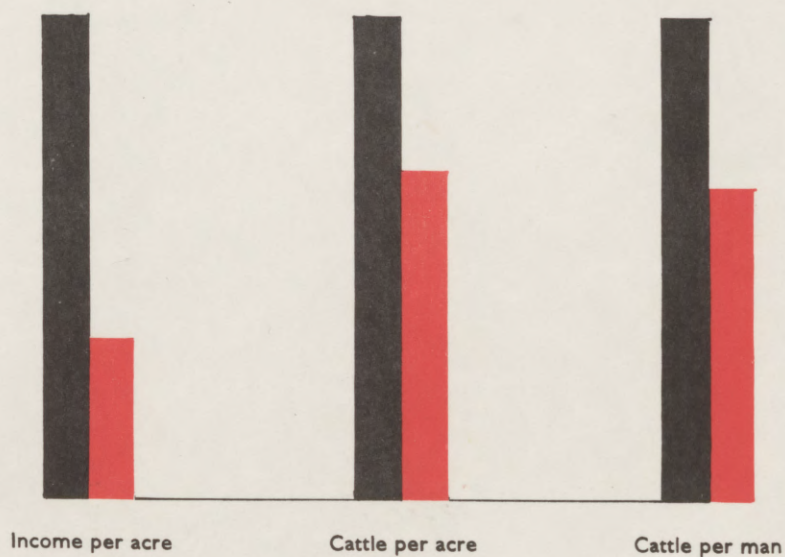
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WITHDRAWN

What makes beef farming pay?

High income farmers compared with low income farmers



by Malcolm Fyfe, B.Sc.(Agr.), Dip.Agric.(Cantab.), D.T.A., M.Sc.

May, 1966

Economic Report 115

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THE
NORTH OF SCOTLAND COLLEGE OF AGRICULTURE

*With the Compliments of the
Agricultural Economics Department*

41½ UNION STREET,
ABERDEEN.

THE NORTH OF SCOTLAND COLLEGE OF AGRICULTURE

Agricultural Economics Department

WHAT MAKES BEEF FARMING PAY?

by

Malcolm Fyfe, B.Sc. (Agr.), Dip. Agric. (Cantab.), D.T.A., M.Sc.

WHAT MAKES BEEF FARMING PAY?

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GLOSSARY

Below the reader will find definitions of some of the more technical terms used in this report.

Adjusted acreage is the acreage of crops and grass, making an allowance for the lower value of rough grazings by taking five acres of rough grass as the equivalent of one acre of rotational grass.

Forage acres are the acres of all crops, other than cereals, used for feeding to livestock. In this report it means grazing, hay, silage and turnips.

Tenant's capital represents an estimate of the capital invested in livestock, equipment, stores and crops. In this report it is calculated by taking the average of opening and closing valuations.

Gross outputs of livestock are calculated by deducting the cost of purchased livestock from all receipts attributable to livestock and making adjustments for changes in the opening and closing valuations.

Grazing outputs are the sum of gross outputs from cattle and sheep.

Gross outputs of crops are calculated by adjusting all receipts attributable to crops for changes in the valuation of stored crops and cultivations.

Other gross outputs include the estimated value of produce consumed on the farm and receipts for contract work.

Other income includes production grants and subsidies not attributable to livestock or crop enterprises.

Total income is the sum of gross outputs and other income.

Labour costs include all wages and perquisites paid to regular and casual labour plus the value of unpaid family labour apart from that contributed by the farmer and his wife.

Power and machinery costs cover machinery depreciation, repairs, fuel, light, power and payments for contract work.

Feed costs cover all purchased feed including roughages and grazing.

Manure costs cover lime and fertiliser expenses net of subsidy.

Rent and Rates are calculated by deducting the rental value of the farmhouse and cottage rents from the expenditure or imputed expenditure on rents and rates.

Other costs include expenditure on seeds, veterinary services, travelling expenses, motor vehicle running costs, insurance, etc. Interest charges are excluded.

Total costs means the sum of the six cost items specified above.

Net farm income is the difference between total income and total costs.

It represents the return to the farmer for his own and his wife's labour and management, plus interest on the tenant's capital invested in the farm, whether borrowed or not.

Labour and managerial earnings are calculated by deducting a charge for tenant's capital from the net farm income, and therefore represent the reward to the farmer for his own and his wife's labour and management.

INTRODUCTION

This report attempts to identify the causes of financial success on cattle fattening farms in the North East of Scotland.

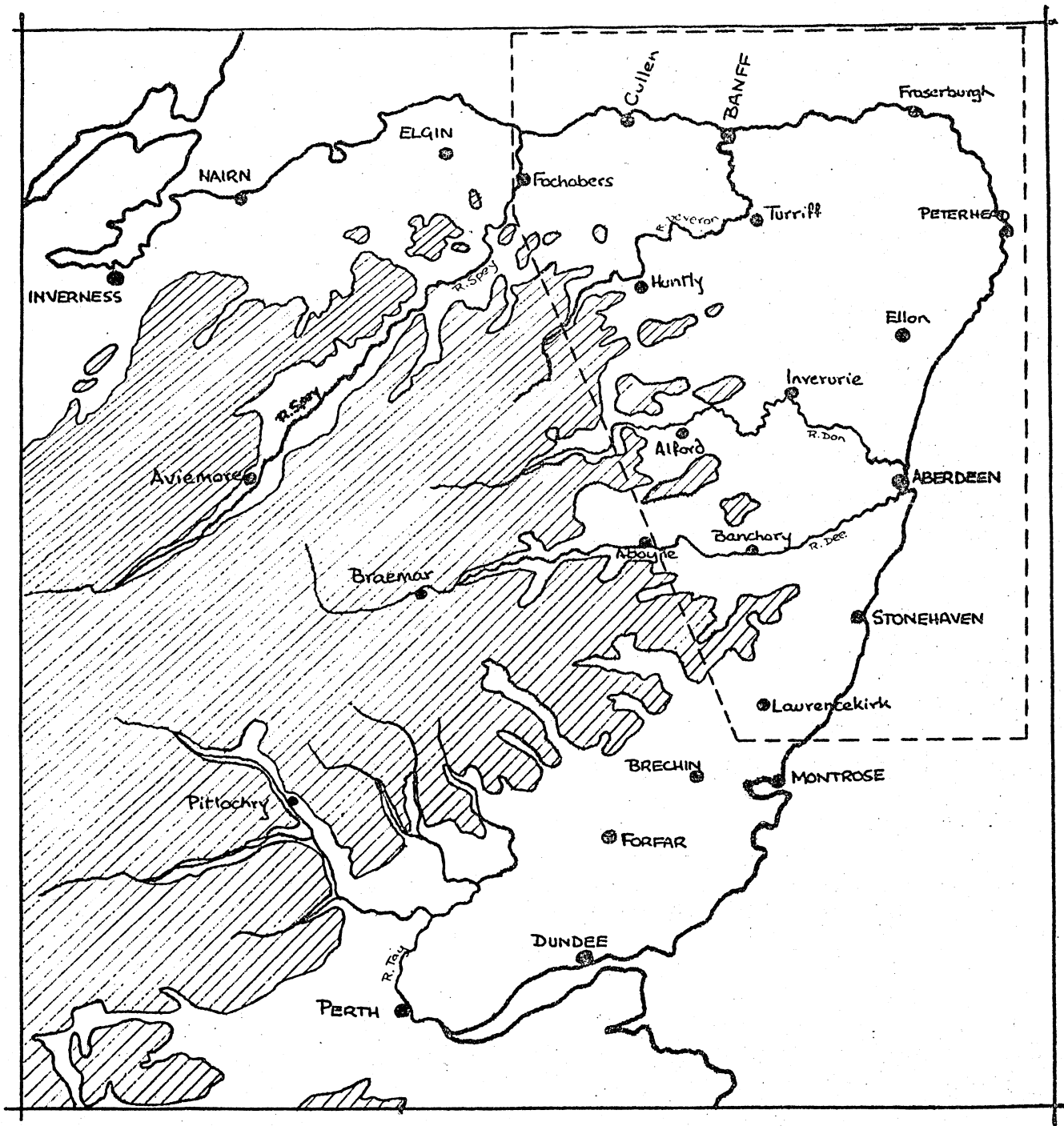
In recent years the College of Agriculture has kept detailed accounts for about three hundred and fifty farms throughout the North of Scotland. More than a hundred of these farms could be described as cattle fattening farms and the report is based upon three years' records from ninety nine of them.

Additional information on various aspects of beef production was obtained by visiting forty of these farms during the winter of 1964/65.

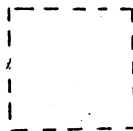
Most of this material appeared for the first time in a thesis which was presented to the University of Aberdeen in 1965.*

* "An economic study of cattle fattening farms in North East Scotland": unpublished M.Sc. thesis by Malcolm Fyfe, August, 1965

MAP SHOWING AREA COVERED BY SURVEY



Above 1,000 feet



Area covered by survey

CHAPTER 1

DIFFERENCES IN INCOMES

Farm incomes vary widely. Some of the reasons for this variation, such as weather or movements in the level of prices, are outside the farmer's control. Other causes of variation are within his control only in the long term, for instance he cannot easily move from one area to another or change the acreage of his farm. But many other causes are within the farmer's control and it is these that are thought about in relation to possible improvements in farm management.

One way of deciding which aspects of management are important is to carry out a survey of existing farms. If certain practices are associated with high incomes one may infer that they are at least partly responsible for the level of income. Further investigation should serve to confirm or refute these inferences.

Comparisons between farms are made more useful if the causes of variation in income that are outside the farmer's control can be reduced. One year's income may be drastically affected by bad weather or bad luck in spite of a high level of management. For this reason, all the farms in this survey were assessed on the records of three consecutive years and wherever possible the figures used are the average of the three harvest years 1960 to 1962. Variations in climatic conditions are restricted to some extent by the fact that all the farms in the sample were drawn from the counties of Aberdeenshire, Banffshire and Kincardineshire. The exact area is shown in the map facing this page.

CHAPTER 2

FARM SIZE

The size of the farm business is, of course, one of the most important factors affecting the level of incomes. The measure of size most commonly used is the total farm acreage. Where quite different types of farming are compared such as poultry farms and sheep farms, this measure is of little value and others must be studied such as the volume of capital involved or the labour requirements. The farms with which this report deals, however, all looked upon the production of fat cattle as their major enterprise. Differences in the quality of land can also make farm acreage an indifferent measure of size. This is especially so where a high proportion of the land is uncultivable rough grazings. In this survey such land amounted only to six per cent of the total farm acreage, but in order to make allowance for quality each farm acreage has been adjusted by including only $1/5$ acre for each acre of rough grazing. The distribution of farmers by the acreage they farmed is shown in Figure 1.

Net farm incomes

Using adjusted acreage as a measure of size, the ninety-nine farms were split into three groups. The low size group were all under 75 acres and the high size group all over 174 acres. Figure 2 shows the distribution of net farm incomes within these size groups.

Net farm incomes have to reward the farmer not only for the labour and management that he and his wife have put into the business, but must also pay the interest on his capital (including loans and overdrafts).

In comparing the rewards that farmers received from businesses of different sizes, it may be helpful to estimate what incomes they secured simply for their efforts as workers and managers. This may be done by calculating a charge for the tenant's capital invested in the business and deducting it from the net farm income. To some extent this will reduce the differences which arise simply because the larger farmer has more capital invested in his business.

