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*Flowers
Cost of
production*

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THE COST OF FORCING TULIPS AND NARCISSI DURING THE 1953-54 SEASON

**DEPARTMENT OF AGRICULTURAL ECONOMICS
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THE COST OF FORCING TULIPS AND NARCISSI DURING THE 1953-54 SEASON.

K. A. INGERSENT, M.S.

Department of Agricultural Economics
University of Nottingham School of Agriculture
Sutton Bonington, Loughborough.

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PREFACE

This report embodies the second year's results of an investigation into the costs of forcing tulips and narcissi.

Although the number of growers taking part in the investigation was slightly greater than in the first year, the group is still far too small to be truly representative of bulb forcing in the East Midlands, or any wider area. Extreme caution must therefore be exercised in drawing any general conclusions from the experience of these growers. Nevertheless, it is hoped that there is enough common ground amongst the co-operating growers to make comparisons of the results obtained by the individuals composing the group useful and that each individual may gain something from the experience of the others.

In conclusion, we wish to acknowledge the very generous co-operation of the participating growers, some of whom have now been supplying information for two years.

K. A. I.

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THE COST OF FORCING TULIPS AND NARCISSI DURING THE 1953-54 SEASON

INTRODUCTION

Nine growers took part in this investigation during the season under review. Three of these supplied details of forcing tulips and narcissi, four of tulips only, and two of narcissi only. There are, therefore, seven records of tulips and five records of narcissi.

The nine holdings to which these costings relate are scattered over a wide area comprising Lincolnshire, Nottinghamshire, Leicestershire and Rutland.

Size of the Enterprise

The size of the bulb-forcing enterprise may be measured in terms of the weight or number of bulbs forced. The following table shows the number of tulips and weight of daffodils forced and costed on the holdings included in the investigation.

Nursery Code Number	Quantity of bulbs forced	
	Tulips	Narcissi
	000's	cwts.
1	116	-
2	49	188
3	222	170
4	40	28
5	-	16
6	20	-
7	113	-
8	-	70
9	330	-

Relative Importance of Bulb-Forcing in the Business

Nurseries 1, 2, 3, 7, and 9 are specialists in bulb-forcing which ranks as a main enterprise in the business. Nurseries 4 and 6 are mixed holdings growing a wide variety of glasshouse and outdoor crops, and forced bulbs are grown as a catch crop between successive crops of cucumbers or tomatoes. Nursery 5 is a mixed holding where a small quantity of narcissi are forced in any space which may be available in houses partially occupied by other crops. Nursery 8 is a holding where forcing is subsidiary to the main business of bulb-growing and outdoor bulb-flower production.

VARIETIES AND BULB SIZES

Many different varieties of narcissi and tulips were forced by this small group of nine growers. Over 50 different tulip varieties and 13 different narcissus varieties are included in the costings.

A full list of the varieties costed on each nursery is shown below, together with details of the number of bulbs planted. Bulbs prepared for early forcing by pre-cooling are denoted in the list by a letter P placed after the varietal name.

Particulars of the source and grade of bulbs forced on each holding are shown in the following table

SOURCES AND GRADES OF BULBS

Nursery Code No.	T U L I P S			N A R C I S S I		
	Size	No. of imported bulbs	No. of English-grown bulbs	Size	Weight of imported bulbs	Weight of English-grown bulbs
	cm.				cwts.	cwts.
1	12	103,050	-	-	-	-
	11	13,050	-			
2	12	30,750	-	As lifted D.N. 1's and 2's	130	58
	11	18,500	-			
3	12	69,100	-	D.N. 1's 2's and 3's	-	170
	11	153,050	-			
4	11	40,000	-	As lifted	-	28
5	-	-	-	D.N. 1's	16	-
6	12	12,000	8,000	-	-	-
7	12	22,130	-	-	-	-
	11	91,350	-			
8	-	-	-	As lifted	-	70
9	11	315,000	-	-	-	-
	10	15,000	-			

