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Berries - Cost of production O.S.

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SOFT FRUIT PRODUCTION

by

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FOREWORD

This report on soft fruit production brings together a considerable volume of information on the major crop of this type, raspberries, which is grown in certain favourable areas of Scotland. Some further information on strawberries and other soft fruits is also discussed.

In preparing this material, Miss Wright has had to deal with a mass of detailed information on both the production and marketing sides of these enterprises. On both sides the information is characterised by a wide variation from holding to holding. Even basic aspects of production such as the number of raspberry canes or strawberry plants planted per acre and methods of cultivation or cleaning show little uniformity; marketing outlets vary from disposing of the fruit for processing, (canning, freezing or jam making) to selling for consumption as fresh fruit. These different outlets entail variations in picking methods and costs and the choice of outlet may depend on such factors as yield, quality and the contacts which the grower is in a position to make. It is also apparent that growers tend to act as individuals and, as yet, co-operative action, particularly on the marketing side, does not cover a major part of the crop.

In these circumstances, the presentation of example data relating to production and output and information on the ranges in costs and outputs should provide growers with useful information on the scope and prospects of these enterprises.

J. D. Nutt,

Advisory Economist.

ACKNOWLEDGMENT

The thanks of the College are due to all the growers who provided information for this report.

INTRODUCTION

The investigation into soft fruit production costs and returns in the Dundee area was continued for the 1964 crops with much the same sample of growers as had co-operated in 1963. There were, however, some differences in general conditions between the two seasons.

The rainfall in the east of Scotland was below average in 1964, whereas it had been above average in 1963.

Yields of both raspberries and strawberries were higher in 1964 than in 1963. In the full sample the raspberry yield was 4.5 cwt higher, the strawberry yield 11.5 cwt; in an identical sample raspberries were 4.0 cwt higher, strawberries 2.0 cwt.

There was hardly any change in the total acreage of strawberries in Scotland between 1963 and 1964, whereas the acreage of raspberries increased by nearly 400 acres. (This extra unproductive acreage of raspberries depressed the increase in the 1964 national yield, which is, of course, calculated on the total raspberry acreage, not on the fruiting acreage as in these costings.)

Although the total production of both raspberries and strawberries was higher in 1964 than in 1963, the average return per ton fell by only £3 for raspberries and £8 for strawberries or 2.3 and 4.7 per cent respectively. The Scottish acreages and outputs for the last 5 years are shown below.

Year	Raspberries					Strawberries				
	acres*	total yield	total value	yield per acre*	value per ton	acres*	total yield	total value	yield per acre*	value per ton
		'000 tons	£'000	cwt	£		'000 tons	£'000	cwt	£
1960	7847	15.2	838	38.8	55.1	1687	3.0	414	36.2	138.0
1961	6892	8.8	868	25.6	98.6	1720	2.0	251	23.8	125.5
1962	6445	9.9	1095	30.6	110.6	1671	2.8	394	33.7	140.7
1963	6444	10.2	1385	31.6	136.1	1641	1.8	308	22.3	168.4
1964	6826	11.5	1530	33.7	133.0	1643	2.7	435	33.0	160.5

Source D.A.F.S. statistics

*includes productive and unproductive acreages

Details of the costing method are given in Appendix I. Unless it is otherwise stated, the "per acre" figures given in the report are calculated from the actual acreage of fruit, excluding the acreage of endrigs and roads, although all costs associated with the endrigs etc. (rent, cleaning costs) have been included. In calculating average figures each case has been given equal weight.

R A S P B E R R I E S

ESTABLISHMENT OF PLANTATIONS

Physical information collected in and before 1964 was used with 1964 values for the individual items of input to build up example costs for the various stages of establishment.

FIRST YEAR

The first year of establishment was costed on 6 holdings in 1964, and 29 earlier costings have also been used (1961-63). Nearly two-thirds of the plantations were under 3 acres in size, the rest ranging up to 16 acres. The distribution of the costed acreages is given in Table 1: the average size was 3.57 acres.

TABLE 1 DISTRIBUTION OF PLANTATIONS BY SIZE

Acres	under 1.0	1.0- 1.9	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0 & over	total
No. cases	6	8	7	2	1	3	2	2	2	-	2	35

The example cost is given in Table 2. Where possible, the physical data for specified methods of operation have been used. The cost of the first year of establishment in this example is £103 per acre. Although single planted in the example, canes are the largest single item of cost (£36), all other costs amounting to £67 per acre.

TABLE 2 EXAMPLE OF COST OF RASPBERRY ESTABLISHMENT
PER ACRE

(spring planting: approx. first 6 months work)

Variety Jewel, certified standard stock, planted singly at 2' x 6'

	Hours		
	man	woman, boy	tractor
<u>Work done</u>			
Applying dung @ 1.0 m hr, 0.7 t hr per ton	18.6		11.0
Ploughing, working ground	7.9		7.9
Ridging	2.0		1.9
Applying fertisers by hand @ 1.4 hrs per cwt	5.6		
Planting @ 6.8 hrs per thou	16.6	7.9	
Care of crop - interrow cultivations	3.0		3.0
hand cultivations	4.7	21.2	
applying weedkiller	1.5		1.4
Total	59.9	29.1	25.2
<u>Costs</u>			£
<u>Materials:</u>			
*canes, 3.6 thou (purchased) @ £10			36.0
dung, 18.6 tons @ £0.875			16.3
*fertiliser, raspberry 3.6 cwt @ £0.975			3.5
* nitrogenous 0.4 cwt @ £0.725			0.3
*weedkiller, simazine, 2.6 lb @ £1.6			4.2
<u>Work:</u>			
man, 59.9 hours @ £0.310			18.6
*woman, 29.1 " @ £0.165			4.8
tractor, 25.2 " @ £0.225			5.7
			89.4
Rent			5.9
Manurial residues			7.9
Total			£103.2

*variable costs, total £48.8

The distribution of costs incurred on the individual plantations costed in 1963 and 1964 is given in Table 3. Home produced canes are valued as if purchased. In two-thirds of this sample the total establishment cost was higher than the example cost.

TABLE 3 DISTRIBUTION OF PLANTATIONS ACCORDING TO FIRST
YEAR COST PER ACRE

£	60-79	80-99	100-119	120-139	140-159	160-179	180-199	200 & over	total
No. cases									
1963	3	1	2	3	1	2	-	-	12
1964	2	-	1	1	1	-	-	1	6

In 11 out of the 12 high cost cases the cost of canes was higher, in 8 cases the other costs were higher and in 7 of the cases both these items were higher than in the example cost. Even in the one-third of the sample where the total establishment cost was lower, canes cost more in 3 cases and other costs were higher in another case. The distributions of these sections of the establishment cost are given in Table 4.

TABLE 4 DISTRIBUTION OF PLANTATIONS ACCORDING TO COST PER ACRE

(a) Canes

£	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100-109	total
No. cases											
1963	1	-	4	3	1	1	-	-	1	1	12
1964	-	-	1	2	-	1	1	-	-	1	6

(b) All Other Establishment Costs

£	20-39	40-59	60-79	80-99	100-119	120-139	140-159	total
No. cases								
1963	3	3	4	1	-	1	-	12
1964	2	1	1	1	-	-	1	6

One possible way of reducing the cost of canes is for the grower to produce his own canes in a spawnbed. The method of establishment of a spawnbed is the same as that of a fruiting plantation, the only difference in cost being the purchase of higher quality canes with which to plant the spawnbed. The available information on cane production was scanty, but is given here for interest. Most of the 8 growers who could give information about spawnbeds expected to be able to dig at least 3 crops of canes and, in some cases, up to 5 crops. In 3 cases where digging from spawnbeds was costed, the numbers of canes dug per acre were 26.5, 31.6 and 56.8 thousand. It was considered possible to dig a crop of up to 50 thousand canes per acre from the variety Jewel and up to 100 thousand from varieties such as Exploit and Promise. The average time taken to dig the canes from the 3 spawnbeds was 7.5 hours per thousand, ranging from 6.0 to 9.1 hours. In a further 8 cases where canes were dug from young fruiting plantations, the average number dug was 6.4 thousand per acre, ranging from 0.7 to 13.3 thousand. The average time taken in these cases was 6.6 hours per thousand, ranging from 1.6 to 20.8 hours.

There was a wide variation in the cost of cleaning the plantations ranging from no work other than applying weedkiller to over 160 hours of hand work per acre in addition to interrow cultivations. It would seem therefore that some growers have reduced these costs by planting on cleaner land or by achieving better weed control after planting. The time spent cleaning on 2 groups of plantations where weedkiller was and was not used is given in Table 5.

TABLE 5 CLEANING TIME - HOURS PER ACRE

Weedkiller	No. cases	Interrow		Hand work	Spraying		Total	
		manual tractor			manual tractor		manual tractor	
used	13	3.2	3.2	25.9	1.5	1.4	30.6	4.6
not used	18	4.3	4.3	46.0	-	-	50.3	4.3

Although weedkiller was used in only 7 of 18 costs collected in 1963 and 1964, this method was used in the example cost as the one likely to be adopted in the future. Out of 28 growers questioned about their growing methods in 1964, 16 used weedkiller on first year plantations and 2 more intended doing so in 1965.

SECOND YEAR

This refers to the year following planting, in which a part crop is usually produced. Costs are given for 2 groups of plantations - those where sufficient growth was made in the first year for the plantations to be cropped in the second year and those where this was not the case. The plantations in the first group were posted and wired in readiness for cropping but in the other group this operation was delayed for a year, the second year being in effect a repeated first year. The incidence of this poor growth and delayed cropping has been found to be about 1 year in 4.

Plantations not Posted and Wired in Second Year (not Cropped)

Costs were available from 11 holdings; of these 4 referred to 1964, 6 to 1963 and 1 to 1962. Three-quarters of the total acreage was of the variety Jewel (27.4 acres); there were also acreages of M's (3.1 acres), Lloyd George (3.5 acres), Burnetholm (1.3 acres) and Enterprise (0.83 acres). There were both small and large plantations in this group; the size distribution is given in Table 6.

TABLE 6 DISTRIBUTION OF PLANTATIONS BY SIZE

Acres	under 1.0	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	5.0-5.9	6.0-6.9	7.0-7.9	total
No. cases	3	3	1	-	-	-	2	2	11

The treatment of these plantations varied. The canes were cut down in 2 cases and gaps replanted in 6. Canes were purchased in only 2 of these cases. Weedkiller was used in 6 of the 11 cases and a little less time was spent in cleaning where it was used. An example of a typical uncropped second year cost is given in Table 7.