FIGURE 1.- DISTRIBUTION OF FARMERS BY ACREAGE FARMED

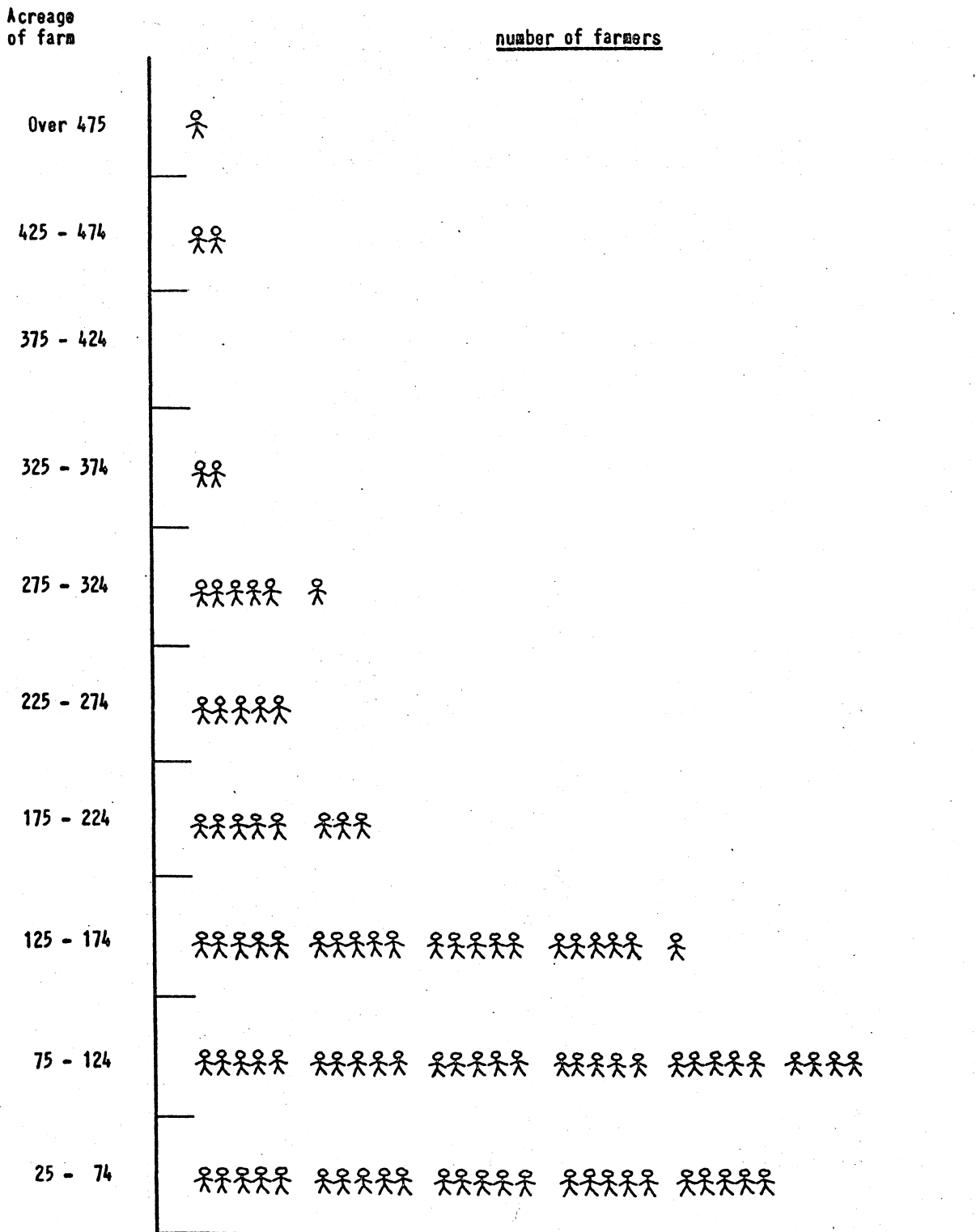


FIGURE 2.- RELATIONSHIP BETWEEN FARMERS' INCOMES AND THE ACREAGE THEY FARM

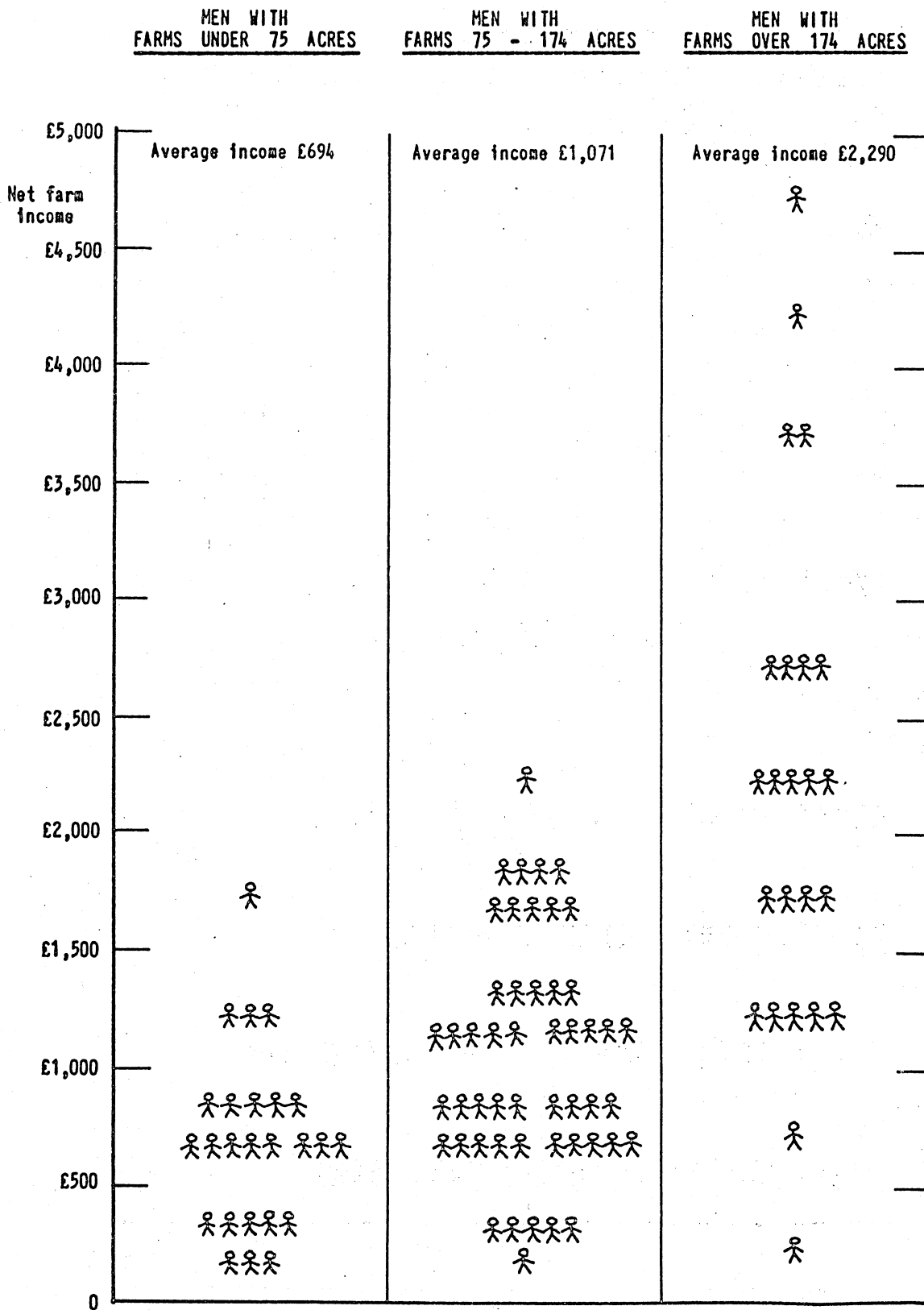
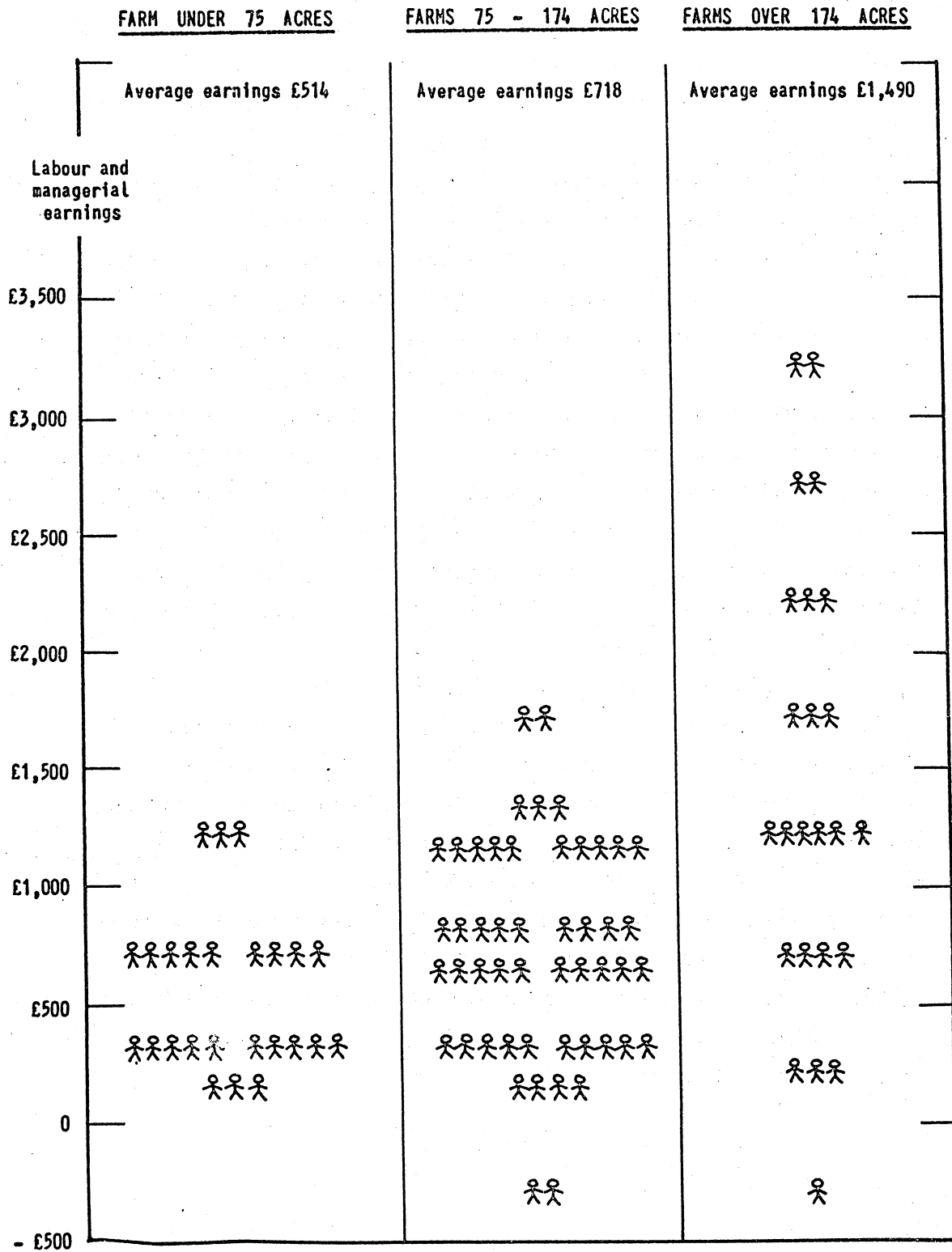


FIGURE 3.- RELATIONSHIP BETWEEN FARM ACREAGE AND FARMERS' EARNINGS



Labour and managerial earnings

These figures have been produced for the farms studied here by estimating the amount of tenant's capital invested and deducting six per cent of this, as interest, from the net farm income.

The results are given in Figure 3, but should only be treated as a guide to the real position since on many farms the tenant's capital is undervalued; moreover, the appropriate rate of interest will differ from farm to farm and from time to time.

The group averages indicate that the small farm pays its occupant no more than a labourer's wage, but it is also clear that some small farmers are earning quite good incomes whilst some larger farmers are, in effect, paying for the privilege of working their farms.

Most farmers know very well that, other things being equal, the man on a large farm stands a better chance of making a high income than the man who farms a small one (though this may not be true when conditions for farming are very bad). But most farmers have few opportunities of increasing their acreage, so that this relationship between size and income is only relevant when comparatively long term decisions are being made.

High income and low income farms

In order to show what management factors are associated with high incomes, forty farms were selected for further investigation. Twenty of these farms were those with the highest incomes for their size, and the other twenty were those with the lowest incomes for their size. Each group contained small, medium and large farms in the same proportion as the original sample. These forty farms were visited and additional data obtained during the winter of 1964/65.

The average farm acreage in each group of twenty was 130 acres. The high income farmers received an average net farm income of £1,950 whereas the low income farmers received £610.

CHAPTER 3

ENVIRONMENT

Once a farmer has entered his farm there is little he can do to control the environment with which he must work. In other words, like size, the choice of environment is a long term factor and its effect upon incomes should therefore be investigated before using incomes as a guide to short term management decisions.

Environmental factors are many and complex. Some cannot be measured and others can be measured only indirectly. For these reasons, the evidence used here can be treated only as a rough gauge of the influence exerted by the environmental factors of the area covered by this survey.

Three aspects of each farm's environment were identified and used to see to what extent the level of farm incomes was connected with them. Soils were classified with help from the Macaulay Institute for Soil Research and altitude was estimated from large scale Ordnance Survey maps. The third factor investigated was the level of rent. Although rents are often determined by considerations which have nothing to do with the quality of the land, one might expect these differences in quality to be reflected in the prevailing level of farm rents, particularly when a reasonably large number of farms is being examined.

Soil

Eight soil classes were represented in the farms surveyed, but four of them appeared on only a few farms. Only when a reasonably large number of farms occur on a particular soil class can one expect the peculiarities of individual farms to cancel one another out and allow a representative picture of the characteristics of that class to emerge. In the same way, one would not try to judge the value of a batch of seed potatoes by looking at only one or two tubers.

Four soil classes had ten or more farms on each. These were:-

<u>KEY</u>	<u>CLASS</u>	<u>DESCRIPTION</u>
TR	Tarves and Inch associations	Good brown loams of fairly high fertility
CW	Countesswells association	Stony, coarse textured soils which are often shallow
FD	Foudland and Strichen associations	Fine textured loams of moderate fertility, generally well drained and free of stones
PE	Peterhead, Stonehaven, Tippetty and Laurencekirk associations	Heavy soils of high fertility, but often with poor or imperfect drainage

Of these four soil classes, only Countesswells showed an average net farm income differing much from £1,500 as Table A shows. The lower incomes obtained by farmers on this soil were closely associated with the smaller acreage of their farms, though income per acre was slightly less than that secured by farms of similar size on other soils.

TABLE A.- NET FARM INCOME AS RELATED TO SOIL CLASSES

	Soil Classes			
	TR	CW	FD	PE
Number of farms	27	21	17	10
Average farm acreage	153	91	142	222
	£	£	£	£
Average net farm income	1,500	914	1,490	1,550
Average net farm income per acre	9.6	10.0	10.2	7.0

Furthermore a comparison of the twenty high income farms with the twenty low income farms showed the main soil classes equally represented in each group. Both sources of evidence suggest that the differences in soil quality exerted an influence on incomes largely through farm acreage.

Altitude

None of the farms in this survey was over 800 feet above sea level and the majority were at heights of less than half this altitude.

As altitude increased net farm incomes fell, as Figure 4 shows. But again this reduction in income was associated with a reduction in farm acreage.

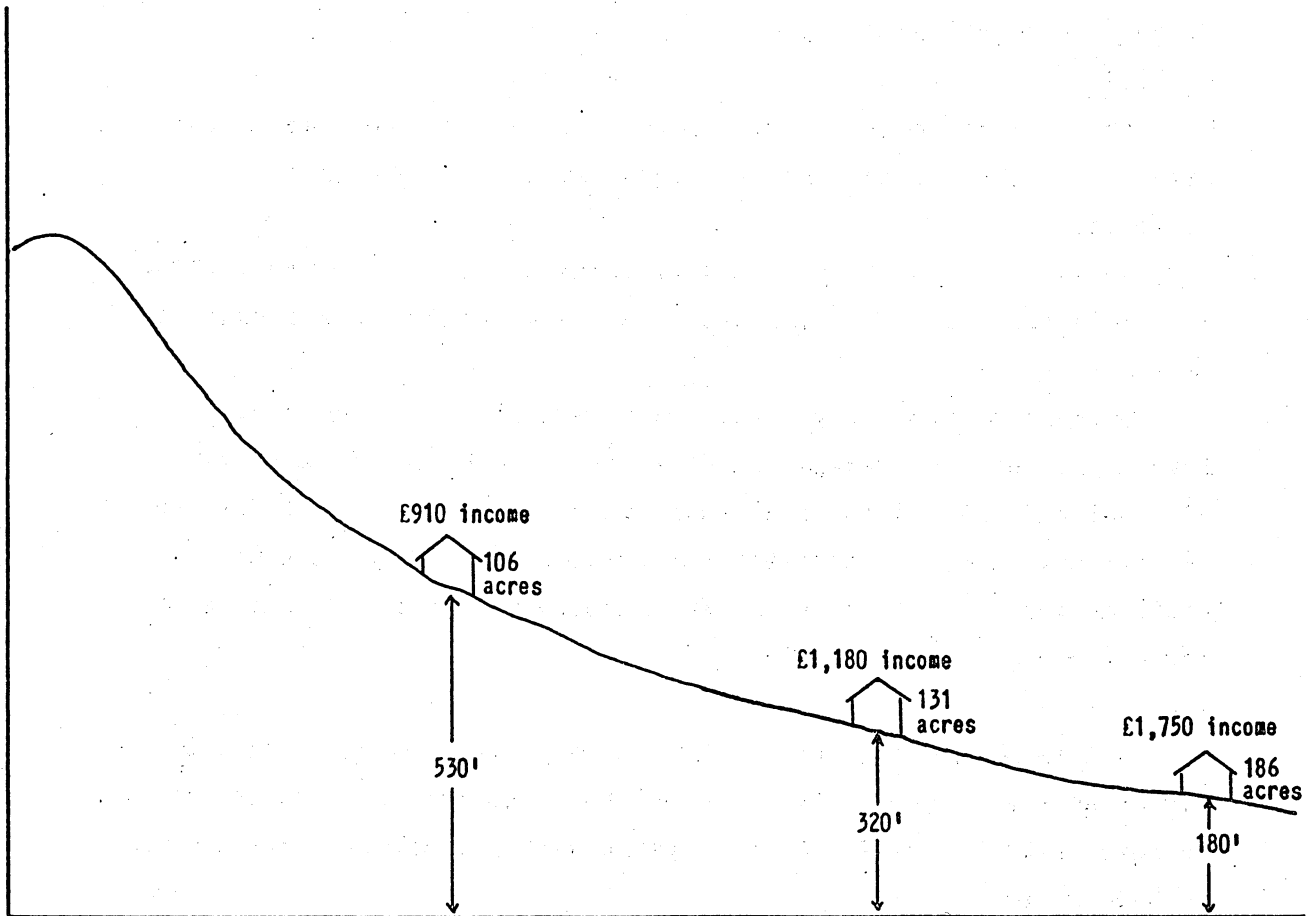
Turning to the forty farms which were selected for closer investigation, the average altitude of the high income farms was 322 feet and that of the low income farms 341 feet. A difference of this magnitude is certainly not sufficient to suggest that altitude was a major factor in determining the level of incomes on these farms.

Rent

All financial accounts in this survey are treated as if the farmer were a tenant. Owner-occupiers' accounts are adjusted by charging a rental value which compares with prevailing rates in the neighbourhood.

Table B shows that the average income of farms paying less than 25s. an acre was very nearly as high as the income of farms which paid more than twice as much rent. Rents per acre did not appear to vary with size of farm, but there seemed to be a connection with altitude. As rents increased, so the average altitude fell.

FIGURE 4.- ALTITUDE, FARM ACREAGE AND INCOME



In general, the lower the elevation of one of these farms, the larger its area was likely to be and the bigger its income.

TABLE B.- NET FARM INCOME AS RELATED TO RENT PER ACRE

	Rents per acre*		
	Under 25s.	25s. to 37s. 6d.	Over 37s. 6d.
Number of farms	33	33	33
Average rent per acre	20s.	32s.	50s.
Average farm acreage	143	138	142
Average altitude	405'	350'	280'
	£	£	£
Average net farm income	1,220	1,300	1,300
Average net farm income per acre	8.5	9.4	9.2

* These were the rents payable in 1960/61-1962/63 by the occupiers of these farms. It is not suggested that ingoing tenants were able to rent farms at these figures, nor that sitting tenants are paying the same rents today.

Of the forty farms visited, the high income farms paid an average rent of 36s. an acre and the low income farms paid an average of 33s. an acre. In relation to the range of rents encountered, this difference in average rents is of little significance.

Tenure

There is no evidence to show that owner-occupiers make better incomes than tenants or vice versa. There are as many owner-occupiers in the low income farms as there are in the high income farms.

All the evidence examined so far suggests that although differences in environment do have some effect on income levels, especially through their influence on the size of farms, this effect is not profound. It must be emphasised that these conclusions apply only to the area from which these farms were drawn. Not only is this a comparatively

restricted area, but the deliberate exclusion of all farms which did not derive at least 30 per cent of their gross output from fat cattle sales will have limited further the range of environmental conditions.

CHAPTER 4

OUTPUTS, COSTS AND RETURNS

A comparison of the financial records of the twenty high income farms with the twenty low income farms may help to pinpoint some of the major aspects in which the two groups differ. Table C (and Figure 5) show the value of some of the more important sources of income and the main items of expenditure. All are expressed in £'s per adjusted acre.

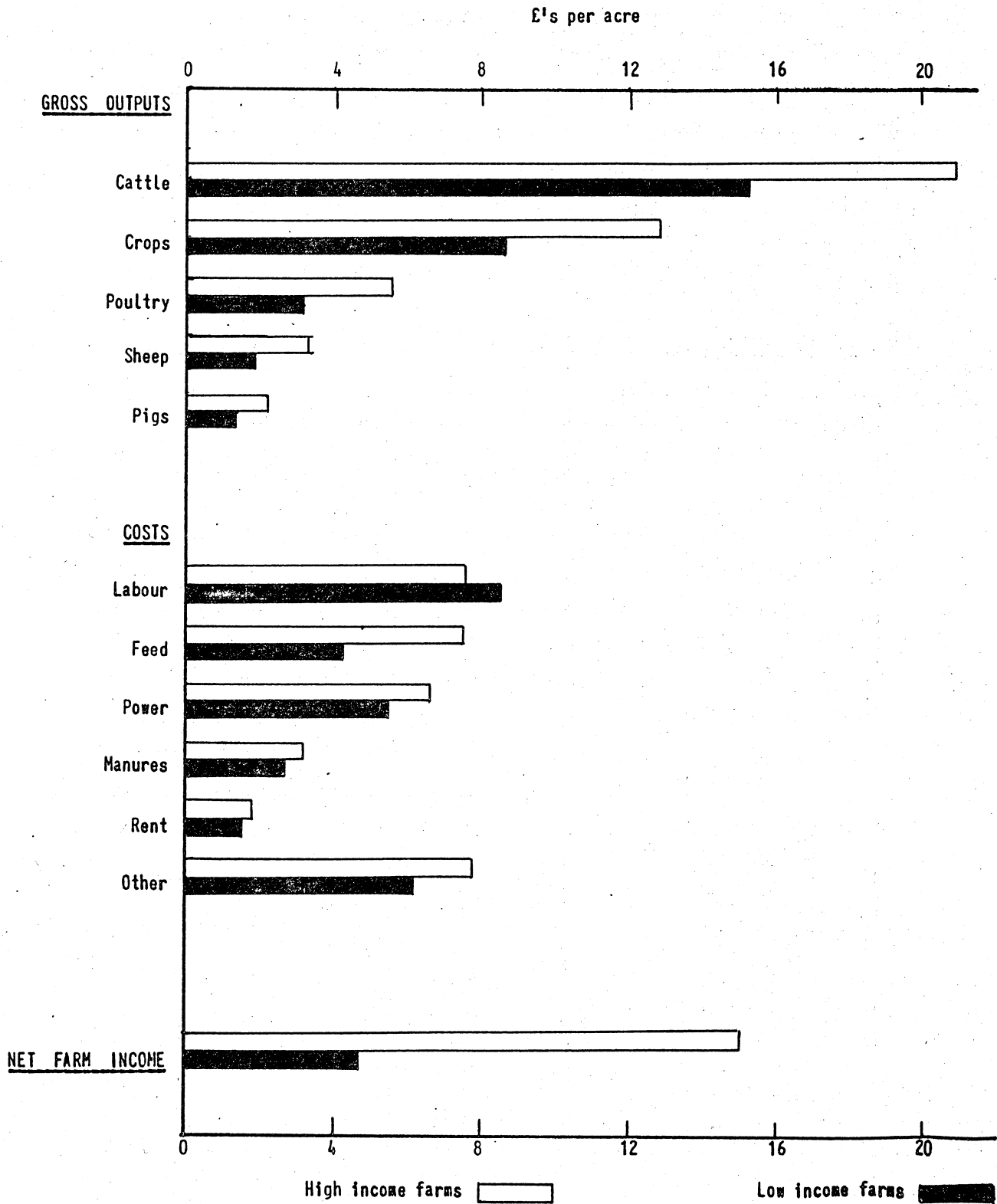
TABLE C.- OUTPUTS, COSTS AND RETURNS

	High income farms	Low income farms	Difference
Number of farms	20	20	
	<u>£'s per acre</u>		
Gross Outputs:-			
Cattle [†]	20.9	15.3	5.6
Crops	12.8	8.6	4.2
Poultry [†]	5.6	3.1	2.5
Sheep [†]	3.4	1.9	1.5
Pigs [†]	2.2	1.1	1.1
Other	1.7	1.0	0.7
Total	46.6	31.0	15.6
Other income	3.1	2.0	1.1
Total income	49.7	33.0	16.7
Costs:-			
Labour [*]	7.7	8.4	- 0.7
Power and Machinery	6.7	5.4	1.3
Feed	7.5	4.2	3.3
Manures	3.2	2.7	0.5
Rent and rates	1.8	1.6	0.2
Other	7.8	6.0	1.8
Total costs	34.7	28.3	6.4
Net farm income	15.0	4.7	10.3

[†] Net of livestock purchases

^{*} Excluding labour of farmer and wife

FIGURE 5.- OUTPUTS, COSTS AND RETURNS



By deducting a charge for tenant's capital, one may estimate rewards for labour and management. The average high income farmer with 130 acres earned £1,500 and the average low income farmer with the same size of farm earned £234. These are the sums which the occupiers obtained for all the efforts, both physical and mental, that they and their wives put into the farms during the course of a year.

Apart from the huge difference in incomes, the most striking difference between the two groups is in the level of gross outputs. For every £'s worth of goods the low income farmer produced, the high income farmer produced thirty shillings worth.

The high income farmer paid out more money as well. He spent twenty four shillings and sixpence for every pound the low income farmer spent.

How are these gross differences made up? On the output side it seems that the increased output from cattle which the high income farmers obtained was the largest single component, and that cattle, sheep and crops accounted for nearly three-quarters of the difference in gross outputs. The pig and poultry enterprises accounted for nearly a quarter of the difference. On the cost side, hired labour was the only item of expenditure where the high income farmer paid out less than the low income farmer. His expenditure on purchased foodstuffs was a good deal higher, which must be connected largely with the increased outputs from poultry and pigs.

How did the high income farmers manage to get so much more output from their crops and grazing livestock? The following chapters discuss this question.

CHAPTER 5

CROPS AND YIELDS

More than a quarter of the difference in gross outputs can be seen to be due to the value of crop sales. To what extent can this be connected with the kind of crops grown? Figure 6 shows the percentage of farm acreage devoted to each crop in 1963.

The high income farmers have a slightly higher proportion of their acreage in cropping than the low income farmers. There are two respects in which their cropping pattern differs substantially from the low income farmers: the acreage of barley on high income farms is more than twice as great as that on low income farms and so is the acreage of potatoes. In the first case barley has expanded at the expense of oats and in the second case there has been a slight reduction in the acreage of turnips.

Yields

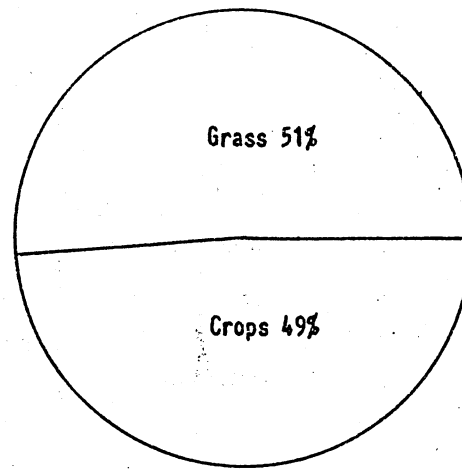
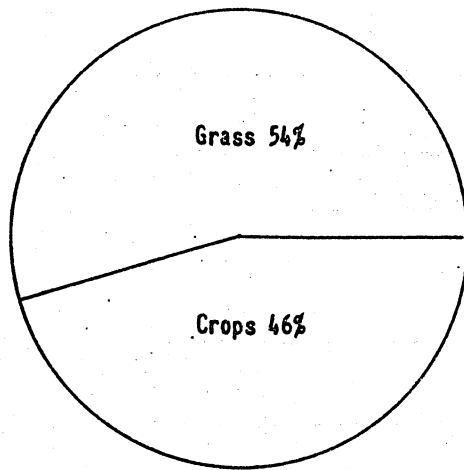
What yields do these high income and low income farmers obtain? Unfortunately it was not possible to measure yields directly and the figures in Table D are derived from farmers' estimates of their own yields in a normal year. Whether these figures overestimate the true yields, and if so, whether one group is likely to have overestimated to a greater extent than the other, is open to conjecture. What the figures do indicate is that by their own accounts the low income farmers obtain yields that are lower than those of the high income farmers.