TABLE 7 EXAMPLE OF COST OF UNCROPPED SECOND YEAR PLANTATION
PER ACRE

	Hours		
	man	woman, boy	tractor
<u>Work done</u>			
Filling gaps @ 7.7 hrs per thou	5.1	3.4	
Applying dung @ 1.0 m hr, 0.7 t hr per ton	3.1		2.2
Applying fertilisers by machine @ 0.25 hr per cwt	1.5		1.5
Care of crop - interrow cultivations	5.4		5.4
hand cultivations	38.2	18.8	
applying weedkiller	1.6		1.6
Total	54.9	22.2	10.7
<u>Costs</u>			
	£		
<u>Materials:</u>			
*canes, 1.1 thou @ £10	11.0		
dung, 3.1 tons @ £0.875	2.7		
*fertiliser, raspberry 5.1 cwt @ £0.975	5.0		
* nitrogenous 1.0 cwt @ £0.725	0.7		
*weedkiller, simazine, 3.0 lb @ £1.6	4.8		
<u>Work:</u>			
man, 54.9 hrs @ £0.310	17.0		
*woman, 22.2 hrs @ £0.165	3.7		
tractor, 10.7 hrs @ £0.225	2.4		
	47.3		
Rent	5.9		
Total	£53.2		

*variable costs, total £25.2

The individual costs in 1963 and 1964 ranged from £21 to £115, the average being £48. The distribution of these costs is given in Table 8.

TABLE 8 DISTRIBUTION OF UNCROPPED SECOND YEAR COSTS
PER ACRE

£	20-29	30-39	40-49	50-59	over 100	total
No. cases						
1963	-	2	2	1	1	6
1964	2	-	1	1	-	4

Plantations Posted and Wired in Second Year (Cropped)

Posting and wiring

There was a wide range in the quantity of posts used per acre according to variations in row width, and distance apart of posts in the rows and in the

number of wires used according to the method of tying the canes. An example is given of the cost of posting and wiring in Table 9.

TABLE 9 EXAMPLE OF COST OF POSTING AND WIRING 6' ROWS
PER ACRE

*Posts, 192 @ $\frac{2}{3}$ x £0.1 per post (15 yd intervals)	£ 12.8
*Wire, 3.5 cwt @ $\frac{1}{2}$ x £4.2 per cwt (2 wires, 12 gauge)	7.4
Man, 24.7 hours @ £0.310	7.7
*Woman, 2.3 hours @ £0.165	0.4
Tractor, 0.9 hours @ £0.225	0.2
Total	<u>£28.5</u>

*variable costs, total £20.6

Growing costs

Information was available from 22 holdings, the total acreage costed being 82.5 acres. Nearly three-quarters of this was planted with the variety Jewel (58.3 acres); there were also acreages of M's (7.6), Exploit (6.8), and Lloyd George (5.0). Small acreages of other or mixed varieties completed the total. The distribution of the size of the plantations is given in Table 10. About half the plantations were between 3 and 6 acres and one-third were under 2 acres.

TABLE 10 DISTRIBUTION OF PLANTATIONS BY SIZE

Acres	under 1.0	1.0- 1.9	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	9.0- 9.9	10.0- 10.9	total
No. cases	2	5	1	3	4	3	1	2	-	-	1	22

The time spent lacing or clasping was usually less on these plantations than on mature plantations, as there were fewer canes to handle and they were usually shorter. Where the canes would be laced to 2 wires in a mature plantation, they were only laced to 1 in the second year or, alternatively, the wires were used double and clasped.

Blanks were filled in only 3 cases, using an average of 200 canes per acre.

Weedkiller was used on half the plantations and the time spent cleaning was a little less on average than where it was not used. The average times for the 2 methods are given in Table 11. The time saved did not quite make up for the cost of weedkiller in this particular year but, of course, the 2 groups of plantations may not have been equally weedy before or equally clean afterwards, and labour may not have been available for hoeing.

TABLE 11 CLEANING TIMES PER ACRE

Method	Hours						
	Spraying manual tractor		Interrow cults. manual tractor		Hand work	Total manual tractor	
Weedkiller - used	2.1	1.9	6.5	6.3	23.4	32.0	8.2
not used	-	-	6.0	6.0	34.6	40.6	6.0

The individual growing costs in 1963 (8 cases) and 1964 (8 cases) ranged from £16 to £146 per acre. Excluding the highest cost, the average for these 2 years (15 cases) was £30, which was similar to the example cost in Table 13 (£33). Eleven of the 16 costs were between £20 and £40 per acre, as is shown in the distribution in Table 12.

TABLE 12 DISTRIBUTION OF PLANTATIONS ACCORDING TO GROWING COST PER ACRE

£	under 20	20-29	30-39	40-49	50-99	over 100	total
No. cases							
1963	1	5	2	-	-	-	8
1964	1	3	1	1	1	1	8

Yields and returns

The yields of fruit from these 22 plantations varied from 0.5 to 20.0 cwt per acre, the average being 11.1 cwt. In 7 cases the fruit was sold for canning and in 1 case in the open market; otherwise it was sold for jam manufacture.

An example of the costs and returns for a cropped second year plantation is given in Table 13. The cost of posting and wiring has not been included here, although it is included in the total establishment cost.

TABLE 13 EXAMPLE OF COSTS AND RETURNS FOR A CROPPED
SECOND YEAR PLANTATION PER ACRE

	Hours		
	man	woman, boy	tractor
<u>Work done</u>			
Winter work - lacing or clasping	7.4	8.8	
Applying fertilisers by hand @ 0.6 hr per cwt	3.4		
Care of crop - interrow cultivations	6.5		6.3
hand cultivations	12.6	10.8	
applying weedkiller	2.1		1.9
applying DDT spray	1.5		1.5
Total	33.5	19.6	9.7
<u>Costs</u>			
		£	
<u>Materials:</u>			
*twine, 6.1 lb		1.5	
*fertiliser, raspberry, 4.9 cwt @ £0.975		4.8	
* nitrogenous, 0.7 cwt @ £0.725		0.5	
*weedkiller, simazine, 2.5 lb @ £1.6		4.0	
*antibeetle spray		0.9	
<u>Work:</u>			
man, 33.5 hours @ £0.310		10.4	
*woman, 19.6 hours @ £0.165		3.2	
tractor, 9.7 hours @ £0.225		2.2	
		27.5	
Rent		5.9	
Total		£33.4	
<u>Returns</u>			
11.1 cwt fruit - 4.8 cwt canning @ £154.9 per ton)		76.4	
6.3 cwt pulp @ £124.3 per ton)			
Picking cost @ £34.4 per ton		19.1	
Margin on fruit, returns less picking costs		£57.3	

*variable costs, total £14.9

DISESTABLISHMENT OF PLANTATIONS

Removal of the posts and wires and destruction of the raspberry stools is necessary at the end of the useful life of a plantation. Data collected in 1964 from 4 holdings have been used with information collected in the earlier years from 11 other holdings to construct disestablishment costs using 1964 prices. These are given in Table 14.

TABLE 14

DISESTABLISHMENT COSTS PER ACRE

(1) Removing posts and wires	man,	16.0 hours @ £0.310	5.0
	*woman,	3.8 hours @ £0.165	0.6
	tractor,	2.5 hours @ £0.225	0.6
	Total		£ 6.2
(2) Destroying canes by rotovating	man,	3.4 hours	1.1
	tractor,	3.4 hours	0.8
	Total		£ 1.9
(3) Destroying canes by burning	man,	22.1 hours	6.9
	*woman,	10.7 hours	1.8
	tractor,	7.1 hours	1.8
	Total		£10.5
(1) + (2)		£ 8.1	
(1) + (3)		£16.7	

*variable costs, total (1) + (2) £0.6

(1) + (3) £2.4

CHARGE AGAINST FRUITING PLANTATION FOR
ESTABLISHMENT AND DISESTABLISHMENT

The cost examples of establishment and disestablishment have been put together in Table 15 to show the total charge to be set against the fruiting life of the plantation. The annual charge against the fruiting plantation has been based on a life of 8 years, with 6 years full fruiting, which has been found to be the usual expectation.

TABLE 15 TOTAL ESTABLISHMENT AND DISESTABLISHMENT COSTS
AND CHARGE PER FULL FRUITING YEAR PER ACRE

	Enterprise costs	Variable costs
	£	£
First year cost	103.2	48.8
$\frac{1}{4}$ share of extra (unproductive) second year cost	13.3	6.3
Posting and wiring	28.5	20.6
Cropped second year cost	33.4	14.9
Disestablishment (by rotovating)	8.1	0.6
Gross charge against full fruiting years	£186.5	£91.2
Credit second year crop (11.1 cwt) - margin from fruit, returns less picking cost	57.3	57.3
Net charge against full fruiting years	£129.2	£33.9
Annual charge per full fruiting year, if 6 years	£21.5	£5.7

FRUITING RASPBERRIES

THE SAMPLE

Twenty-eight fruiting plantations were costed in 1964 on holdings varying in size from small specialist holdings of 3 acres to farms of over 600 acres, where the fruit enterprise was one of many. The range in the size of the holdings is shown in Table 16. Sixteen of the costs were collected in Perthshire, 9 in Angus and 3 in Fife.

TABLE 16 DISTRIBUTION OF PLANTATIONS BY SIZE OF HOLDING

Acres	under 10	10-24	25-49	50-74	100-199	200-299	300-399	400-499	500-599	over 600	total
No. cases	6	2	1	3	6	4	1	2	2	1	28

Wherever possible the whole fruiting acreage of raspberries on a holding was costed, so that an individual cost usually included a range of ages and several varieties.

The plantations varied in size from 0.70 to 29.50 acres of fruit, the average being 8.11 acres, with 0.79 acres of associated endrig and road. Nearly half the sample were under 5 acres and only 4 plantations exceeded 15 acres in size. The plantation sizes are shown in Table 17.

TABLE 17 DISTRIBUTION OF PLANTATIONS BY SIZE

Acres	under 5	5-9	10-14	15-19	20-24	25-29	total
No. cases	13	4	7	2	1	1	28

The average age of each plantation was calculated and the distribution is given in Table 18. The average age of the 27 plantations for which this was available was 5.7 years.

TABLE 18 DISTRIBUTION OF PLANTATIONS BY AVERAGE AGE

Years	3	4	5	6	7	8	n.a.	total
No. cases	3	5	6	8	3	2	1	28

The average proportions of different ages and varieties of fruit are given in Table 19.

TABLE 19 AGES WITHIN PLANTATIONS: VARIETIES GROWN

(a) Average proportions of different ages in plantations

Years	2	3	4	5	6	7	8	9	10	n.a.	total
Per cent	4	2	19	7	18	19	11	10	5	5	100

(b) Average proportions of different varieties in plantations

Variety	Jewel	Exploit	M's	Promise	Lloyd G.	Burnetholm	Enterprise	total
Per cent	51	20	11	9	7	1	1	100

AVERAGE RESULTS

The costs and returns for the whole sample are given in Table 20, with the range in the individual items of cost where these were incurred. The growing cost was 43 per cent and the harvesting cost 57 per cent of the total, £198.4 per acre. Returns of £367.5 left a margin of £169.1.

The results on 24 holdings which were costed in both 1963 and 1964 are given in Table 21. The growing costs were up by £5 per acre in 1964, due to an increased use of weedkiller, a few more hours of manual work and a higher charge for the share of the establishment cost. The harvesting cost had only risen by £1 per ton, an increase in the charge for containers being partly offset by a decrease in the charge for labour. The return per ton was lower in 1964 for all 3 types of sale and the average return was also a little lower, although the percentage sold fresh and for canning/freezing was a little higher than in 1963. However, an increase of 4 cwt per acre in the yield improved the returns per acre, so that finally the margin per acre of all returns over all costs was £8 higher in 1964.

TABLE 20 AVERAGE COSTS AND RETURNS FOR 28 PLANTATIONS
IN 1964, PER ACRE

	Average		Range in cost where incurred		
			no. cases	lowest	highest
<u>Growing cost</u>		£		£	£
Materials:					
dung	2.7 tons	4.4	13	1.8	26.9
fertiliser	5.8 cwt	7.4	28	1.1	24.3
twine	8.7 lb	2.0	27	0.7	4.4
weedkiller - simazine	1.3 lb	2.9	18	0.8	8.0
others		0.1	3	0.2	1.7
other sprays		1.0	20	0.4	4.0
water		0.2	2	0.3	4.6
posts, wire, clips etc.		0.7	12	0.1	7.7
Work:	<u>hrs</u>				
casual labour - hourly	51.5	8.6	21	0.2	37.4
piecework		2.2	6	2.8	17.6
regular labour	87.0	25.9	28	4.9	83.3
tractor	10.5	2.4	27	0.5	9.6
rotary hoe	0.9	0.2	2	0.4	5.3
Rent		5.9	28	1.7	12.5
Share of establishment		21.1	28	4.4	59.0
Total		£85.0			
<u>Harvesting cost</u>					
Materials:					
punnets, trays		11.2			
barrels, pails, scales		0.7			
Haulage on fruit		6.9			
Growers' association levy		1.8			
Work:					
casual labour		68.7			
pickers' transport & miscell.		2.9			
regular labour		17.0			
unallocated regular & casual		2.5			
tractor		0.6			
Cold store		1.1			
Total		£113.4			
<u>Growing + harvesting cost</u>		£198.4			
<u>Returns</u>	<u>% by wt.</u>	<u>cwt</u>			
Fruit:					
fresh	18	8.84		83.4	
canning/freezing	30	14.99		115.7	
jam manufacture	52	25.76		159.9	
house etc.	-	0.20		1.5	
total fruit	100	49.79		360.5	
Canes		0.84thou		7.0	
Total				£367.5	
<u>Margin</u>				£169.1	

TABLE 21 COSTS AND RETURNS IN 1963 AND 1964 FOR AN IDENTICAL SAMPLE OF 24 HOLDINGS PER ACRE.

	1963	1964
Acres fruiting raspberries	7.39 acre	7.84
Average age of plantation	5.0 yr	5.7
<u>Per acre</u>		
Yield	47.3 cwt	51.3
	£	£
Costs - growing	80.1	85.0
harvesting	98.7	114.7
Total	£178.8	£199.7
Returns - fruit	339.0	365.9
canes	4.3	6.2
Total	£343.3	£372.1
Margin	£164.5	£172.4
<u>Per ton</u>		
Average return	143.0	141.4
Harvesting cost	41.9	42.9
Margin	£101.1	£98.5
Return per ton sold fresh	221.4	196.5
canning/freezing	148.4	143.4
pulp	130.6	124.3
Percentage sold fresh	11	14
canning/freezing	29	30
jam manufacture	59	56

GROWING COST

The average growing cost in 1964 was £85 per acre, ranging from £36 to £167. The distribution of the growing costs is shown in Table 22.

TABLE 22 DISTRIBUTION OF PLANTATIONS ACCORDING TO GROWING COST PER ACRE

£	under 50	50-74	75-99	100-124	125-149	150-174	total
No. cases	1	12	7	5	1	2	28

The largest item in the growing cost was labour (43 per cent), followed by the share of establishment (25 per cent) and manures (dung and fertilisers together, 14 per cent).

MATERIALS USED

Manures

Dung was applied on 13 plantations and fertiliser on all the plantations. Excluding the 5 plantations where an organic fertiliser was used, an average of 5.4 cwt of fertiliser was applied on 12 plantations where fertiliser only was used; 4.5 cwt of fertiliser and 6.5 tons of dung were applied on the other 11 plantations.

Twine

The average amount of twine used was 6.6 lb per acre where the canes were laced to 1 wire only (18 cases) and 15.9 lb where the canes were laced top and bottom (9 cases). The average costs per acre were £1.5 for single lacing and £3.3 for double lacing.

Weedkiller

Pre-emergent spray was applied by 18 growers, in 3 cases to only part of the fruiting plantations. The average amount applied on the treated acreage was 2.9 lb per acre (14 cases), the average cost of the material being £4.9 per acre (15 cases). In 7 cases the amount of material used was between 1.5 and 2.5 lb per acre, in 2 cases about 3 lb and in 5 cases 4 lb. The average cost of the whole operation, including spraying by the farm staff or contractor, was £5.9 per acre (18 cases). In addition, a contact spray was used in 3 cases to control perennial weeds.

Antibeetle sprays (D.D.T. or malathion) were used by 19 growers. The average cost of this material was £1.3 per acre sprayed (15 cases), the cost of the whole operation, including the work done by the farm staff or contractor, being £2.0 per acre sprayed (19 cases).

In 2 cases tar oil winter wash and in another 2 cases lime sulphur was applied.

WORK DONE

The average amount of work done is given in Table 23 for the whole sample and the monthly distribution of work for the 19 plantations where the information was available is given in Table 24.

TABLE 23 AVERAGE WORK REQUIREMENTS PER ACRE

	Hours			
	regular	casual	tractor	rotary hoe
Winter work	54.2	34.9 +	0.1	-
Autumn and spring cultivations etc.	33.6	16.6 +	10.6	0.9
Picking	54.1	62.8 +	2.9	-

+ plus some piecework, costing £2.0 per acre in the winter, £0.2 in the spring and £60.5 for picking.

TABLE 24

MONTHLY USE OF LABOUR, HOURS PER ACRE

	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	total
<u>Winter work</u> (19 cases)													
man		0.4	0.6	13.0	13.9	10.4	13.0	9.3	1.3	0.2		0.1	62.2
woman		1.3	0.3	1.8	8.9	8.6	12.5	5.6	1.1				40.1
<u>Cleaning:</u>													
<u>w.k.* used</u> (12 cases)													
man	0.1	0.6	0.2	1.2		0.3	2.2	5.0	5.0	7.4	6.0	0.9	28.9
woman	0.1							1.0	4.5	3.5	4.9	5.3	19.3
tract. & r. hoe		0.2	0.2			0.3	1.1	2.0	1.6	2.7	2.1		10.2
<u>w.k.* not used</u> (7 cases)													
man						5.1		3.6	5.9	12.6	8.9	1.2	37.3
woman							0.8	2.3	2.1	2.4	8.0	2.8	18.4
tract. & r. hoe						3.8		1.4	2.8	6.0	2.9		16.9
<u>Dunging</u> (8 cases)													
man					0.5	2.4	0.1	1.8	1.2	0.4			6.4
woman						1.1	0.4		3.6				5.1
tract.					0.2	0.8	0.1	0.8	0.4	0.1			2.4

* w.k. = weedkiller

Winter work

This included cutting strings, moving wires, digging, cutting out, carrying off and burning canes, maintaining posts and wires, lacing and topping canes. A breakdown of the total time into separate jobs has not been possible as they were frequently recorded in groups. Nor have the times been given for different growing methods because the samples were too small to allow for the factors which may influence the growing method in any particular case. For example, the amount of digging or cutting out may be affected by the age of the plantation, the variety grown or the manuring policy. The range in hours of winter work and the cost per acre are given in Table 25. The average cost of winter work was £23.7 per acre.

TABLE 25

WINTER WORK

(a) Distribution by hours worked (regular + hourly casual labour) per acre

Hours	under 25	25-49	50-74	75-99	100-124	125-149	150-174	175-199	200-224	total
No. cases:										
some piecework	3	2	-	-	-	-	-	1	-	6
no piecework	-	3	6	6	2	-	1	2	2	22

(b) Distribution by total cost (hourly + piecework) per acre

£	under 10	10-19	20-29	30-39	40-49	50-59	total
No. cases	4	12	5	2	2	3	28

Autumn, spring and summer work

This work consisted mainly of cleaning operations, but included the application of fertiliser, weedkiller and other sprays. The average time spent on various operations is given in Table 26. (The time spent applying dung is included in the cost of the dung.)

TABLE 26 TIMES FOR VARIOUS OPERATIONS PER ACRE

	No. cases	Hours			
		man	woman	tractor	rotary hoe
Applying fertiliser -					
by machine	15	1.5	0.2	1.3	-
by hand	13	3.1	1.5	-	-
Applying w.k.* -					
by machine	14	1.0	-	1.0	-
Applying antibeetle spray -					
by machine	14	1.3	-	1.2	-
Ploughing, dung applied	9	2.2	-	2.2	-
Cleaning -					
w.k.* used - interrow cults.	18	6.7	-	6.4	0.1
hand	18	10.9	12.6	0.1	-
w.k.* not used - interrow cults.	10	12.7	-	10.1	2.4
hand	10	26.2	13.0	-	-
Repairing wind damage to posts and wires during summer	9	8.4	7.4	-	-

*w.k. = weedkiller

The cost of cleaning varied more widely where no weedkiller was used than where it was used; the distribution of cleaning costs for these 2 groups is shown in Table 27(a) and the average cost in Table 27(b). The weedkiller users had a cleaning cost £3.5 per acre lower on average than non-users. This difference in cleaning costs between users and non-users of weedkiller holds good for 1963 and 1964 for those holdings which were costed in both years, as is shown in Table 28.