FIGURE 6.- CROPPING PATTERN 1963

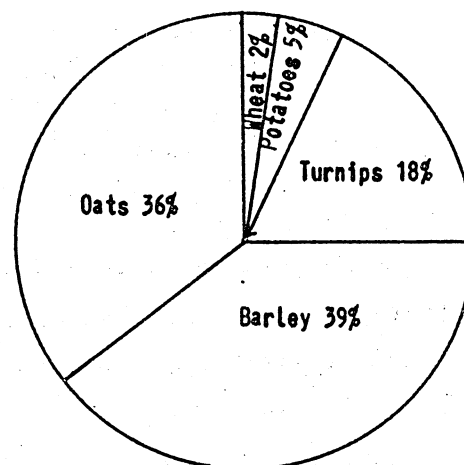
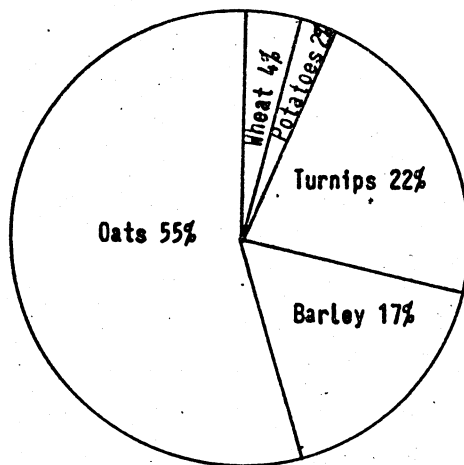
Low income farms

FARM ACREAGE

High income farms



CROPS



GRASS

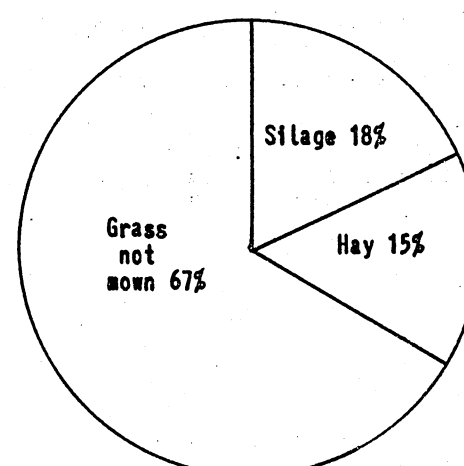
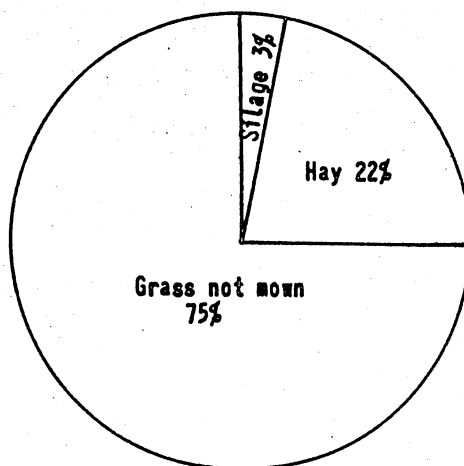


TABLE D.- CEREAL YIELDS IN NORMAL YEAR, FARMERS' ESTIMATES

	Average Yields	
	Oats	Barley
	<u>quarters per acre</u>	
High income farmers	9½	8½
Low income farmers	8½	7½
Difference	1	1½
	<u>cwts. per acre</u>	
High income farmers	28	34
Low income farmers	25	29
Difference	3	5

Too few of the farmers interviewed grew wheat for the yields estimated to be meaningful for the whole group.

Some farmers may feel that their yields are not as high as they should be. Some farmers may believe that they could increase their incomes by growing more barley and more potatoes. It certainly seems that, on the whole, the more successful farmers in this area over the past few years have owed part of their higher incomes to these factors. But individual circumstances differ and farmers would be wise to contact their county advisers before jumping to conclusions.

CHAPTER 6

GRAZING OUTPUTS AND GRASSLAND POLICY

Nearly half the difference in gross outputs is due to cattle and sheep. Why were the high income farmers' outputs from cattle and sheep so much larger than those of the low income farmers?

Taking cattle first, the difference amounts to £730 per farm. It may be due to the fact that the high income farms sell more cattle in the course of the year or because they obtain a higher output from each animal. Table E shows that during the period 1963/64 the high income farms sold an average of 78 animals per year as compared with the low income farms' 56 animals. The average output per animal was £35 in both cases, so the difference in cattle outputs can be attributed entirely to the larger number of animals sold.

TABLE E.- NUMBERS OF CATTLE SOLD ANNUALLY 1963/64

	Fat cattle	Store cattle	Total
	<u>number per year per farm</u>		
High income farms	70	8	78
Low income farms	50	6	56
Difference	20	2	22

This difference in sales can be examined further to determine whether the high income farms kept more animals per farm throughout the year or whether they had a faster turnover of animals. Using an average of the numbers of cattle on each farm at December 1st and June 1st, it was discovered that the high income farms had 25 per

cent more cattle than the low income farms. Since, from Table E, the difference in numbers sold per farm is 40 per cent, it is clear that more than half of the difference in cattle outputs can be attributed to an increase in numbers of stock per farm. The remainder was due to a faster turnover of animals on the high income farms.

The difference in sheep outputs amounts to £190 per farm, of which half can be attributed to the fact that the high income farms had 40 per cent more sheep than the low income farms. The remainder was due to greater prolificacy per ewe and a more rapid turnover of lambs.

These figures are based on the adjusted acreage for each farm. The high income farms had fewer acres in grass and turnips (Figure 6) and in relation to the farm land actually set aside for ruminant stock were therefore even more productive. Cattle and sheep outputs together amount to £40.3 per acre of grass and turnips on the high income farms. The corresponding figure for the low income farms is £27.0.

Does this difference in output per forage acre, which we have shown to depend largely on increased numbers per farm, vary over the year? An approximate answer to this question can be arrived at by comparing the numbers of cattle and sheep on the farms at the beginning of December with the acres of turnips and the acres of grass conserved for winter fodder in the previous summer. A similar calculation compares the numbers of cattle and sheep on the farms at the beginning of June with the acreage of grazing available at that time.

For ease of comparison, the figures are expressed in terms of the numbers of six quarter (18 months) old cattle kept for every ten acres used for ruminant stock.

TABLE F.- NUMBERS OF CATTLE KEPT PER TEN FORAGE ACRES, WINTER AND SUMMER

	WINTER	SUMMER
High income farms	30	20
Low income farms	25	14
Difference	5	6

Table F shows, in other words, that the high income farmers kept 20 per cent more grazing animals per forage acre than the low income farmers during the winter and over 40 per cent more in the summer months.

In order to see to what extent these differences might be due to better yields of grass and turnips, farmers were asked for estimates of these. Unfortunately, it soon became apparent that few farmers had any confidence in their ability to estimate yields of turnips, so no guide is available. Table G shows the estimated yields of hay and silage.

TABLE G.- GRASS YIELDS AND FERTILISER PRACTICES

	High income farmers	Low income farmers
Number of farmers	20	20
	<u>cwts. per acre</u>	
Hay	45	39
Silage	150	120
	<u>numbers of farmers NOT using fertilisers containing nitrogen</u>	
On grass for mowing	3	6
On grass for grazing only	4	14

There is clearly a difference between the two groups' attitudes towards the use of nitrogen on grass, especially in the case of grazing. Many farmers who did not use nitrogen on their grazing spoke of the enhanced risks of staggers or hypomagnesaemia associated with such a practice. However, it seems quite possible that at least part of the increased carrying capacity of the higher income farms is due to the use of fertiliser containing nitrogen.

Once again the College's advisory services could be helpful to the farmer who would like to carry more stock, but fears the possibility of losing animals from staggers.

CHAPTER 7

CATTLE SALES

The last chapter showed that the high income farms sold 40 per cent more cattle than the low income farms and that the level of gross outputs per animal was much the same. A comparison of the receipts for fat cattle during the three years 1960/61 to 1962/63 shows that the high income farms averaged £78 per head and the low income farms £81. In order to determine the significance of this difference, these farmers were asked for the ages, liveweights and receipts for all fat cattle sold in the twelve months from December 1963 to November 1964. In most cases, prices were recorded in account books or notebooks and quite often liveweights were obtained from invoices or market receipts. Ages were arrived at by the farmers' own estimates.

Table H shows that, on average, the high income farmers are selling their cattle younger and at lighter weights than the low income farmers. An average difference of four months in age and nearly a hundredweight in liveweight is quite substantial.

TABLE H.- AGE, WEIGHT AND PRICE OF CATTLE SOLD FAT 1963/64

	Age	Liveweight	Receipts	Receipts
	<u>months</u>	<u>cwts.</u>	<u>£/head</u> ^o	<u>£/cwt.</u> ^o
High income farms	22	8.7	80	9.2
Low income farms	26	9.6	84	8.8
Difference	- 4	- 0.9	- 4	+ 0.4

^o including deficiency payments

Receipts per head again show the low income farmers to be getting more than the high income farmers, but their receipts per hundredweight are lower.

Timing of sales

In order to see whether differences in receipts per hundredweight could be accounted for by differences in the time of marketing, the sales of fat cattle on each farm were analysed month by month throughout 1963/64. Figure 7 shows the monthly sales of fat cattle during the twelve months.

If we assume that cattle sold during the months November to May inclusive have been fattened indoors and those sold during the months June to October inclusive have been fattened off grass, then the high income farmers fatten 74 per cent of their cattle indoors as compared with the low income farmers' 63 per cent. There is bound to be some overlapping in these periods and it is fully appreciated that some of the cattle sold in June will have been finished indoors. But for the purpose of this comparison it was thought better to underestimate rather than overestimate the numbers of cattle fattened indoors. This difference between the two groups is fairly large and a statistical analysis shows that the odds were 100 to 1 against a difference of this size having occurred simply by chance.

Figure 7 shows that high income farms' sales rise in November and December, which suggests that the high income farmers are quicker off the mark in getting winter fed animals ready for the butchers. The high income farmers may have some animals which are further advanced in the fattening process before they come inside or they may manage to get their animals into condition for slaughtering in a much shorter period of feeding. There is no evidence that they bring their cattle inside any earlier than the low income farmer.