TABLE 27 CLEANING COSTS PER ACRE

(a) Distribution

£	under 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	total
No. cases: Weedkiller -										
used	-	7	3	4	4	-	-	-	-	18
not used	1	1	5	1	-	-	-	1	1	10

(b) Average

	Weedkiller	
	used	not used
No. cases	18	10
Interrow cultivations	£ 3.1	£ 10.2
Hand work	5.5	7.3
All cleaning work	8.6	17.5
Application of weedkiller	0.6	-
Weedkiller material	4.8	-
Total	14.0	17.5

TABLE 28 CLEANING COSTS IN 1963 AND 1964 ON
THE SAME HOLDINGS

	No. cases	£ per acre	
		1963	1964
Weedkiller used both years	8	15.9	13.8
" " neither year	10	21.7	17.5

YIELD

Although the average yield was 49.8 cwt, the individual plantation yields ranged from 27.0 to 89.0 cwt per acre. The distribution of the yields is given in Table 29.

TABLE 29 DISTRIBUTION OF PLANTATIONS BY YIELD PER ACRE

cwt	20-29	30-39	40-49	50-59	60-69	70-79	80-89	total
No. cases	1	7	7	7	4	1	1	28

RETURNS

The average prices received for the fruit sold in 1964 were £204.4 per ton for fruit sold in the fresh market, £154.9 from canning/freezing firms and £124.3 from jam manufacturers. There was a range in the price

received for each type of sale, the widest being in the fresh market. The distributions are shown in Table 30.

TABLE 30 DISTRIBUTION OF PLANTATIONS ACCORDING TO PRICE RECEIVED PER TON OF FRUIT

(a) Sales in fresh market

£	140-159	160-179	180-199	200-219	220-239	240-259	260-279	total
No. cases	2*	3*	1*	3	1	3*	1	14

*represents 1 case net of container/haulage charges

(b) Sales to canning/freezing firms

£	130-139	140-149	150-159	160-169	total
No. cases	1	3	4	9	17

(c) Sales to jam manufacturers

£	100-109	110-119	120-129	130-139	140-149	150-159	total
No. cases	2	4	11	6	1	1	25

Twenty of the growers sold their fruit in more than 1 way, 8 of these using all 3 outlets. Details are given in Table 31.

TABLE 31 DISTRIBUTION OF PLANTATIONS ACCORDING TO TYPE OF SALE

No. outlets used	Outlets	No. cases
1	Fresh market only	1
	Canning/freezing only	2
	Jam manufacture only	5
2	Fresh market + jam	5
	Canning/freezing + jam	7
3	Fresh market + canning/freezing + jam	8

The proportion of the individual crops sold in different ways is given in Table 32. Only 4 of the 14 growers who sold any fresh market fruit sold more than 25 per cent of their crop in this way; only 7 of the 17 growers selling for canning sold more than 50 per cent in this way.

TABLE 32 DISTRIBUTION OF PLANTATIONS ACCORDING TO
PROPORTION OF INDIVIDUAL CROPS SOLD IN DIFFERENT WAYS

Per cent	nil	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100	total
No. cases: fresh	14	3	4	4	-	-	1	-	-	-	2	-	28
canning/ freezing	11	1	2	2	4	1	3	-	1	-	3	-	28
jam	3	2	1	2	-	5	-	2	4	3	3	3	28

The proportions sold in different ways largely determined the average return per ton. This was £143.8 over the whole sample, ranging from £108.3 to £201.5. The distribution is given in Table 33. Most growers had returns between £120 and £160 per ton, i.e. within the processing/manufacturing price range.

TABLE 33 DISTRIBUTION OF PLANTATIONS ACCORDING TO
AVERAGE RETURN PER TON

£	100-109	110-119	120-129	130-139	140-149	150-159	160-169	170-179	180-189	190-199	200-209	total
No. cases	1	-	6	5	6	7	-	2	-	-	1	28

Although the return per ton has an effect on the return per acre, the yield of fruit is more important. The effect of yield per acre upon fruit returns per acre is shown in Table 34.

TABLE 34 DISTRIBUTION OF PLANTATIONS ACCORDING TO FRUIT
RETURNS AND YIELD PER ACRE

Return for fruit per acre £	Yield per acre, cwt							total
	20-	30-	40-	50-	60-	70-	80-89	
150-	1	1						2
200-		2						2
250-		3	5	1				9
300-		1		1				2
350-			2	4				6
400-								
450-						2		2
500-				1	1	1		3
550-					1			1
600-								
650-								
700-749							1	1
Total	1	7	7	7	4	1	1	28

Av. return per ton, £ 141.1 144.6 138.6 138.2 155.5 141.8 159.6

Per cent sold
fresh - 3 14 17 18 - 100
for canning/
freezing 37 46 23 19 54 56 -

HARVESTING COSTS

Harvesting costs are considered in 2 sections - picking costs and marketing expenses. Costs in both sections varied according to the type of sale.

The picking of the fruit was usually done on a piecework basis, although in 3 cases some or all of the work was paid for on an hourly basis. Where picking was done by piecework the rates for fruit picked into baskets or punnets were $\frac{1}{2}$ d. to 1d. higher than for picking into pails for jam making in 15 of the 20 cases where there was more than 1 type of sale.

The average picking cost for all types of sale was £35.7 per ton, of which £28.7 was for casual labour. Details are given in Table 35 and also the range in each category of cost where it was incurred. The total picking cost ranged from £19.3 to £57.2 per ton.

TABLE 35 AVERAGE PICKING COST PER TON

	Average	Range in cost where incurred		
		no. cases	lowest	highest
	£		£	£
Casual labour	28.7	28	19.3	36.7
Regular labour	5.7	26	1.2	33.8
Tractor	0.2	16	0.1	1.1
Pickers' transport	0.9	19	0.3	3.4
" miscellaneous exs.	0.2	4	0.3	1.7
Total	35.7			

In 21 cases the casual labour cost for picking various categories of fruit (fresh, canning, jam etc.) was known fairly accurately. The averages of these costs are given in Table 36. Fruit for canning or freezing (in 2 lb chips) cost a little less than fresh fruit (in punnets), and jam fruit (in pails) cost least of all. In some cases part of the picking may be done by regular labour, thus reducing the cost of casual labour. It would have been interesting to allocate the picking costs other than casual labour to the various categories of fruit, because, for example, the amount of supervision needed is less for picking into pails than for basketing or punnetting the fruit, but this was not possible.

TABLE 36 CASUAL LABOUR COST PER TON FOR FRUIT SOLD IN VARIOUS WAYS

Type of sale	Fresh	Canning/freezing	Jam manuf.
No. cases	8	11	16
	£	£	£
Average cost	34.4	32.7	25.6
Range - highest	42.9	50.6	39.2
lowest	20.6	26.3	18.7

Details of the average marketing expenses are given in Table 37 for the various type of sale groups. Growers' expenses for fresh fruit were not usually as high for the more direct sales as for the open market, because haulage and containers were sometimes provided by the purchaser; even where haulage costs had to be met, the distances involved were not usually as great. The canning/freezing firms provided both baskets and haulage except in 5 cases, where the growers were involved in some expense. All except 5 of the growers selling fruit for jam manufacture had small expenses for barrels and pails, and in 7 cases there was also a haulage cost.

TABLE 37 MARKETING EXPENSES PER TON OF FRUIT SOLD

Type of sale	Fresh		Canning/ freezing	Jam manuf.
	open market	other sales		
No. cases	7	5	17	25
	£	£	£	£
Punnets, trays	31.2	17.0	0.1	-
Barrels, pails, scales	-	-	-	0.8
Haulage	22.7	6.3	0.2	0.4
Growers' association levy	5.5	-	-	-
Total	£59.4	£23.3	£ 0.3	£ 1.2
Range in total cost - lowest	£30.4	£16.3	£ 0.0	£ 0.0
highest	£83.8	£34.2	£ 1.3	£ 6.0

In 6 cases a charge for cold storage, the largest part of which was the depreciation charge for the cold store, was included in the harvesting cost. This varied from £0.9 to £3.4 per ton, the average for the 6 cases being £1.8.

In Table 38 the marketing expenses and picking costs have been deducted from the average returns for the fruit sold in various ways. (The number of cases in each group is not the same for the marketing expenses and picking costs: the returns refer to the same sample as the marketing expenses.)

TABLE 38 DIFFERENCE BETWEEN FRUIT RETURNS AND HARVESTING COST
PER TON

Type of sale	Fresh		Canning/ freezing	Jam manuf.
	open market	other sales		
	£	£	£	£
Returns	231.1	163.4	154.9	124.3
Marketing expenses (Table 37)	59.4	23.3	0.3	1.2
Returns less marketing exs.	171.7	140.1	154.6	123.1
Picking cost -				
casual labour (Table 36)	34.4	34.4	32.7	25.6
other costs (Table 35)	7.0	7.0	7.0	7.0
Returns less harvesting costs	130.3	98.7	114.9	90.5

The differences between the returns and marketing expenses and the total harvesting costs (picking plus marketing) were highest for the open market fruit, followed by the canning/freezing, other fresh sales and jam in that order.

MARGIN

The margin per acre is the difference between all returns (fruit + canes) and all costs. Although the average was £169 in this sample, it ranged from £46 to £372 per acre. The distribution of the margins is given on the bottom line of Table 39, in which the relationship between the margin and the yield per acre is shown.

TABLE 39 DISTRIBUTION OF PLANTATIONS ACCORDING TO MARGIN AND YIELD PER ACRE

Yield, cwt	Margin, £								
	under 50	50-99	100-149	150-199	200-249	250-299	300-349	350-399	total
20-29			1						1
30-39		2	4	1					7
40-49		1	4	2					7
50-59	1		2	3	1				7
60-69				1		2		1	4
70-79							1		1
80-89					1				1
Total	1	3	11	7	2	2	1	1	28

Yield had a big effect upon the margin per acre because it largely determined the return per acre; growing costs were much the same at all yield levels. This is shown in Table 40.

TABLE 40 COSTS AND RETURNS FOR PLANTATIONS GROUPED ACCORDING TO YIELD PER ACRE

Yield per acre, cwt	20-39	40-59	60-79
No. cases	8	14	5
£	£	£	£
<u>Per acre</u>			
Returns for fruit	254.4	340.0	508.3
Harvesting cost	63.8	108.9	144.9
Difference	190.6	231.1	363.4
Growing cost	77.5	85.2	86.2
Margin	113.1	145.9	277.2
<u>Per ton</u>			
Average return	143.4	137.6	153.9
Harvesting cost	36.0	43.7	44.1
Difference	107.4	93.9	109.8
Percentage sold - fresh	3	15	14
canning/freezing	44	21	55

In Table 41 the results have been grouped according to the margin per acre. This table demonstrates the importance of keeping growing costs at a reasonable level and again illustrates the importance of yield in determining the return and margin per acre. The difference between the return for fruit and the harvesting cost per ton was very similar in all groups; groups 1 and 4 sold a greater proportion in the fresh market and so had higher returns, but these were offset by higher harvesting costs. Any differences in "return per acre less harvesting cost" were thus mainly attributable to differences in yield. Growing costs were much the same in groups 2, 3 and 4, so that yield had a big effect upon the margin also. In group 1, a growing cost which was approximately $1\frac{1}{2}$ times as high as in the other groups, reduced the margin compared with group 2, which had almost the same yield and return.

TABLE 41 PLANTATIONS ARRANGED IN MARGIN PER ACRE QUANTILES

Group	1	2	3	4
Quartile range, £	46-128	131-150	159-192	196-372
No. cases	7	7	7	7
	£	£	£	£
<u>Per acre</u>				
Returns - fruit	303.8	280.7	342.9	507.6
other	0.2	11.6	7.8	8.2
Total	304.0	292.3	350.7	515.8
Harvesting cost	105.8	79.8	95.1	165.7
Difference	198.2	212.5	255.6	350.1
Growing cost	111.3	70.3	74.4	84.1
Margin	86.9	142.2	181.2	266.0
<u>Per ton</u>				
Average returns	144.9	138.9	138.6	149.3
Harvesting cost	48.0	38.6	37.8	47.2
Difference	96.9	100.3	100.8	102.1
Yield per acre, cwt	41.3	40.7	49.6	67.6
Percentage sold - fresh	22	7	7	22
canning/freezing	7	31	30	50

S T R A W B E R R I E S

ESTABLISHMENT

Strawberry establishment was costed on 9 holdings in 1964 and these data have been used with the physical information from earlier costings (1961-63) on a further 17 holdings to draw up an example cost, using 1964 prices. A distribution of the costed acreages is given in Table 1. The size of the individual plantations was usually small, 15 of the cases being under 2 acres, the remainder ranging from 2 to 6 acres.

TABLE 1 DISTRIBUTION OF ESTABLISHMENTS BY SIZE

Acres	under 1.0	1.0- 1.9	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	total
No. cases	6	9	3	1	1	4	2	26

Specified methods were used wherever possible in drawing up the example cost given in Table 2.

TABLE 2 EXAMPLE OF COST OF STRAWBERRY ESTABLISHMENT

PER ACRE

(spring planting @ 36" x 18": approx. first 6 months work)

	Hours		
	man	woman, boy	tractor
<u>Work done</u>			
Applying dung, @ 1.0 m hr, 0.4 w hr and 0.9 t hr per ton	26.6	10.6	23.9
Ploughing, working ground, marking out	11.8	-	11.0
Applying fertiliser by machine @ 0.4 hr per cwt	2.1	-	2.1
Planting by hand	28.5	57.2	0.2
Spraying weedkiller, once by machine	2.1	-	2.1
Care of crop - interrow cultivations hand work	5.1	-	5.1
	33.3	81.7	-
Total	109.5	149.5	44.4
<u>Costs</u>		£	
<u>Materials:</u>			
*runners, 10 thou @ £5		50.0	
dung, 26.6 tons @ £0.875		23.3	
*fertiliser, 5.3 cwt		5.2	
*weedkiller, simazine, 1.6 lb @ £1.6		2.6	
<u>Work:</u>			
*casual - woman @ £0.165		24.7	
regular - man @ £0.310		33.9	
tractor @ £0.225		10.0	
Rent		6.2	
Manurial residues		7.3	
Total		£163.2	
Over 3 years fruiting: charge per year		£ 54.4	

*variable costs, total £82.5

Table 3 shows the distribution of the individual establishment costs for the plantations costed in 1963 and 1964, with all runners charged as if purchased.

TABLE 3 DISTRIBUTION OF 1963 AND 1964 ESTABLISHMENTS
BY COST PER ACRE

£	under 100	100- 119	120- 139	140- 159	160- 179	180- 199	over 200	total
No. cases 1963	-	3	-	4	1	1	1	10
1964	1	-	-	2	3	2	-	8

The average cost for the 1963 group was £156.5 and for the 1964 group £158.8, both of which are slightly below the example cost of £163 given in Table 2.

Runners are the largest single item of cost, being 31 per cent of the total in the example cost. The number of runners used per acre varied very widely as is shown in Table 4.

TABLE 4 DISTRIBUTION OF PLANTATIONS ACCORDING TO NUMBER
OF RUNNERS USED PER ACRE

Thousand	6	7	8	9	10	11	12	13	14	15	16	17	n.a.	total
No. cases	1	1	3	2	11	-	2	-	-	1	1	1	3	26

It may be possible for the grower to reduce the cost of runners by growing them himself and, sometimes, to make extra income by sales of runners. Information on runner production was scanty in these costings, but it appears that up to 400 thousand runners per acre may be lifted from a plantation intended for fruiting, although 120 to 200 thousand is a more usual number. The time digging runners averaged 9.5 hours per thousand. Some extra cleaning costs were incurred because hand weeding was necessary once the runners started to grow.

Reduction of cleaning costs is perhaps best achieved by planting on really clean land. In the example given the cleaning cost was £25.6 per acre, that is 16 per cent of the total cost, but in individual cases it was more than double this amount. Amongst the individual 1963 and 1964 costs, the cleaning cost ranged from £29 to £59 per acre where weedkiller was used, averaging £41, and from £8 to £64 where no weedkiller was used, averaging £29.

When considering which method of weed control should be used in the example cost it was found that on 7 of the 9 plantations costed in 1964 weedkiller had been used and also that it was used by 12 out of 19 growers questioned about their growing methods in the same year. As the use of weedkiller was the most common practice this method was chosen, although there was no advantage in cost in the small sample available. Details of the time taken to clean plantations by different methods are given for interest in Table 5. The hand work included the time spent filling blanks but not deflowering. (Only 4 plantations were deflowered, the time spent on this operation was between 10 and 13 hours per acre in 3 cases and

25 hours in the other case.)

TABLE 5 CLEANING TIME PER ACRE

	No. cases	Hours						
		Interrow		Hand	Spraying		Total	
		manual	tractor	manual	manual	tractor	manual	tractor
<u>Tractor used for interrow work</u>								
Weedkiller - used	6	5.1	5.1	115.0	3.0	3.0	123.1	8.1
not used	9	4.7	4.5	117.8	-	-	122.5	4.5
<u>Hand rotary used for interrow work</u>								
Weedkiller - used	5	10.5	10.5	123.7	*2.5	2.5	136.7	13.0
not used	3	30.7	30.7	102.3	-	-	133.0	30.7

* average of 3 cases only: work done by contract in 2 cases

Planting by hand cost £18.7 in the example cost, 11.5 per cent of the total cost. This cost can be reduced by using a machine if the acreage to be planted and the saving of labour at that particular time of year warrant it. For example, a 3 unit planter and a team of 1 man, 1 tractor and 5 or 6 women can plant 8 to 16 thousand runners in a 7 hour day, depending on soil conditions. Assuming a cost of £134 for the planter, with a life of 5 years, a few repairs and 10 acres to plant each year, the costs per acre might be as follows:-

Speed of planting per day (7 hr)	8 thou	12 thou
	£	£
Depreciation planter	2.7	2.7
Repairs - say	0.3	0.3
Planting @ 10 thou per acre -		
woman @ £0.165	48.4 hr 8.0	32.1 hr 5.3
man @ £0.310	8.8 hr 2.7	5.8 hr 1.8
tractor @ £0.225	8.8 hr 2.0	5.8 hr 1.3
Total	<u>£15.7</u>	<u>£11.4</u>

Thus at the slowest speed there could be a saving of £3 per acre; at an average speed the saving could be £7.

FRUITING STRAWBERRIES

THE SAMPLE

Fourteen fruiting plantations were costed in 1964. The average size of plantation was 3.39 acres of fruit with 0.27 acres of associated endrign and roads. The size of the individual plantations, excluding endrigns, is shown in Table 6(a). The average age of the plantations was 3.0 years. The distribution of the plantations according to their average age is shown in Table 6(b) and the proportions of different ages and varieties in Table 7.

TABLE 6 DISTRIBUTION OF PLANTATIONS ACCORDING TO:-

(a) Area of fruit

Acres	under 1.0	1.0- 1.9	2.0- 2.9	3.0- 3.9	4.0- 4.9	5.0- 5.9	6.0- 6.9	7.0- 7.9	8.0- 8.9	total
No. cases	2	5	1	-	2	-	2	1	1	14

(b) Average age

Years	2.0-2.4	2.5-2.9	3.0-3.4	3.5-3.9	4.0-4.4	total
No. cases	3	3	4	2	2	14

TABLE 7 AVERAGE PROPORTION IN PLANTATIONS OF:-

(a) Different ages

Years	2	3	4	5	over 5	total
Per cent	44	23	27	2	4	100

(b) Different varieties

Variety	Talisman	Red Gauntlet	Cam. Favourite	Cam. Vigour	Merton Princess	Mixed	total
Per cent	28.4	25.9	21.7	7.9	1.9	14.2	100.0

AVERAGE RESULTS

Table 8 gives the average results for the whole sample and the ranges found in the individual items of cost where these were incurred. On average the growing cost was 38 per cent and the harvesting cost 62 per cent of the total, £346.5 per acre. Deducting this from the returns for fruit (£495.0) and runners (£23.5) leaves a margin of £153.9 per acre.