FIGURE 7.- FAT CATTLE SALES, DECEMBER 1963 TO NOVEMBER 1964

per cent of
total sales

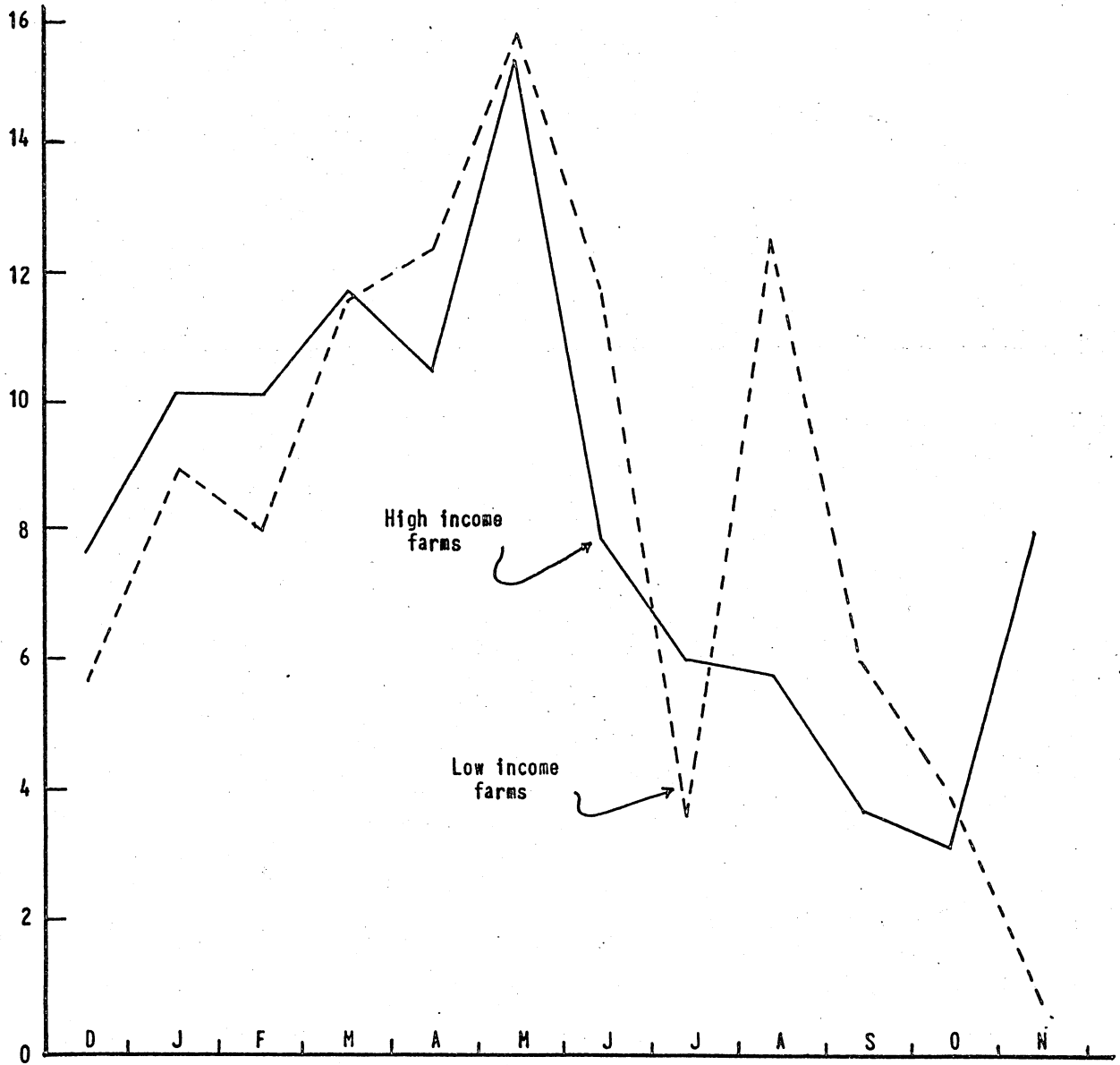
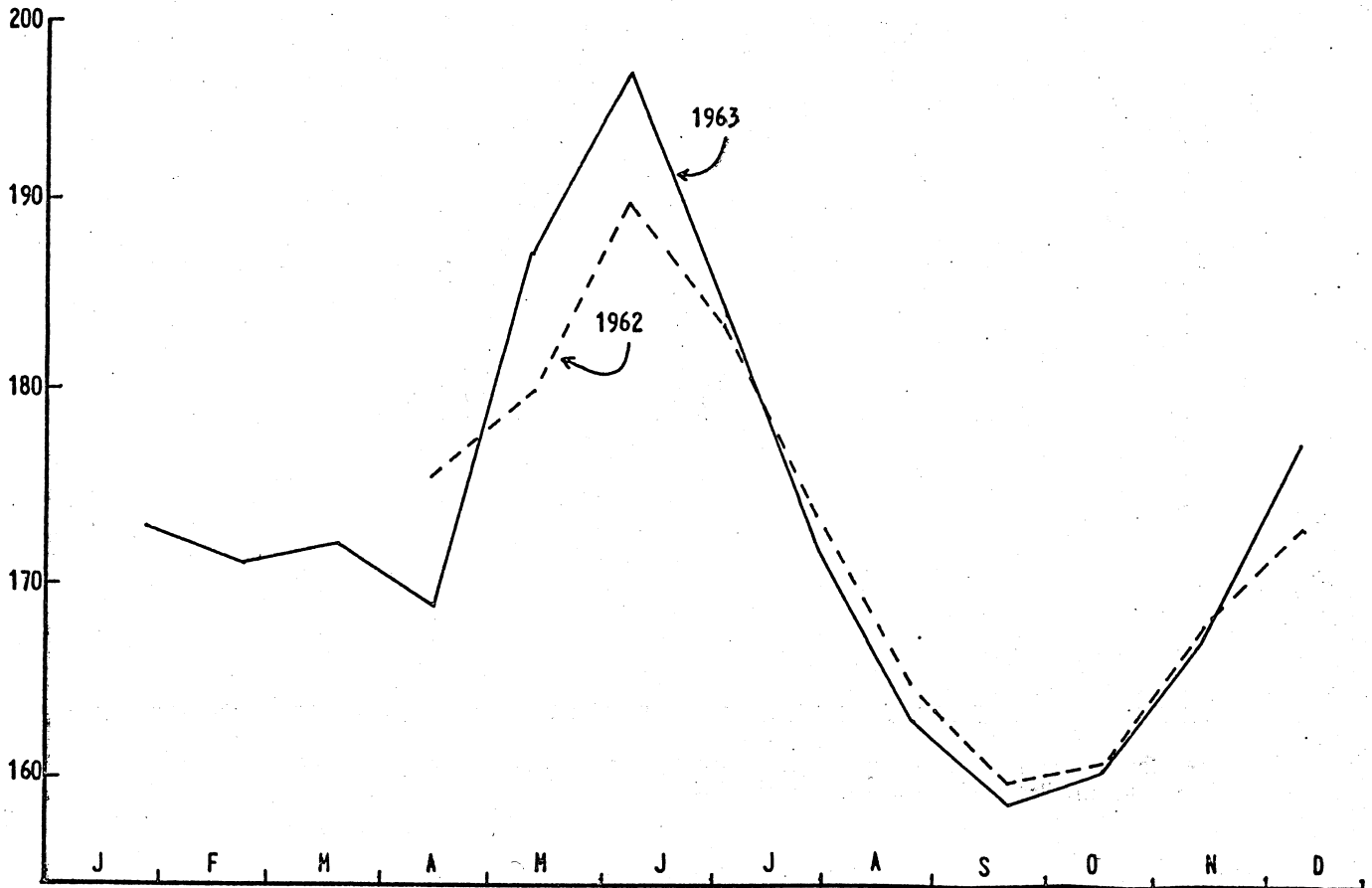
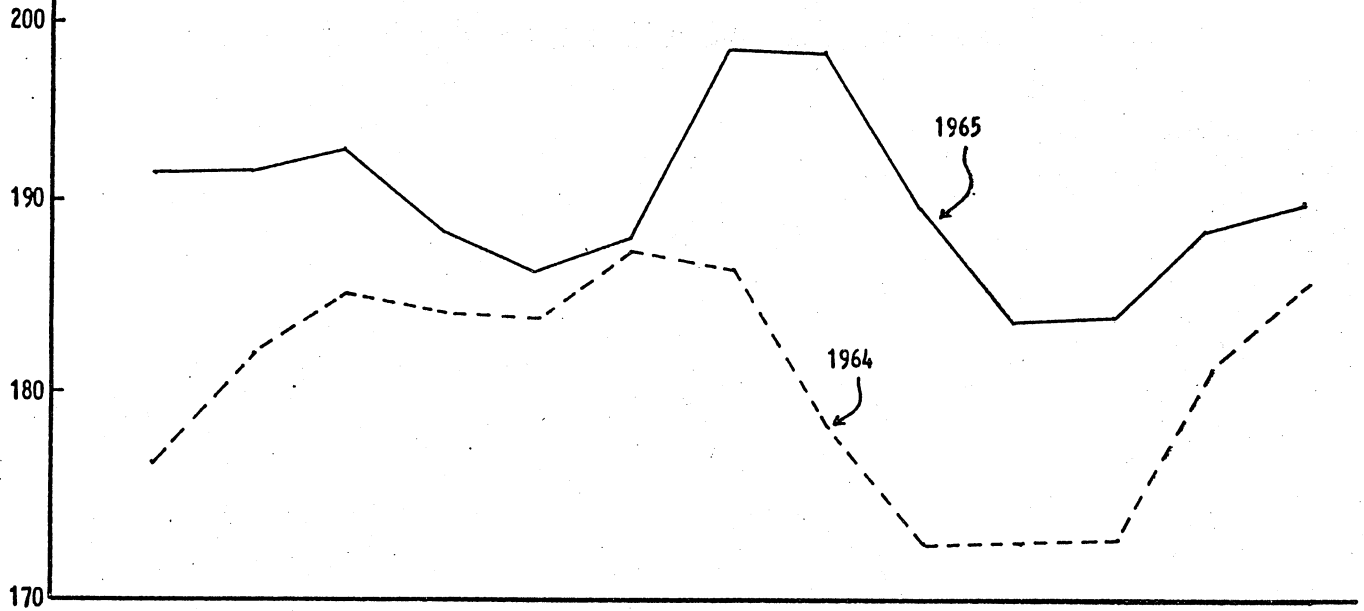


FIGURE 8.- FAT CATTLE RECEIPTS, SCOTLAND

Based on weekly prices for steers 7-11½ cwt. and weekly deficiency payments

shillings per cwt.
liveweight



It has been suggested that since the North East is traditionally a winter feeding area, farmers will continue to produce fat cattle indoors simply because their whole farming system is adapted to this pattern of production. But this argument does not explain why the low income group, which is presumably just as strongly influenced by tradition, should fatten a smaller proportion of their cattle in winter. Moreover, statistics for the pattern of certifications of fat cattle in Aberdeenshire show that over the past seven or eight years the proportion of cattle certified in the winter months has been rising.*

Unfortunately, the past is not always a reliable guide to the future and the advantage which winter fattening has seemed to enjoy over summer fattening in this area may not persist. The seasonal fluctuation in farmers' returns from beef over the past four years is shown in Figure 8. In 1962 and 1963 the peak was reached in May/June and the lowest point in September/October; the difference amounting to about 30s. per live hundredweight. In 1964 and 1965 a similar pattern persisted but the differential between early summer and autumn returns narrowed to about 15s. per live hundredweight.

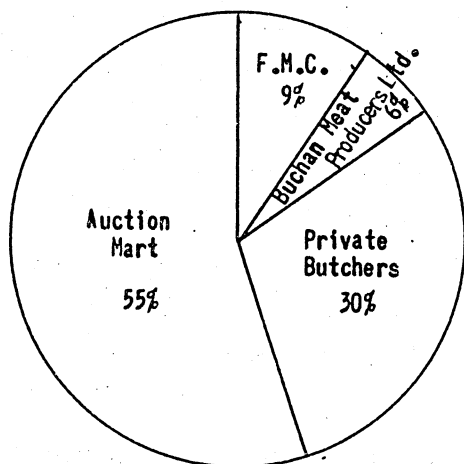
Marketing channels

The figures reproduced in Figure 9 are only approximate, since many farmers used more than one channel and could not remember exactly how many cattle had gone to each. Nevertheless, it does seem that Buchan Meat Producers Ltd. receive more animals from the high income farmers and that private butchers take a larger number of cattle from the low income farmers. Only three farmers out of the forty, however, sold animals to private retailers so that although a lot of cattle in this sample were disposed of in this way, the figures may not be representative of the whole area.

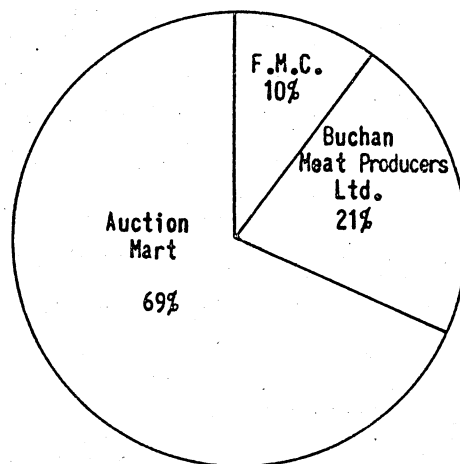
* The author is indebted to Mr. J. H. Smith, Senior Lecturer in Agricultural Economics at the University of Aberdeen for these and other county statistics.

FIGURE 9.- CHANNELS THROUGH WHICH FAT CATTLE WERE MARKETED

Low income farms



High income farms



CHAPTER 8

CATTLE SUPPLIES

Sources

Some cattle are born on the farm which fattens them, some are bought as young calves only a week or two old and some are bought as weaned calves. Other cattle are bought as stores and may be less than a year or nearly two years of age.

Evidence from statistics for the whole of Aberdeenshire suggests that 80 per cent of fat cattle certified in the county were born outside its boundaries. The data collected in this survey suggests that only 5 per cent are born, reared and fattened on the same farm. Figure 10 shows the percentage of animals of each type making up the total supplies of cattle.

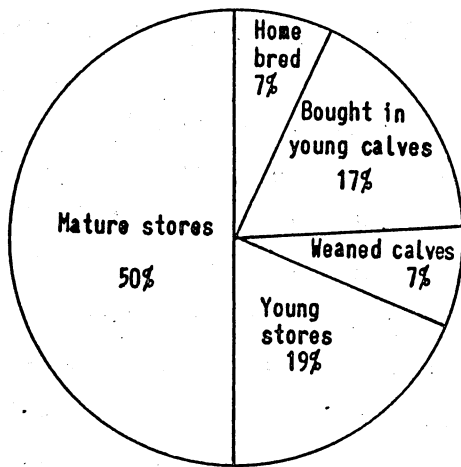
The distinction between young stores and mature stores is necessarily arbitrary and difficult to apply with accuracy, but as a general guide animals under sixteen months of age were classified as young whilst those over that age were classified as mature.

The main differences that emerge in Figure 10 are that the low income farms seem to buy half their supplies as mature stores whereas the high income farmers rely more upon young stores and weaned calves. This helps to explain the fact that the average prices paid for store cattle in the three years 1960/61 to 1962/63 were £51 on the high income farms and £58 on the low income farms.

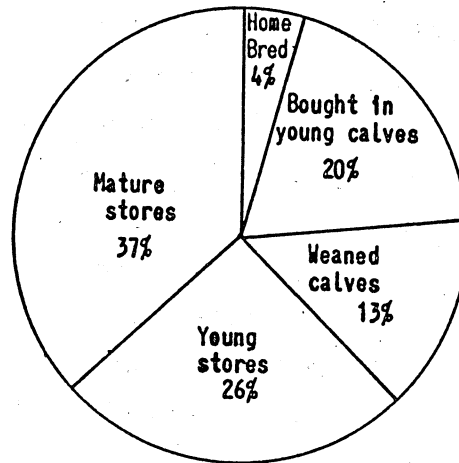
A difficulty in presenting these figures is that no farm will be likely to conform exactly to the average. Some farms, usually the larger ones, buy all their supplies as stores. Some farmers breed three or four calves from their own cows, buy in a dozen or more to suckle and fill up the byre with mature stores as stalls fall empty. No two farms are quite alike and every combination of sources is possible.

FIGURE 10.- SOURCES OF CATTLE SUPPLIES

Low income farms



High income farms



Four fairly distinct types of activity may be identified.

These are:-

- (a) The breeding and suckling or buying and suckling of calves.
- (b) The purchase of young calves for hand rearing.
- (c) The purchase of weaned calves.
- (d) The purchase of store cattle.

In the sample of forty farms, the following numbers were found to be engaged in each of these activities:-

<u>Type of activity</u>	<u>Number of farms engaged in it</u>
Breeding and suckling purchased calves	17
Hand rearing purchased calves	16
Buying in weaned calves	9
Buying in stores	21
TOTAL	<u>63</u>

The farm with only one or two cows for the house was not included in the first category. Since the number of farms engaged in activities exceeded forty, it is evident that some farms must have been engaged in two or more activities. The position was as follows:-

	<u>Number of farms</u>	<u>Number of activities</u>
One activity farms	21	21
Two activity farms	15	30
Three activity farms	4	12
TOTALS	<u>40</u>	<u>63</u>

In general, farms depending mainly on mature stores will buy fairly large numbers during the course of a year. This is partly due to the fact that these farms are usually operating on a larger scale than average, but it is also due of course, to the fact that

the turnover of mature animals is much faster. As the main source of supplies comes down the scale to young stores, weaned calves and young calves, so do the numbers bought per year on these farms grow smaller, because the animals will be spending longer on the farm.

The high income farmers' total supplies of cattle averaged 76 head per farm as against the low income farmers' total supplies of 58 head. These figures agree fairly well with the total sales during the same period which were given in Table E. Both sets of figures show that the high income farmers had a throughput of about four cattle for every three of the low income farmers.

Prices

The average prices paid for each type of animal were very similar as between groups. The range of prices paid seemed, however, to be rather wider amongst the low income farmers who were prepared on the one hand to pay very high prices for some beasts and on the other to find some supplies at very low prices.

TABLE 1.- PRICES PAID FOR CATTLE 1963/64

<u>Type of animal</u>	Average	Range	
	<u>£'s per head</u>	<u>High income</u>	<u>Low income</u>
		<u>£'s per head</u>	
Young calves	20	18-22	15-24
Weaned calves	38	35-40	31-47
Young stores	52	44-55	48-54
Mature stores	62	58-65	56-71

Breed

Accurate information on breeds is not easy to obtain, but there was an appreciable difference between the two groups. On the low income farms about 80 per cent of the cattle had black coats and polled heads whereas on the high income farms this type of animal made up just over 50 per cent of the total. The high income farms had about four times as many Friesians, Herefords and Hereford X Friesians as the low income farms.