TABLE 8 AVERAGE COSTS AND RETURNS FOR 14 FRUITING
STRAWBERRY PLANTATIONS, PER ACRE

	Average	Range in cost where incurred		
		no. cases	lowest	highest
<u>Growing cost</u>	£		£	£
Materials:				
dung, 0.2 ton	0.3	1		3.8
fertiliser, 5.8 cwt	8.7	13	1.5	36.9
straw, 1.2 ton	10.3	12	4.0	69.2
weedkiller	2.8	6	2.5	11.0
other sprays	0.8	4	1.4	6.7
water	0.9	2	3.0	9.2
Work:				
casual labour	24.8	11	10.6	67.6
regular labour	27.5	14	0.4	86.8
unallocated labour	2.0	1		28.0
tractor	2.3	13	0.2	7.0
hand rotary	1.6	6	0.7	5.9
Rent	7.7	14	2.3	16.1
Share of establishment	49.7	14	24.0	99.5
Total	£139.4			
<u>Harvesting cost</u>				
Materials:				
punnets, trays	49.5			
barrels, pails, scales	0.1			
Haulage on fruit	25.1			
Growers' association levy	5.7			
Work:				
casual labour (incl. transport etc.)	90.1			
regular labour	22.3			
unallocated labour	28.8			
tractor	0.5			
Cold store	2.5			
Total	£224.6			
<u>Growing + harvesting cost</u>	£364.0			
<u>Returns</u>		<u>% by wt.</u>	<u>cwt</u>	
Fruit:				
fresh		74	39.55	413.2
canning/freezing		25	13.71	79.0
house		1	0.38	2.8
total fruit		100	53.64	495.0
Runners			4.7thou	23.5
Total	£518.5			
<u>Margin</u>	£154.5			

A comparison of the 1963 and 1964 crops on 11 holdings which were costed in both years is given in Table 9. The average growing cost was higher by £19 per acre in 1964, due mainly to a higher labour cost (+£12.0) and partly to more fertiliser being used (+£3.1) and a higher charge for share of establishment cost (+£3.8). An increase in weedkiller use (+£1.9) was balanced by an equal reduction in the cost for straw. The harvesting cost per ton was also higher in 1964, partly because a larger proportion of the fruit was sold fresh. Although returns per ton were the same in both years for fresh fruit and slightly lower for canning fruit in 1964, a larger proportion of the fruit was sold fresh in that year, so that the average return per ton was £14 higher than in 1963. The yield was up by 2 cwt per acre in 1964 and this, combined with the increased returns per ton, gave returns per acre which were £66.9 higher. This did not quite compensate for the increases in growing and harvesting costs, the margin of fruit returns over all costs being £4.5 per acre lower in 1964 than in 1963.

TABLE 9 HOLDINGS COSTED IN 1963 AND 1964

	1963	1964
Acres fruiting strawberries	3.54	3.60
Average age of plantations, years	3.0	3.1
<u>Per acre</u>	£	£
Growing cost	121.2	140.2
Harvesting cost	138.6	191.0
Total	£259.8	£331.2
Returns for fruit	£408.5	£475.4
Margin of fruit returns over total cost	£148.7	£144.2
Yield, cwt	48.08	50.27
Percentage sold fresh	62	72
canning	33	27
<u>Per ton</u>	£	£
Harvesting cost	67.4	74.2
Returns for fruit	168.3	182.2
Margin of fruit returns over harvesting cost	£100.9	£108.0
Return per ton sold fresh	£207.7	£207.2
canning	£119.1	£116.6

GROWING COSTS

Total growing costs in 1964 ranged from £76 to £255 per acre, averaging £139. The distribution of this cost is given in Table 10.

TABLE 10 DISTRIBUTION OF PLANTATIONS ACCORDING TO TOTAL GROWING COST PER ACRE

£	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250-274	total
No. cases	4	3	1	2	2	1	-	1	14

The average amounts of work done are given in Table 11. The monthly distribution of labour use was available in 7 cases and this is given in Table 12.

TABLE 11 AVERAGE LABOUR AND TRACTOR WORK PER ACRE

	Hours			
	man	woman, boy	tractor	hand rotary
Autumn	31.0	53.3	2.8	1.9
Spring	70.5	83.2	7.6	5.3
Total	101.5	136.5	10.4	7.2
Picking	80.8	69.6*	2.4	-

* plus piecework which cost £64.1

TABLE 12 MONTHLY LABOUR USE IN 7 CASES, HOURS PER ACRE
(picking excluded)

Type	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	total
man	8.8	4.3		4.7	3.3	1.5	2.4	7.6	22.1	10.6	28.4	0.3	94.0
woman	19.8	2.3		2.0	8.2	15.4	0.8	22.5	51.4	31.3	49.6	2.9	206.2
tractor	0.9	1.7		0.9		0.7	0.8	0.4	2.3	2.5	3.2		13.4
rotary	2.7	1.2						1.8	1.3	2.9			9.9

The times recorded for various operations other than cleaning, where these were distinguishable, are given in Table 13.

TABLE 13 JOB TIMES PER ACRE

Job	No. cases	Hours		
		man	woman, boy	tractor
Cut, remove leaves and straw, by machine	8	2.0		2.0
Cut leaves by hand	2	13.4		
Straw	10	21.2	35.5	1.7
Spray weedkiller by machine	4	1.8		1.8
Other sprays by machine	4	2.1		2.1

The time spent cleaning the plantations was identifiable on the 6 plantations which used weedkiller and on 6 of the 8 plantations which did not. The times spent on this job and the costs are given in Table 14, and also the distribution of the individual cleaning costs. It will be seen that there was a very wide range in the cost per acre and that, in this particular sample, some of the weedkiller users had the highest costs. It should be emphasised, however, that this is a very small sample and that there is no information about the cleanness of these plantations before or after the season's work.

TABLE 14 CLEANING OF PLANTATIONS

(a) Hours per acre

Season	Weedkiller used (6 cases)						Weedkiller not used (6 cases)					
	interrow			hand			interrow			hand		
	m	t	rh	m	w	t	m	t	rh	m	w	t
Autumn	4.2	1.0	3.2	9.0	27.0	-	4.4	1.4	1.7	11.7	19.8	0.9
Spring	11.9	3.7	8.2	45.2	69.1	0.1	14.7	7.3	4.0	25.3	77.9	-
Total	16.1	4.7	11.4	54.2	96.1	0.1	19.1	8.7	5.7	37.0	97.7	0.9

(b) Cost per acre

	Weedkiller	
	used	not used
No. cases	6	6
Acreage fruit	3.70	3.16
Average age of plantations, years	3.1	3.2
	£	£
Cost of cultivations - interrow	12.4	8.9
hand	27.1	27.6
total	39.5	36.5
weedkiller - application	1.7	-
material	6.5	-
Total	£47.7	£36.5

(c) Distribution of plantations according to cleaning cost per acre

£	under 10	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	n.a.	total
No. cases											
Weedkiller - used	1	1	-	-	1	-	2	-	1	-	6
not used	1	-	1	1	2	1	-	-	-	2	8

YIELD

The yield varied from 18.8 cwt to 100.0 cwt per acre, the average being 53.6 cwt. The distribution is given in Table 15.

TABLE 15 DISTRIBUTION OF PLANTATIONS ACCORDING TO YIELD
PER ACRE

cwt	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100	total
No. cases	2	1	1	2	2	1	4	-	-	1	14

RETURNS

The level of returns per acre depended firstly on yield per acre and secondly upon return per ton, the latter being affected by the types of sale made. In 1964 no grower in the sample sold any fruit for jam manufacture, the whole crop being sold in the fresh market or for freezing or canning. All the growers in the sample sold some fruit fresh and the average price received for this fruit was £202.6 per ton, ranging from £119.1 to £266.1. (See Table 16(a).) Open market sales (via wholesale market) were more remunerative than other, more direct, sales. Fruit was sold for processing by 8 growers and averaged £116.9 per ton, ranging from £105 to £125. (See Table 17(b).)

TABLE 16 DISTRIBUTION OF PLANTATIONS ACCORDING TO PRICE
RECEIVED FOR FRUIT PER TON

(a) Sold in fresh market

£	under 120	120-139	140-159	160-179	180-199	200-219	220-239	240-259	260-279	total
No. cases:										
Open market	-	-	-	-	1	2	-	3	1	7
Other sales	1	-	2	-	3	1	-	-	-	7

(b) Sold for processing

£	100-109	110-119	120-129	total
No. cases	2	1	5	8

The proportions of the crop sold in different ways by the individual growers are shown in Table 17. The average proportions for the whole sample were 74 per cent in the fresh market and 25 per cent for processing.

TABLE 17 DISTRIBUTION OF PLANTATIONS ACCORDING TO PROPORTION OF THE CROP SOLD IN VARIOUS WAYS

(a) Sales to fresh market

Per cent	nil	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100	total
No. cases	-	1	1	-	-	1	1	-	1	3	3	3	14

(b) Sales for processing

Per cent	nil	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100	total
No. cases	6	1	2	1	-	-	2	-	-	1	1	-	14

The average return per ton for the whole sample was £176.4, ranging from £107.0 to £237.9. The distribution of the average return per ton for the individual plantations is given in Table 18.

TABLE 18 DISTRIBUTION OF PLANTATIONS ACCORDING TO THE AVERAGE RETURN PER TON

£	100-119	120-139	140-159	160-179	180-199	200-219	220-239	total
No. cases	2	1	3	-	3	2	3	14

As in 1963, the range in returns per acre was widest for those selling in the fresh market, but for both types of sale increasing returns went with increasing yield per acre. The effect of yield upon returns per acre is shown in Table 19. The range in returns for fruit per acre was from £112 to £876.

TABLE 19 DISTRIBUTION OF PLANTATIONS ACCORDING TO YIELD AND RETURNS PER ACRE

£	100-199	200-299	300-399	400-499	500-599	600-699	700-799	800-899	total
<u>Yield, cwt</u>									
under 20	2								2
20-39		2 [‡]							2
40-59		1 [‡]	1*	2					4
60-79						1	2*	2	5
80-99									
100-119							1		1
Total	2	3	1	2		1	3	2	14

‡ represents 1 case where more than 75 per cent fruit sold for processing
 * " " " " approx. 50 " " " " " "

HARVESTING COSTS

The cost of containers and haulage for fresh fruit are given in Table 20 for 2 types of sale, i.e. open market sales and other, more direct, sales. (The open market sales were in Scotland and the north of England.) No such expenses were incurred for processing fruit as the firms concerned provided both containers and haulage. The table shows that if the marketing expenses are deducted from the returns, fruit sold on the open market left a higher margin than the other fresh sales although the expenses were higher, and that the latter left a better margin than the processing sales.

TABLE 20 MARKETING EXPENSES PER TON OF FRUIT SOLD

Type of sale	Processing	Fresh	
		other sales	open markets
No. cases		7	7
	£	£	£
Haulage	-	21.6	33.5
Punnets, trays	-	4.2	21.1
Growers' association levy	-	-	6.3
Total	-	£ 25.8	£ 60.9
Returns for fruit	116.9	172.7	232.6
Margin of fruit returns over marketing expenses	£116.9	£146.9	£171.7

On only 3 of the 8 holdings where fruit was picked both for processing and for sale fresh was there a difference in the rates paid for picking the fruit on piecework. (This difference was $\frac{1}{2}$ d. per lb in 2 cases and between $\frac{1}{2}$ d. and 1d. in the third case.) Of those who paid the same rate whether the fruit was picked into baskets or punnets, 4 growers paid their workers by the hour and the rest by the lb. As the cost of picking fruit for processing was very similar to that for the fresh fruit, details of the labour cost are given together, excluding 2 cases where the costs were abnormally high due to having to search for the fruit in very weedy plantations. (See Table 21.) If these 2 costs are included, the average total picking cost was £58.8 per ton.

TABLE 21 AVERAGE PICKING COST PER TON OF ALL FRUIT
(12 cases)

	£
Casual labour (hourly + piecework)	26.3
Pickers' transport and miscellaneous	0.9
Regular labour (ordinary + O.T.)	7.1
Unallocated regular and casual	6.7
Tractor	0.2
Total	£41.2

The variation in the cost of the labour for picking is shown in Table 22. The range was from £23 to £198 per ton. Tractor work was recorded in 6 cases.

TABLE 22 DISTRIBUTION OF PLANTATIONS ACCORDING TO TOTAL COST OF REGULAR AND CASUAL LABOUR AND TRACTOR WORK PER TON

£	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100 & over	total
No. cases	3	3	3	2	-	-	1	-	2*	14

* both weedy plantations

Cold stores were not necessarily used even where they were available, although a depreciation charge was allocated to the fruit enterprise subject to deductions for other uses. A charge was made in 6 cases, ranging from £0.7 to £9.4 per ton, the average charge for these 6 cases being £3.2 per ton.

MARGINS

The variation in the margin between the returns for fruit and the harvesting cost per ton was wide as is shown in Table 23.

TABLE 23 DISTRIBUTION OF PLANTATIONS ACCORDING TO DIFFERENCE BETWEEN FRUIT RETURNS AND HARVESTING COST PER TON

£	loss	0-24	25-49	50-74	75-99	100-124	125-149	150-174	total
No. cases	1*	-	2*	1	3	1	4	2	14

* 1 weedy plantation

The margin between all costs and all returns ranged from -£271 to +£583 per acre, the average being +£154. This margin was strongly influenced by yield. The distribution of these margins according to yield is shown in Table 24.

TABLE 24 DISTRIBUTION OF PLANTATIONS ACCORDING TO MARGIN
AND YIELD PER ACRE

Margin, £	-			+						total
	299-200	199-100	99-0	0-99	100-199	200-299	300-399	400-499	500-599	
Yield, cwt										
10-19	1			1						2
20-29			1							1
30-39				1*						1
40-49			1	1						2
50-59				1*	1*					2
60-69						1				1
70-79						1		2*	1	4
80-89										
90-99										
100					1					1
Total	1	-	2	4	2	2	-	2	1	14

* represents 1 case with 50 per cent or more of fruit sold for processing

In Table 25 the average results for various yield groups are shown. Group A had a growing cost a little above the average for the whole sample (£139 per acre). Although the average return per ton in this group was low, the harvesting cost per ton was also low, resulting in a difference between fruit returns and the harvesting cost of £103 per ton. However,

TABLE 25 COSTS AND RETURNS FOR PLANTATIONS IN VARIOUS
YIELD GROUPS

Yield per acre, cwt	A under 40	B 40 - 59	C 60 & over
No. cases	4	4	6
<u>Per acre</u>			
Yield, cwt	24.0	47.5	77.5
	£	£	£
Growing cost	149.8	127.3	140.5
Harvesting cost	101.3	195.0	328.0
Total cost	251.1	322.3	468.5
Returns for fruit runners	175.9 3.6	387.7 -	779.4 52.4
Margin	-71.6	65.4	363.3
Percentage sold fresh canning	73 24	62 38	82 18
<u>Per ton</u>	£	£	£
Return sold fresh canning	163.8 120.0	203.1 105.6	228.3 122.5
Average return	146.7	167.9	204.8
Harvesting cost	43.6	87.1	84.0
Margin of fruit returns over harvesting cost	103.1	80.8	120.8

because the yield was low there was a loss per acre after the growing costs had been deducted. In group B the growing cost per acre was below the average for the whole sample; the return per ton for fresh fruit was higher than for group A and the average return per ton (all fruit) was higher even though the return per ton for canning fruit was lower and a larger proportion of the crop was sold for processing. The harvesting cost per ton in group B was double that of group A; thus the difference between the returns for fruit and the harvesting cost was only £81 per ton but, with the higher yield, group B was left with a profit per acre after growing costs had been covered. Group C had the highest growing cost per acre, partly attributable to runner production. The harvesting cost per ton was much the same as in Group B, but a larger proportion of the crop was sold fresh and returns per ton were higher for all fruit, so that the difference between returns and harvesting cost was £121 per ton. This, together with the higher yield per acre, gave a return per acre for fruit which was double that of group B.

BLACKCURRANTS

Small acreages of fruiting blackcurrants were costed on 4 holdings in 1963 and 1964 and, although this is a very small sample, the results are given as it is thought that they may be of some interest. The plantations were mostly 4 years old in 1963 and were all under 2 acres in size; the varieties grown were Seabrook Black, Amos Black and Goliath. A summary of the costs and returns for both years is given in Table 1.

TABLE 1 COSTS AND RETURNS FOR 4 FRUITING PLANTATIONS

	1963			1964		
	Range lowest	highest	Average	Average	Range lowest	highest
<u>Per acre</u>						
Yield, cwt	9.0	43.7	23.8	18.7	8.9	37.3
	£	£	£	£	£	£
Growing cost	36	134	87.0	109.0	78	138
Harvesting cost	59	94	76.1	82.4	48	128
Total	124	192	163.1	191.4	130	265
Returns (all sold fresh)	107	364	266.2	213.1	93	419
Margin	-74	+209	103.1	21.7	-68	+129
<u>Per ton</u>						
Returns	167	280	236.6	222.6	181	279
Harvesting cost	43	141	79.2	96.0	68	125
Difference	97	189	157.4	126.6	90	156

It will be seen that there was a wide range in yields, costs and returns and, consequently, in margins.

The largest part of the growing cost was the labour and tractor work which, on average, cost £36 per acre in 1963 and £46 in 1964, ranging from about £8 to £86 in both years. The times spent on both the major jobs - pruning and cleaning - varied widely. In both years rent was about £11 per acre on average, manures (F.Y.M. + fertilisers) nearly £18 and the share of establishment charge £22. Sprays, mulches and irrigation were used by 2 growers in 1963 (the individual costs being £4.4 and £6.6 per acre) and by only 1 grower in 1964 (£41.4).

The variation in the harvesting cost per ton was due to variations in both the marketing expenses and the picking costs. Where containers were supplied by the grower they cost £13 per ton in 1963, £19 in 1964. Haulage costs varied from about £2 to £19 in both years. Total marketing expenses varied from £3 to £20 in 1963 and from £2 to £31 in 1964. The picking cost (casual + regular labour) varied from £23 to £125 in 1963 and from £48 to £106 in 1964. In only 1 case was the work partly paid for on a piecework basis.

GOOSEBERRIES

Information on gooseberries was collected from 6 holdings for 1 or more years between 1961 and 1964. The average costs and returns for 5 plantations costed in 1964 are given in Table 1. In 3 cases the variety grown was Careless, in 1 case Leveller and in 1 case an unnamed local variety. All the plantations were mature, i.e. 5 years old or more. The number of bushes per acre varied from 1148 to 2500.

TABLE 1 AVERAGE AND RANGE OF COSTS AND RETURNS IN 1964

(5 cases)

	Average	Range where relevant	
		lowest	highest
<u>Per acre</u>			
Yield	53.5 cwt	13.0 cwt	133.5 cwt
	£	£	£
Returns - fruit	234.4	45.7	585.0
cuttings	2.1	-	10.6
total	236.5	45.7	585.0
Harvesting cost	67.1	12.4	152.2
Difference	169.4	33.3	462.5
Growing cost	147.5	75.1	390.0
Margin	21.9	-41.8	+72.5
<u>Per ton</u>			
Return for fruit	80.9	64.5	112.0
Harvesting cost	24.0	13.6	50.8
Difference	56.9	50.9	69.2

It will be seen from Table 1 that these averages cover a wide range of both growing and harvesting costs as well as yields and returns per ton. Almost half of the growing cost was attributable to the cost of the work done in the plantations - on average, pruning cost £25.7 (ranging from £7.7 to £60.0) and cleaning or mulching plus the application of manures and sprays cost £54.2 per acre (ranging from £5.5 to £179.5). Manures (F.Y.M. + fertilisers) cost £12.6 on average (ranging from £1.7 to £25.0), weedkillers used on 4 plantations averaged £14.6 (ranging from £5.8 to £30.0) and other sprays cost £5.0 on average (ranging from £2.6 to £8.6) per acre. In 1 case mulching material cost £65 per acre and in another case irrigation cost £7.7. Rent averaged £10.6 and the share of establishment charge £13.2.

Most of the harvesting cost was attributable to labour - casual, pickers' transport and regular, totalling £20.4 per ton on average. The incidence of costs for haulage and containers varied.

Returns for fruit in 1964 varied from £70 to £112 per ton for fruit sold fresh (4 cases) and were £65 and £70 where sold for canning (2 cases). The difference between fruit returns and harvesting costs was about £51 per ton in 3 cases, £61 and £69 respectively in the other cases. The price paid for canning fruit had been higher in earlier costings - £90 (1 case) in 1963, £80 (1 case) in 1962 and £70 (1 case) in 1961. Returns for fresh fruit in 1963 had been £83 and £112 in 2 cases, in 1962 £80 in 1 case, and in 1961 £65 and £74 in 2 cases.