The high income farmers may have found it more profitable to fatten animals with Hereford and Friesian ancestors, but on the other hand, it may be that they are less conservative and therefore more prepared to try a new venture. More and better evidence on this aspect of the subject is needed before any reliable conclusions can be drawn.

Sex

Accurate figures on the exact numbers of bullocks and heifers bought on each farm were not always easily obtained. However, there is no doubt that the high income farms, as a whole, bought more heifers than bullocks. The three largest farmers in this group, who between them buy 750 stores annually, stated that they never bought a bullock.

On the low income farms bullocks appeared to outnumber heifers by about two to one. Any farmer in this group buying animals of one sex only, bought bullocks.

Here again it would be unwise to come to a definite conclusion about the relative profitability of heifers as compared with bullocks, but the evidence that heifers are more profitable on farms such as these is strong enough to warrant further investigation.

Timing of purchases

Figures for purchased stock were collected as monthly totals so that it was possible to discover when most buying occurred with every

type of animal throughout the year.

Taking all forty farms together, most of the young calves were bought during the winter months. There was a difference, though, in the buying pattern of the two groups. The low income farmers bought nearly all their young calves between December and April, buying very few in the rest of the year. The high income farmers also bought a good number of calves during these months but they bought almost as many in May, July, October and November.

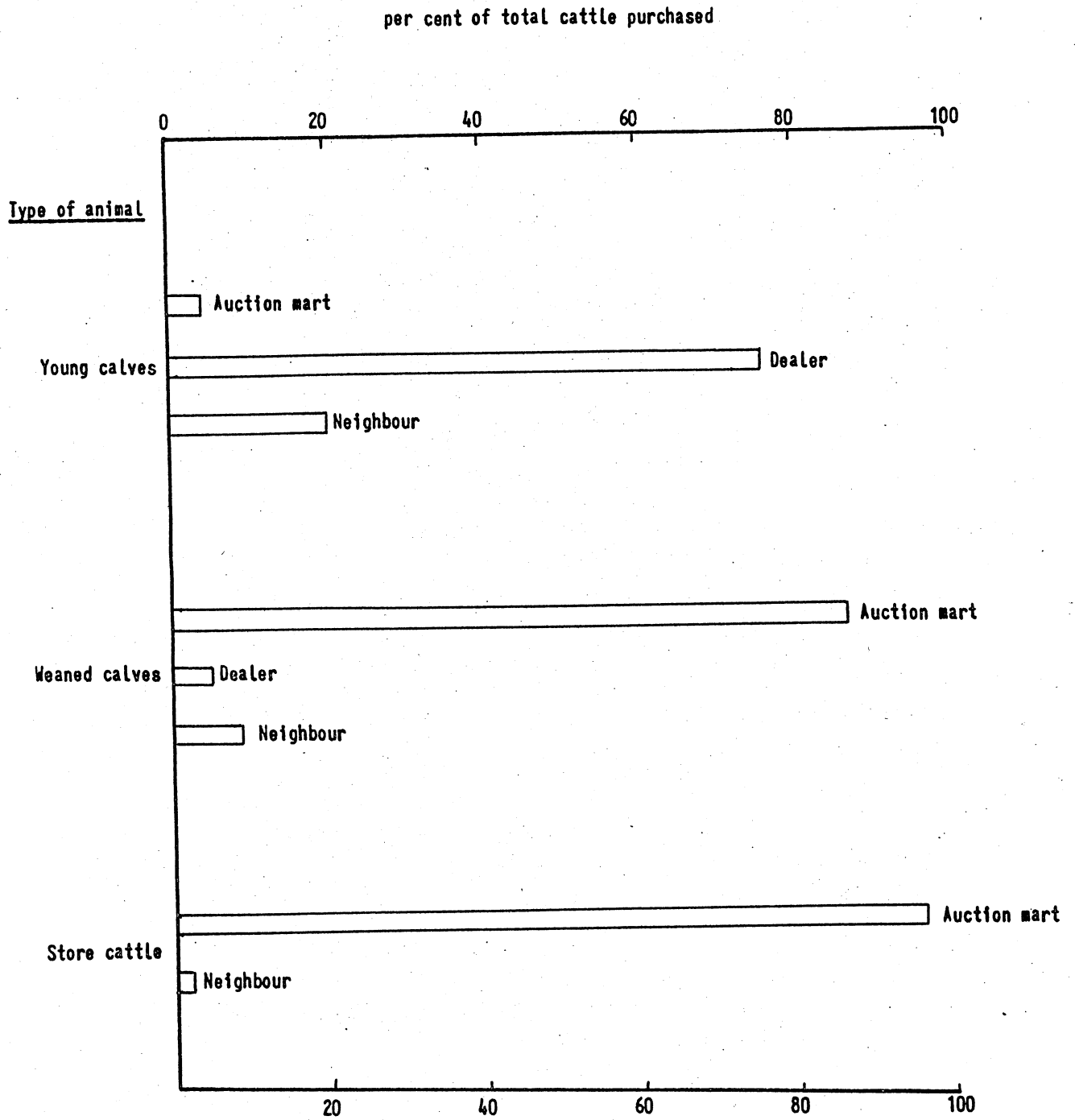
Nearly all weaned calves were bought in the autumn sales and the bulk of them were bought by high income farmers.

The seasonal pattern of young and mature store cattle purchases on the high income farms was fairly regular, one month's purchases being much the same as another. On low income farms, however, there was quite a different pattern with two peaks. Very few cattle were bought in December and the numbers rose to a maximum in April, falling away again to a very low figure in July. Purchases then rose again to a second peak in October.

Purchasing channels

Where did these farmers obtain their animals? This information is given in Figure 11 for all forty farms as there was no evidence of any difference in the purchasing methods of the two groups. The importance of the dealers in young calves, many of which were brought up from the South of England, is clear. Many young calves, though, were bought locally. In many cases these would have been bought from neighbours or relatives with a dairy herd of Friesians.

FIGURE 11.- CHANNELS USED FOR PURCHASING CATTLE



CHAPTER 9

REARING AND FEEDING

Calf rearing methods

As Figure 10 shows, young calves constituted 24 per cent of cattle supplies from all sources on both high and low income farms. Figure 12 shows the percentage of calves in each group reared by five distinguishable methods.

The majority of calves in each group was bucket reared, but a higher proportion of those on the high income farms were weaned at three months or younger. Similarly, of those calves that were allowed to suckle, a far larger proportion on the high income farms had to share their dam or nurse cow with two or more other calves. As those who have worked with calves will know, multiple suckling and early weaning require the exercise of skill and patience.

Rations for store cattle

There was much variation in the sort of feed offered to store cattle. The most significant difference between groups was that on the high income farms twelve farmers out of twenty were feeding silage, whereas on the low income farms only one farmer was doing so.

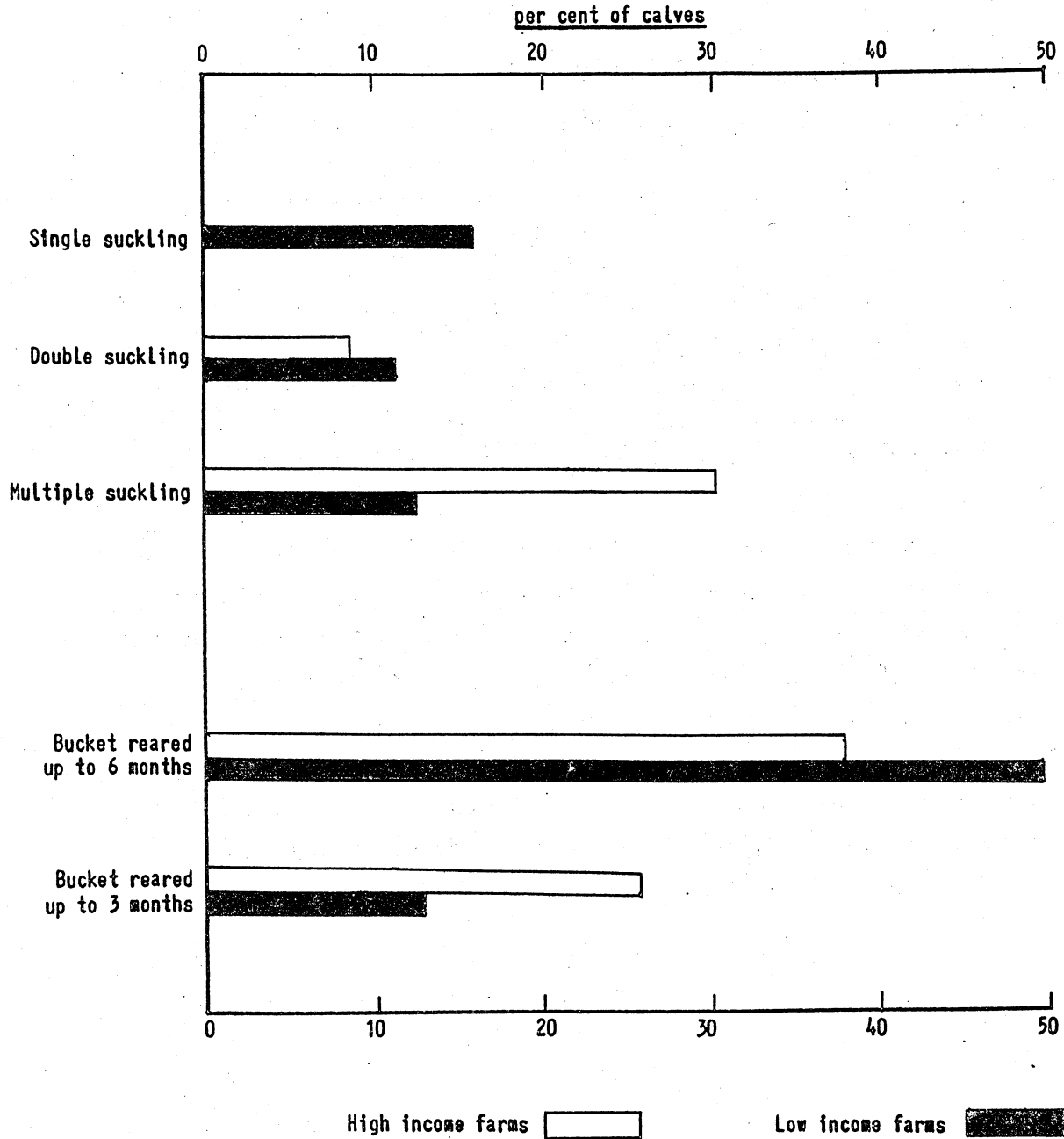
Rations for fattening cattle

There was more consistency in the composition and quantities of the rations offered to fattening animals. Only three farmers offered their fattening cattle silage and all of them were high income farmers. Of these three, two fed turnips as well as silage.

Apart from these three farms, all the fattening rations consisted of cereals, turnips and hay. About a third of the farmers in each group fed some cattle cake, but this seldom amounted to more than two pounds a day per head.

More than half of the high income farmers included barley in their fattening rations, but only one-fifth of the low income farmers did so.

FIGURE 12.- METHODS OF CALF REARING



On each farm the interviewer weighed sample rations with a spring balance. The average rations for the two groups are given in Table J.

TABLE J.- RATIONS OFFERED TO FATTENING CATTLE

	Cereals	Hay	Turnips
	<u>lbs. per head per day</u>		
High income farms	6.6	7.5	61
Low income farms	6.0	11.0	65
Difference	+ 0.6	- 3.5	- 4

Apart from the amounts of hay fed, there is little difference between them. There may have been some difference in the quality of the feeds, but it was not possible to measure feeding values on every farm. Variations in the quality of hay may have been associated with the quantities fed.

Although the average amounts of cereal fed by each group are similar there was more variation in the amounts of grain fed on the low income farms. Some of these farms fed as little as 2 lbs., others as much as 12 lbs. per head.

CHAPTER 10

BUILDINGS

Capacity

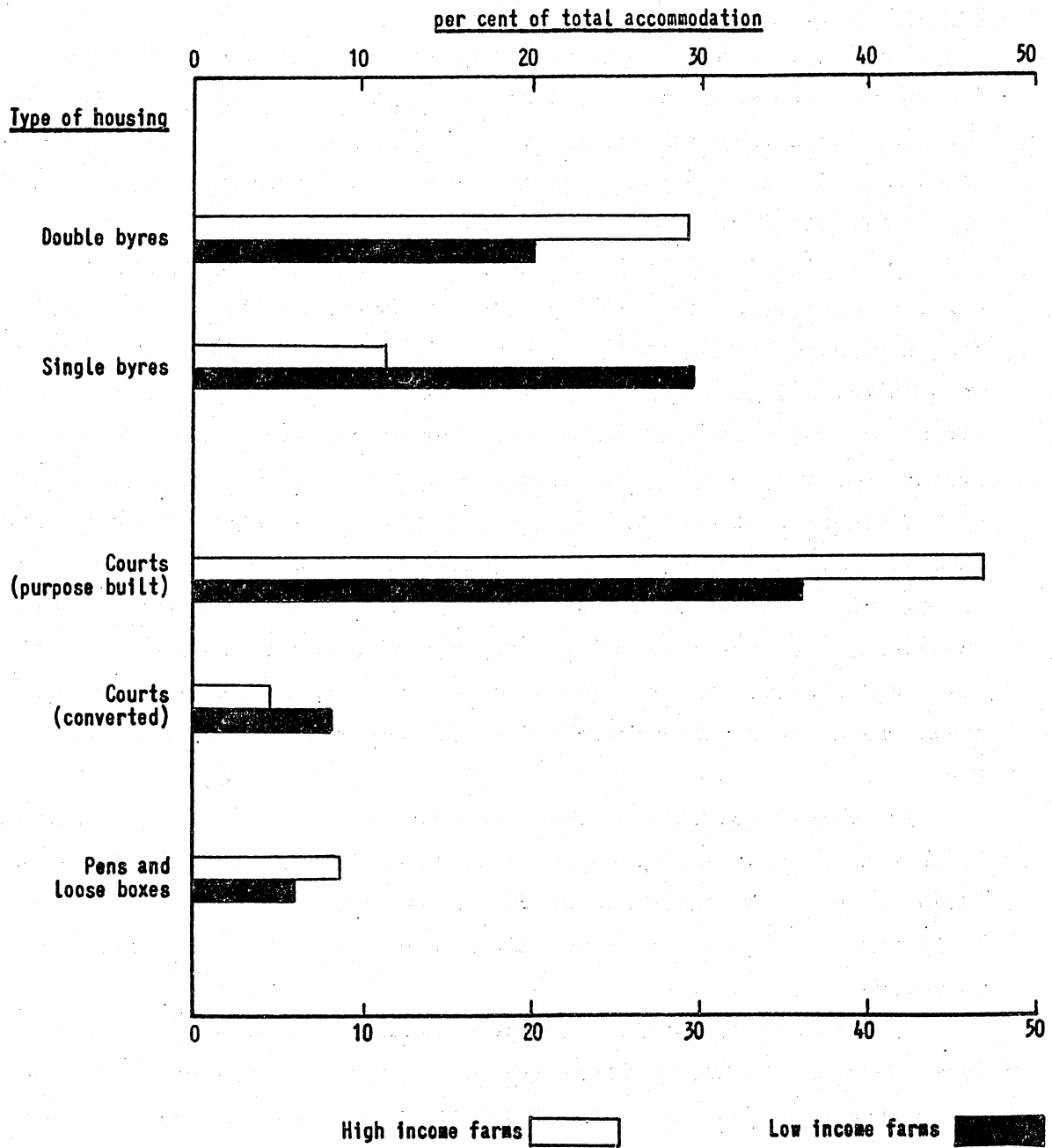
The majority of the fat cattle produced in the North East are finished in the steading. A comparison shows that during the winter the high income farms carried nearly 30 per cent more cattle than the low income farms. How did their accommodation compare with that on the low income farms?