TABLE 2 GROSS MARGINS FOR STRAWBERRIES

Spring planted @ 36" x 18" : 1 year establishment, 3 years fruiting			
Type of sale		Open market: N. of England	Canning
Yield, cwt per acre		50	50
		£	£
Price per ton		303.0	117.6
<u>Per fruiting acre</u>			
Annual output		757.5	294.0
Variable costs		331.7	127.3
Gross margin		<u>£425.8</u>	<u>£166.7</u>
<u>Per acre establishment</u>			
Variable costs			£93.5
<p>With a continuing strawberry enterprise the gross margin per acre of all land used for strawberries may be calculated e.g. 4 acre enterprise:-</p>			
<u>Variable costs</u>			
Establishment	1 acre	93.5	93.5
Fruiting	3 acres	995.1	381.9
Total		<u>£1088.6</u>	<u>£475.4</u>
<u>Output</u>			
Fruiting	3 acres	2272.5	882.0
<u>Gross margin</u>			
Total for 4 acres		1183.9	406.6
per acre estab. + fruiting		296.0	101.7

SUMMARY

1. Physical data on raspberry establishment collected from 35 growers between 1961 and 1964 were used to draw up example costs, using 1964 prices for the inputs. Planting singly at 6' x 2' costs other than canes amounted to £67.2 per acre for the first year. The cane cost for certified standard Jewel was £36.0.
2. For 11 uncropped second year plantations the example cost was £53.2 per acre.
3. The example cost of posting and wiring was £28.5 per acre.
4. Twenty-two cropped second year plantations gave an example growing cost of £33.4 per acre. The average yield of 11.1 cwt fruit gave a calculated return of £76.4 and a margin of £57.3 per acre between returns and picking cost.
5. Example disestablishment costs were £8.1 per acre using a rotovator, and £16.7 when the canes were collected and burnt.
6. The total example cost for establishment and disestablishment to be set against the expected fruiting life of the plantation was £129.2 per acre. If the fruiting life is taken as 6 years the charge per year was £21.5 per acre.
7. Twenty-eight fruiting raspberry plantations were costed in 1964; the average size was 8.11 acres of fruit with 0.79 acres of associated endrig etc., and the average age was 5.7 years. The average yield was 49.8 cwt per acre and this was the main factor affecting returns and net margin per acre. The average return per ton was £204.4 for fruit sold in the fresh market, £154.9 for canning/freezing and £124.3 for jam manufacture. The average returns per acre were £360.5 for fruit and £7.0 for canes; growing costs were £85.0 and harvesting costs £113.4, leaving a margin of £169.1 per acre.
8. In an identical sample of 24 fruiting raspberry costs the yield was 4 cwt per acre higher in 1964 than in 1963 and a slightly higher proportion of the crop was sold fresh or for canning/freezing; the result was an increased margin of £8 per acre, in spite of higher costs in 1964. (The growing cost was £5 per acre higher in 1964 and the harvesting cost £1 per ton higher.)
9. Physical data on strawberry establishment collected from 26 growers between 1961 and 1964 were used to draw up an example cost using 1964 prices. Planting at 36" x 18" establishment cost £163.2 per acre; this gave an annual charge of £54.4 if the expected fruiting life of the plantation was 3 years.
10. Fourteen fruiting strawberry plantations were costed in 1964; the average size was 3.39 acres of fruit with 0.27 acres of associated endrig etc.; the average age was 3.0 years. The average yield was 53.6 cwt per acre and this was the main factor affecting returns and margin per acre. Average returns per acre were £495.0 for fruit and £23.5 for runners; growing costs were £139.4 and harvesting costs £225.2, leaving a margin of £153.9 per acre.

11. Examples of variable costs and gross margins were built up for raspberries and strawberries using 1963 and 1964 physical data and 1964 values. For raspberries the gross margins per fruiting acre were £354 for fruit sold in the open markets in the north of England, £257.5 for canning/freezing, and £203.8 for jam manufacture. Per acre of the whole enterprise (i.e. fruiting + establishment) the gross margins were £259.6, £187.3 and £147.0 for the same 3 categories of sale. For strawberries the gross margins per fruiting acre were £425.8 for fruit sold in open markets in the north of England, and £166.7 for canning/freezing. Per acre of the whole strawberry enterprise the gross margins were £296.0 and £101.7.
12. No conclusions can be drawn from the small diverse samples of blackcurrant and gooseberry costs.

APPENDIX I

COSTING METHOD

Labour

Casual work was charged at cost.

Regular workers were charged at hourly rates calculated from the wages paid; plus perquisites, employer's contribution to insurance etc., adjusted for paid holidays, sick leave etc. Overtime was charged at the rates paid.

Family labour was charged at the same rates as hired labour.

Power

Wheeled tractors were charged at 4s.6d. per hour.

Power rotovators etc. were also charged at 4s.6d. per hour.

Horses were charged at 2s. per hour.

Manures

Dung was charged at 17s.6d. per ton (unless it was purchased, when it was charged at cost) plus the cost of application.

Lime was charged at net cost plus the cost of application.

All other manures were charged at net cost on the holding. (Application of these is included in cultivation costs.)

Manurial residues

For fruit establishment, residual values were calculated according to the recommendations of the Scottish Standing Committee, as set out in the fourteenth report "Residual values of fertilisers and feeding-stuffs" and charged in full. No residues were allowed after the first year.

Proportion of cost chargeable to:-

	<u>1st crop</u>	<u>2nd crop</u>	<u>3rd crop</u>	<u>4th crop</u>
1. Dung	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$
2. Compound Manures	$\frac{2}{3}$	$\frac{1}{6}$	$\frac{1}{6}$	-
3. Inorganic Nitrogenous Manures	$\frac{1}{2}$	-	-	-
4. Phosphates	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$
5. Potash	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{1}{4}$	-
6. Lime	$\frac{1}{7}$ of net cost for 7 years			
7. Grassland	Where fruit was planted after ploughed grassland, a value was put on this grass according to the following scale and the charge spread over 4 years as for dung.			

Ploughed after	1 year	38s. per acre
"	"	2 years 52s. " "
"	"	3 years 60s. " "
"	"	4 years 71s. " "
"	"	5 years 80s. " "
"	"	6 years 88s. " "
"	"	6 years+ 88s. " "

Rent

This was charged at cost where the land was tenanted and at a reasonable estimate of actual rental value where owner-occupied.

Special equipment

Cold stores were depreciated at 10 per cent and small equipment (pails, barrels, scales) at rates agreed with the individual growers, varying from 5 to 33 per cent.

General overheads

No charge was made.

APPENDIX II

VARIABLE COSTS

I RASPBERRIES

Type of sale	<u>Open market</u> (N. of England)	<u>Canning</u>	<u>Jam manuf.</u>
	£	£	£
<u>Annual variable costs per fruiting acre</u>			
Fertiliser - 6 cwt	7.6	7.6	7.6
*Weedkiller - simazine, band-sprayed, 2 lb @ £1.65	3.3	3.3	3.3
Antibeetle spray	1.3	1.3	1.3
Twine - 15 lb	2.8	2.8	2.8
Miscellaneous	0.5	0.5	0.5
Casual labour: prepicking			
winter work 16 hr @ £0.165	2.6	2.6	2.6
piecework	3.7	3.7	3.7
cleaning 21 hr @ £0.165	3.5	3.5	3.5
piecework	0.4	0.4	0.4
‡Casual labour: picking @ £34.4 per ton @ £26.2 per ton	80.8	80.8	-
Containers: punnets, 73½ gross ½ lb @ £0.4	29.4	-	-
trays, 705 x 7½ lb @ £0.067	47.2	-	-
barrels, pails	-	-	1.0
Haulage by road @ 3d. per lb	65.8	-	-
+Growers' assoc. levy @ 1d. per lb	22.0	-	-
Total	£270.9	£106.5	£88.3
<u>Variable costs for establishment per acre</u>			
<u>First year</u>			
Fertiliser - 5 cwt @ £0.97		£	4.8
Canes (purchased) - 3.6 thou @ £10			36.0
Weedkiller - simazine, 4 lb @ £1.65			6.6
Casual labour: planting 11 hr @ £0.165			1.8
cleaning 19 hr @ £0.165			3.1
Total			£52.3
<u>Second year - part crop</u>			
		<u>Canning</u>	<u>Jam manuf.</u>
‡Posts - 192 @ £0.1		19.2	19.2
‡Wire (2) - 3.5 cwt @ £4.2		14.7	14.7
Fertiliser - 6 cwt		6.8	6.8
Weedkiller - simazine, 2 lb @ £1.65		3.3	3.3
Antibeetle spray		0.9	0.9
Twine - 6 lb		1.4	1.4
Casual labour: prepicking			
winter 2 hr @ £0.165		0.3	0.3
cleaning 11 hr @ £0.165		1.8	1.8
‡Casual labour: picking @ £34.4 per ton @ £26.2 per ton		18.9	-
		-	14.4
Total		£67.3	£62.8
<u>Value of second year output (11 cwt)</u>		£85.3	£68.2

* may use overall spray @ 4 lb per acre.

‡ this includes pickers' transport and any miscellaneous pickers' costs.

+ voluntary membership.

‡ these items usually last for more than 8 yrs., the average life of posts being 12 yrs., and wire 16 yrs. - the charge against one plantation may therefore be reduced.

II STRAWBERRIES

	Open market (N. of England)	Canning
	£	£
<u>Annual variable costs per fruiting acre</u>		
Fertiliser - 4.5 cwt @ £0.8	3.6	3.6
Weedkiller - simazine, 1.8 lb @ £1.65	3.0	3.0
[±] Disease control - metasystox, 24 fl.oz. @ £0.1	2.4	2.4
*Straw - 2 ton @ £6.9	13.8	13.8
Casual labour: prepicking		
hoe 78 hr) @ £0.165	18.2	18.2
straw 32 hr)		
[≠] Casual labour: picking @ £46.3 per ton	115.8	-
@ £34.5 per ton	-	86.3
Containers: punnets, 78 gross $\frac{1}{2}$ lb @ £0.4	31.2	-
trays, 750 x $7\frac{1}{2}$ lb @ £0.067	50.3	-
Haulage by road @ 3d. per lb	70.0	-
Growers' assoc. levy @ 1d. per lb	23.4	-
Total	<u>£331.7</u>	<u>£127.3</u>
 <u>Variable costs for establishment per acre</u>		
		£
Fertiliser - 6 cwt @ £0.97		5.8
Runners (purchased) - 10 thou @ £5		50.0
[±] Weedkiller - teneran, 1 x 8 lb @ £1.1		8.8
simazine, 1 x 1.5 lb @ £1.65		2.5
Casual labour: plant 59 hr)		26.4
hoe 101 hr) @ £0.165		
Total		<u>£93.5</u>

[±] crops other than those for canning may also be sprayed against botrytis etc.

* this operation may be omitted with erect varieties intended for canning.

[≠] includes cost of transport for pickers and any miscellaneous costs e.g. dormitories, drinks.

⁺ either weedkiller may be used 1X or 2X on its own, or none may be used.

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