During the interviews on each farm a sketch map of the main buildings was made and the dimensions of courts and byres recorded. Figure 13 shows the accommodation for each group separated into types of housing. Double byres are those with stalls for tying cattle on either side of a central passageway whereas the single byre has stalls against one wall only. The capacity of byres is determined simply by the number of stalls and will not vary with the ages of the beasts tied up in them. Courts and pens, however, will hold a larger number of yearlings than they will of two year olds. In order to standardise the capacity of these buildings, figures were based on the number of six quarter cattle which a court or pen would accommodate. The floor area needed for a six quarter old animal was taken to be 60 square feet.

The difference between courts (purpose-built) and courts (converted) is that the latter are byres or barns which have been turned into courts. Often the width of these converted courts is under 20 feet. Courts built for the purpose are generally rectangular and seldom, if ever, as narrow as 20 feet.

The overall difference in accommodation between the high income farms and the low income farms was 30 per cent, which corresponds with the difference in the numbers kept through the winter. Most of the additional capacity enjoyed by the high income farms was in the category of courts (purpose-built). Another difference that appeared was in the proportion of single byres. The low income farms seem to have had 60 per cent of their tyings in single byres whilst the high income farms had only 28 per cent.

FIGURE 13.- TYPE AND CAPACITY OF CATTLE HOUSING



Condition of buildings

Quite apart from the type of accommodation available it is important to consider its quality. Some buildings are far from comfortable for the stock in them, some are not even weather proof. During each interview a note was made of cracked walls, holes in roofs and other building defects. On the basis of these notes the farm buildings were classified as being of good, average or bad quality. Table K shows the distribution of these classes between the two groups.

TABLE K.- CONDITION OF BUILDINGS

<u>Condition</u>	High income	Low income	All
	<u>number of farms</u>		
Good	6	8	14
Average	13	6	19
Bad	1	6	7
Totals	20	20	40

It is very difficult, of course, to produce precise figures when dealing with a subject which is judged very much by personal opinion rather than direct measurements. For this reason the figures in Table K should be treated as a guide to the situation rather than an exact definition of it. There is little doubt, however, that the low income farms had far more buildings in bad condition than the high income farms.

There was no evidence that the particularly bad buildings were due to poor landlord-tenant relationships for four out of the seven farmers whose buildings fell into this category were owner-occupiers. Most of the faults appeared to have arisen through prolonged neglect rather than to any flaw in the original construction.

Convenience of layout

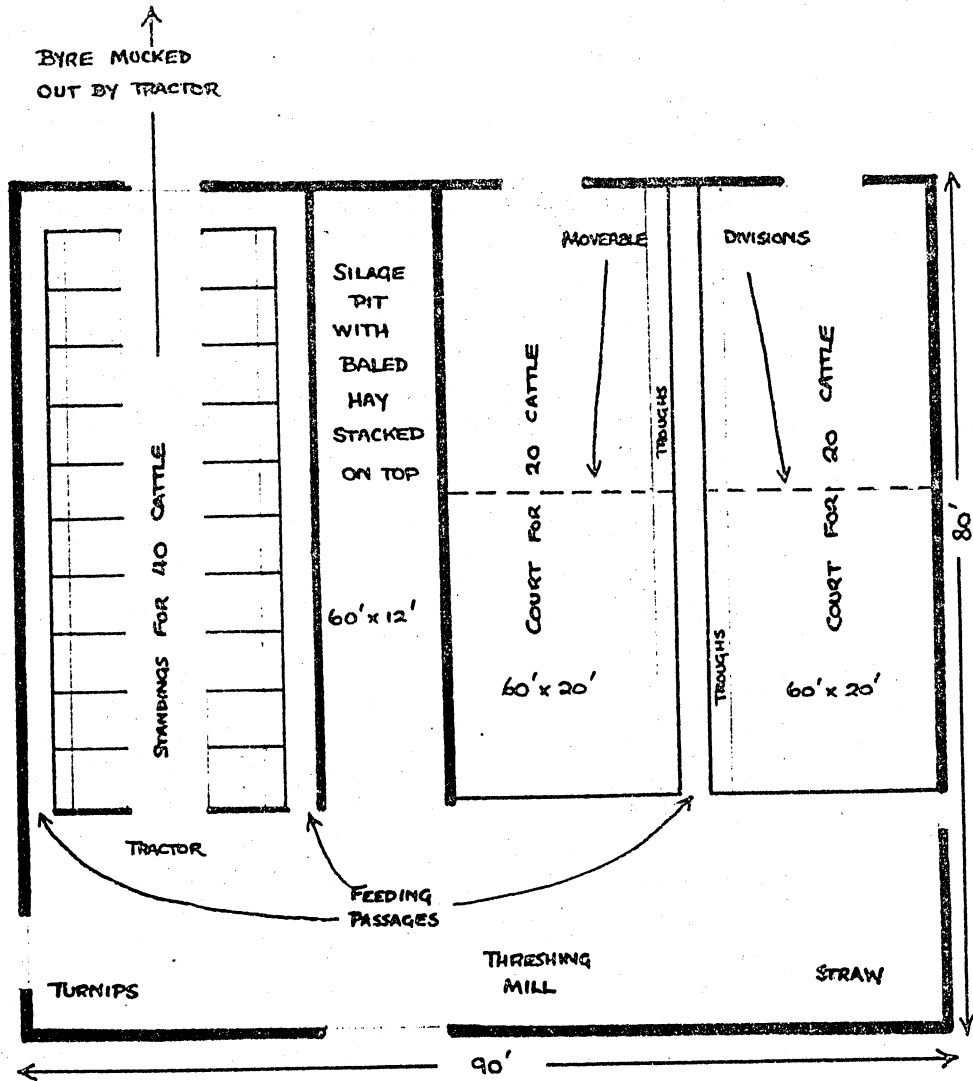
Another point to which particular attention was paid was the convenience of design in the way buildings were arranged and used. Here again the farms were classified good, average or bad by largely personal judgements on the spot. To help the reader see what aspects of layout seemed most important, sketch maps of three typical layouts are reproduced in Figures 14, 15 and 16. The numbers of farms which fell into each class is shown in Table L.

TABLE L.- CONVENIENCE OF LAYOUTS

<u>Condition</u>	High income	Low income	All
	<u>number of farms</u>		
Good	6	4	10
Average	8	7	15
Bad	6	9	15
Totals	20	20	40

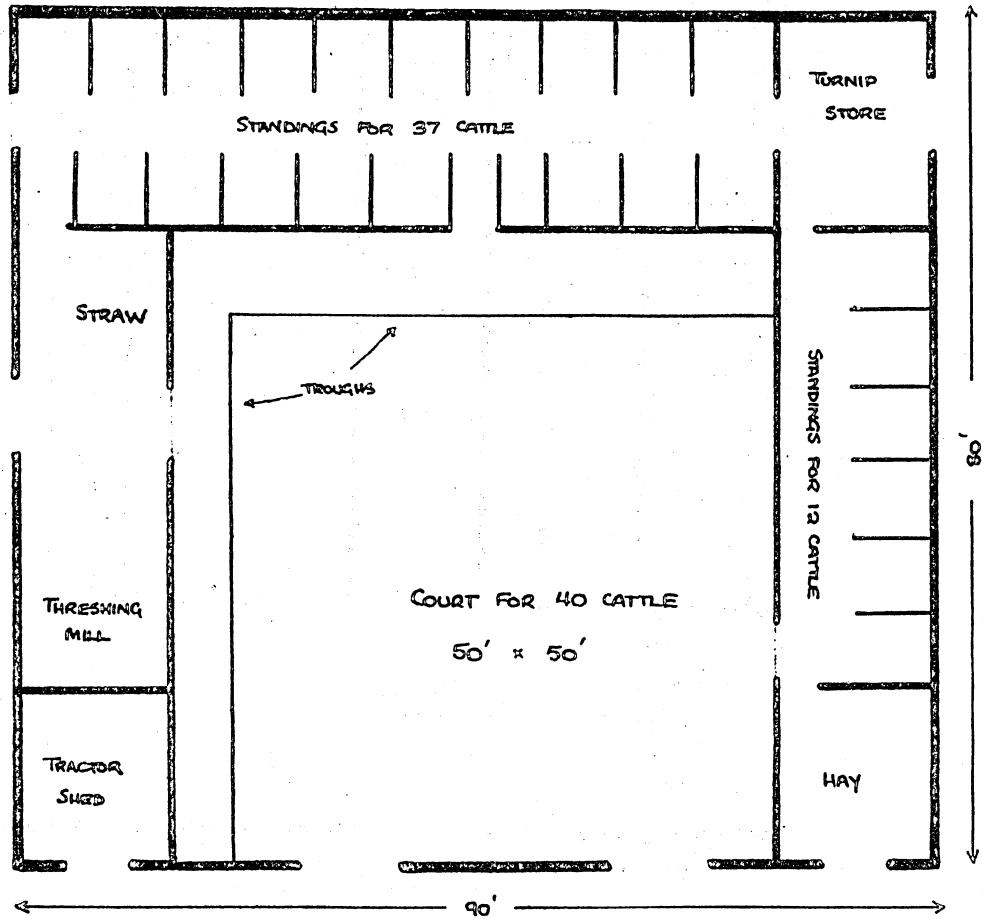
On one or two farms, model layouts had been achieved by the expenditure of considerable sums of money, but there were several farms where by careful thought and good organisation equally large savings in the use of labour had been achieved at a fraction of the cost. This is yet another field in which farmers can obtain expert technical advice from a specialist department in the College.

FIGURE 14



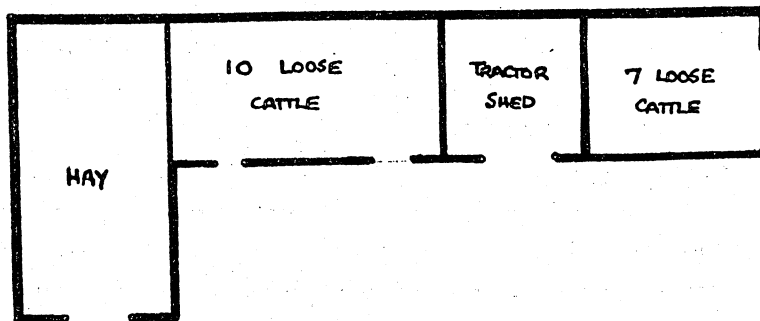
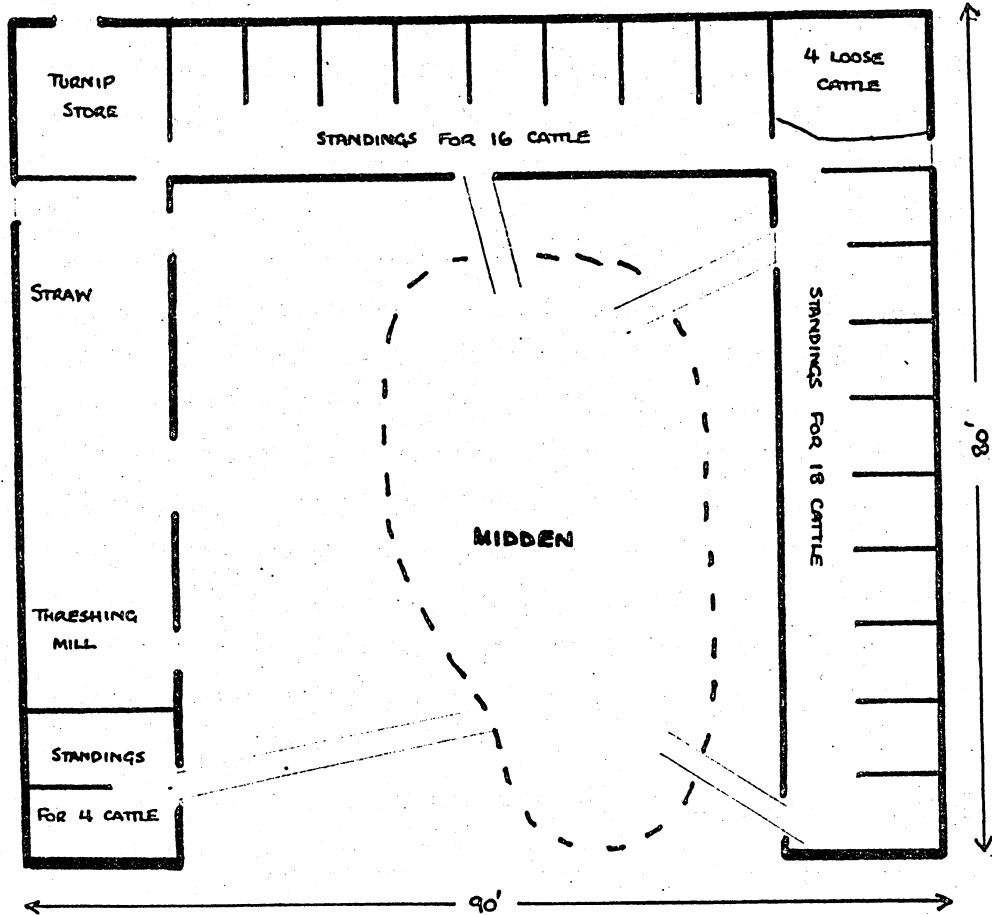
A GOOD LAYOUT

FIGURE 15



AN AVERAGE LAYOUT

FIGURE 16



A BAD LAYOUT

CHAPTER 11

LABOUR EFFICIENCY

This section is concerned with the amount of labour used for the cattle. During the winter months, work amongst cattle and their feedstuffs absorbs a large proportion of the total labour force on farms. How is it that the high income farms manage to keep 30 per cent more cattle through the winter without any larger a labour force than the low income farms?

Farmers were asked how many men were ordinarily employed on various tasks and roughly how long each task would take. The answers to all these questions were added up and the results, which are given in Table M, expressed in terms of the number of man-hours spent every day in looking after 100 head of cattle. Since the tasks are regarded on the farm as being quite distinct, it was comparatively easy to show labour expenditure on the harvesting and carting of turnips separately from the labour used in feeding, mucking out, bedding, etc.

Overall the low income farms used 40 per cent more labour than the high income farms for every 100 head of cattle. The biggest

TABLE M.- LABOUR USED IN WINTER FATTENING

<u>Tasks</u>	High income	Low income
	<u>man hours per 100 head</u>	
Feeding, cleaning, bedding, etc.	6.1	7.5
Harvesting and carting turnips	1.4	2.9
Total labour on cattle enterprise	7.5	10.4

difference between the two groups was in the amount of labour spent on harvesting and carting turnips. Unfortunately farmers were not asked whether they used a puller or mechanical harvester so it is impossible to say whether this difference in labour expenditure arose partly because of differences in the use of machinery.

Disregarding the amount of labour spent on harvesting and carting turnips, the number of man hours spent on other tasks among cattle was estimated for each farm and compared with the class in which that farm had been placed for the layout of its buildings. In other words, the figures in Table N are an attempt to show the connection between well designed layouts and labour saved.

TABLE N.- LAYOUT AND LABOUR SPENT ON FEEDING, CLEANING AND BEDDING

Layout	No. of farms	Man hours per 100 head per day
Good	10	5.7
Average	15	7.8
Bad	15	8.2

There is, of course, a great deal of variation underlying these figures since many other factors affect the efficiency of labour performance. Farmers differ in the amount of effort they are prepared to put into their business and they also differ in their ability to obtain the most effort from their employees.

CHAPTER 12

PERSONAL FACTORS

An examination of various aspects of the farm would be incomplete without some attention being paid to the man who makes the decisions that mould the business. During the course of these interviews farmers were asked a number of questions about themselves. They were told that if any of these questions seemed impertinent they should tell the interviewer to mind his own business. That none of them did so is a remarkable tribute to the patience and good humour of the forty farmers who co-operated in this survey.

Age

Each farmer was asked how old he was. Figure 17 shows the age groups into which they fell.

The fact that each of the high income farmers aged sixty or more was farming at least two hundred and thirty acres is worth noting. It would not be unreasonable to suggest that physical strength declines more rapidly with advancing years than does managerial ability and that therefore the larger a farmer's business, the less tendency there will be for his income to diminish as he grows older.

Another factor connected with age which should be borne in mind is the effect of the economic climate which prevailed during the farmer's youth. Many who started farming during the depression still retain a marked reluctance to increase their expenditure.

Previous experience

Farmers were asked when they first assumed full control of a farm. Four-fifths of those interviewed had taken full responsibility in their twenties or thirties.

Figure 18 shows that a quarter of the low income farmers did not take full responsibility until after reaching the age of forty.

FIGURE 17.- AGE OF FARMERS INTERVIEWED

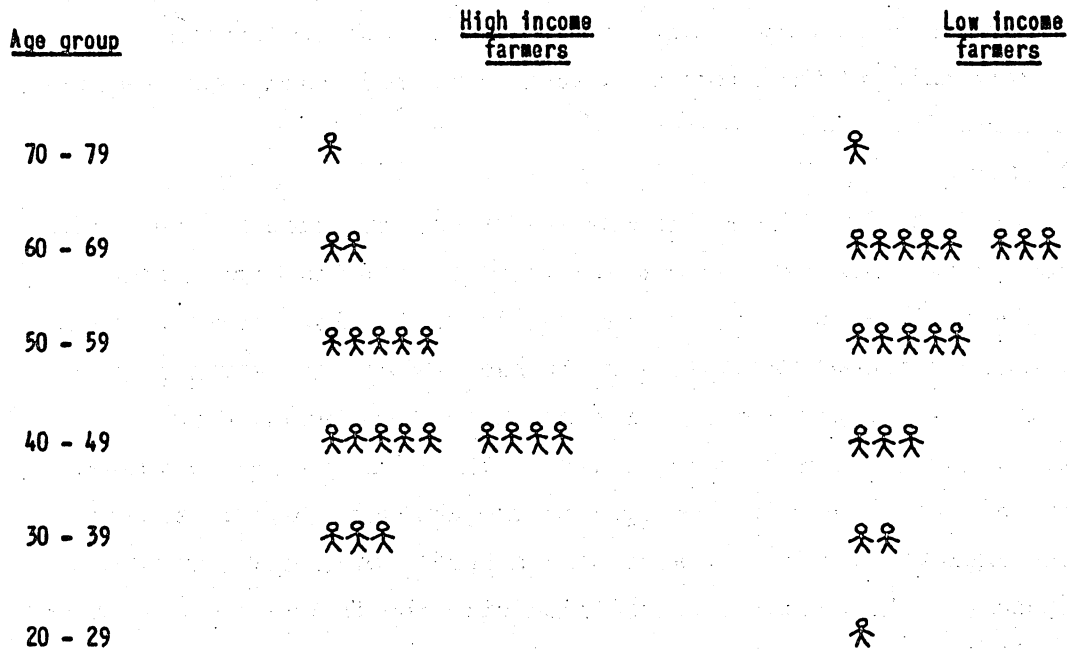
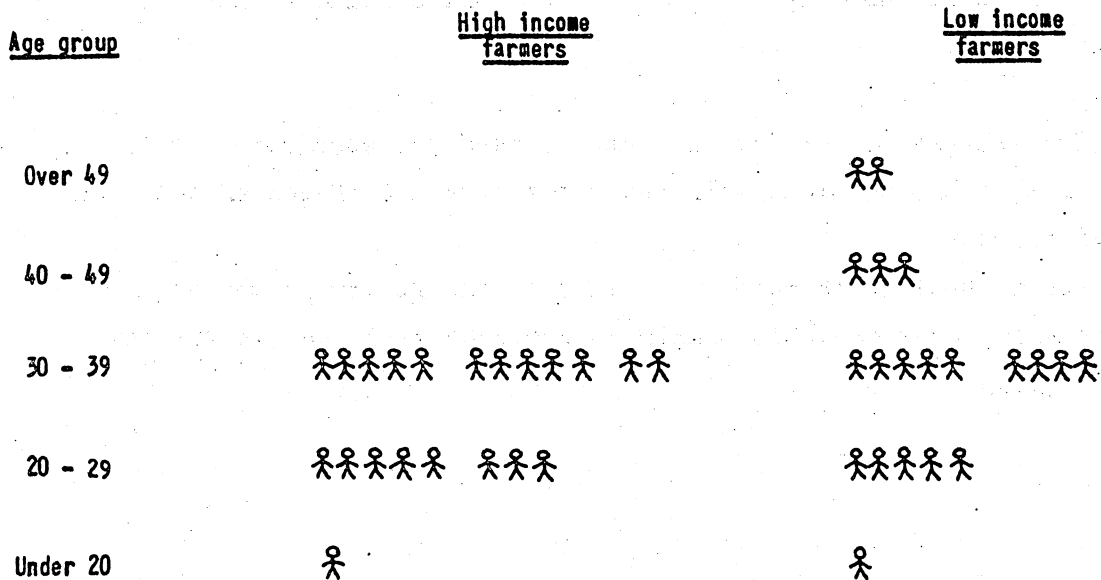


FIGURE 18.- AGE OF FARMERS ON FIRST ASSUMING CONTROL OF A FARM



Father's occupation

One of the low income farmers and two of the high income farmers were sons of farm workers. All the rest were sons of farmers.

Exactly half of the farmers in each group had taken over their present farms from their fathers.

Marital status

Three of the low income farmers and two of the high income farmers were bachelors. Amongst the married farmers, all the high income farmers had children whilst only two thirds of the low income farmers had. The high income farms as a whole had twelve sons working with their fathers as compared with six sons on the low income farms.

Two explanations may be suggested. The first is that although the working sons' labour was charged to the accounts just as though they were employees, they may have worked harder or longer hours than hired labour. The second is associated with the farmer's own motives. Several middle aged farmers without children remarked to the interviewer "Ach, where's the sense in killing myself with work - I can manage fine as I am and there's naebody coming after me." This attitude would not occur to all farmers in similar circumstances, but it does not seem to be an unreasonable one. Concern for the future welfare of children, especially sons anxious to farm themselves, may well act as a spur to men who might otherwise not strive quite so hard for higher returns.

Health

The welfare of the farm business depends so much upon the farmer himself that his physical well-being may have a profound effect upon its efficiency.

Asked about their main worries, only one farmer in the high income group mentioned his health as compared with four in the low income group.

Ambitions

Several farmers found it difficult to say what their ambitions were. This is hardly surprising since many people are not accustomed to formulating such ideas in a few sentences. It is interesting that 25 per cent in each group said that they were perfectly content as they were and wished to continue working and living in the same fashion. Of the remainder who expressed an opinion, ten high income farmers intended either expanding their businesses or setting up a son in his own farm as compared with the two of the low income group; six low income farmers mentioned retirements, but none of the high income farmers did.

SUMMARY

This report looks at the earnings and records of ninety nine beef farms. Twenty of these farms that showed their occupiers a good return in the three years 1960/61 to 1962/63 are compared with twenty that did not. By identifying the differences in management between these two groups and by looking at the larger picture presented by the whole sample, some of the answers to the question posed in the title of this report may have emerged.

Size

The size of a man's farm obviously influences the size of his income, though two men on similar farms may earn very different incomes. The evidence on incomes and farm acreage of the ninety nine farms studied here suggests that in general, about half the variation in farmers' incomes can be attributed to differences in the acreage they farm.

Situation

Although the influence of soil and situation does have some effect upon income levels, it seems that within the limits of this particular survey, these factors are of less importance than size of farm and quality of management.

Farmer

Much depends upon the farmer's own characteristics. Men vary not only in their physical and mental abilities but also in the goals which they pursue. Both their abilities and their aims will be affected, sometimes profoundly, by their health, their age and their domestic circumstances.

Management

Most farmers, whilst they are interested in the effects of acreage, environment and other long term factors upon farm incomes, are much more concerned by the influence of short term management decisions which can be changed more easily.

Twenty farms with relatively high incomes for their size were compared with twenty farms having relatively low incomes for their size and the following points were shown to be of considerable importance.

1. Stocking Density

The high income farmers were found to be keeping 33 per cent more grazing livestock in relation to the land devoted to them than the low income farmers. In achieving a high stocking rate two things were particularly notable:-

- (a) The provision of adequate accommodation for inwintered animals. High income farmers had more court space for cattle.
- (b) Good grassland management. The high income farmers used more nitrogenous fertiliser on grassland and kept far more animals on each acre of grazing.

2. Turnover of Animals

High income farmers turned over the capital they had invested in cattle at a faster rate than low income farmers.

On average, their animals were slaughtered four months younger and a hundredweight lighter than the cattle sold by low income farmers. This implies a reduction of the store period and attention to the maintenance of rapid gains in liveweight.

3. Labour Efficiency

The high income farmers kept 30 per cent more cattle through the winter and had more pigs and poultry than the low income farmers, yet their labour costs were slightly lower. Harder work may have accounted for much of the difference but there is evidence that better organisation was important too, as shown in the amount of labour saved by improvements in the layout of buildings.

4. Crops

High income farmers received 50 per cent more money from the sale of crops than low income farmers. Their estimated yields of oats were 3 cwts. higher and of barley 5 cwts. higher than the low income farmers. High income farmers were putting a much bigger proportion of their land into barley.

5. Other Livestock

High income farmers received 80 per cent more money from poultry, sheep and pigs. Expenditure on feeding stuffs was higher in consequence, but labour costs were not.

COLLEGE ADVISORY SERVICES

Reference is made in the body of this report to the College's advisory services. Any farmer who wishes to consult the advisory services should first contact his local agricultural adviser. Agricultural advisers are stationed in the following places:-

Aberdeen	Keith
Aboyne	Kirkwall
Benbecula	Lerwick
Dingwall	Stonehaven
Dornoch	Stornoway
Elgin	Thurso
Inverness	Turriff
Inverurie	

The local agricultural advisers are the general practitioners of the advisory services. They are able, if required, to call on the specialist advisory services provided by the following departments which are based on Aberdeen or Craibstone.

Animal Husbandry	Crop Husbandry
Grassland Husbandry	Poultry Husbandry
Agricultural Economics	Bacteriology
Botany and Mycology	Chemistry
Engineering	Entomology and Zoology
Farm Buildings	Horticulture
Veterinary Hygiene and Animal Physiology	
Veterinary Investigation	

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