BULB VARIETIES AND NUMBERS ON COSTED NURSERIES

<u>Nursery 1</u>	
<u>Tulips</u>	<u>No.</u>
Delice	17,500
Hildegarde	14,050
Alberio	9,000
Prunus	9,000
Delice (P)	8,000
Mothersday	8,000
Fridjof Nansen	8,000
Hildegarde (P)	6,000
Her Grace	5,000
Philip Snowden	4,500
Edith Eddy	4,000
Red Pitt	4,000
Copeland's Rival	3,000
Purple Copeland	2,250
Elmus	2,000
Insurpassable	2,000
Pieter de Hoogh	2,000
Sonja	2,000
Fridjof Nansen (P)	1,950
Van den Erden	1,500
Bartigon	1,250
Allbright	1,000
Cellini	100

<u>Nursery 2</u>	
<u>Tulips</u>	<u>No.</u>
Philip Snowden	9,500
Copeland's Rival	7,000
Early Queen	5,000
Special Pink	5,000
Ursa Minor	5,000
Albino	2,000
John Gay	2,000
Piccadilly	2,000
Red Pitt	2,000
Themis	2,000
Krelage's Triumph	1,750
Marjorie Bowen	1,000
Ossi Oswaldi	1,000
Utopia	1,000
Blue Parrot	500
Golden Measure	500
Mrs. John Scheepers	500
Pieter de Hoogh	250
Princess Margaret Rose	250

<u>Nursery 2 (Continued)</u>	
<u>Narcissi</u>	<u>Tonnage</u>
Rembrandt	2.25
Carlton	2.00
Golden Harvest	2.00
Flower Record	1.00
Flower Carpet	0.80
Edwin G. Buxton	0.50
La Riante	0.25
Scarlet Leader	0.25
Van Sion	0.25
Adventure	0.10

<u>Nursery 3</u>	
<u>Tulips</u>	<u>No.</u>
Rose Copeland	116,850
Rose Copeland (P)	49,100
Red Copeland	21,200
Edith Eddy	15,000
Red Copeland (P)	10,000
William Copeland (P)	10,000

<u>Narcissi</u>	<u>Tonnage</u>
Carlton	2.90
Cheerfulness	2.80
Helios	2.80

<u>Nursery 4</u>	
<u>Tulips</u>	<u>No.</u>
Rose Copeland	20,000
Carrarra	10,000
Krelage's Triumph	10,000

<u>Narcissi</u>	<u>Tonnage</u>
Carlton	1.40

<u>Nursery 5</u>	
<u>Narcissi</u>	<u>Tonnage</u>
Carlton	0.40
Golden Harvest	0.40

<u>Nursery 6</u>	
<u>Tulips</u>	<u>No.</u>
Krelage's Triumph	12,000
Pink Gem	3,000
Van den Erden	3,000
White Sail	2,000

BULB VARIETIES AND NUMBERS ON COSTED NURSERIES (CONT'D.)

<u>Nursery 7</u>		<u>Nursery 8</u>	
<u>Tulips</u>	<u>No.</u>	<u>Narcissi</u>	<u>Tonnage</u>
Edith Eddy	10,000	Early Glory	3.50
Prunus	8,000		
White Sail (P)	8,000		
Edith Eddy (P)	7,500		
Early Queen (P)	7,000		
Early Queen Orange (P)	6,500		
Copeland's Rival	6,000		
Rose Copeland (P)	6,000		
Van den Erden (P)	6,000		
Van den Erden	6,000		
Peach Blossom	5,480		
Utopia	5,000		
William Pitt	5,000		
Alberio (P)	4,000		
Mozart	4,000		
Rose Copeland	4,000		
Shackleton	4,000		
White Virgin	4,000		
Crown Imperial (P)	3,000		
Allbright	2,000		
Golden Harvest	2,000		
		<u>Nursery 9</u>	
		<u>Tulips</u>	<u>No.</u>
		Rose Copeland	80,000
		Krelage's Triumph	65,000
		Hildegarde (P)	55,000
		Krelage's Triumph (P)	25,000
		John Gay	20,000
		Early Queen	15,000
		Golden Harvest	15,000
		King of Yellows (P)	15,000
		Imperator (P)	10,000
		Reformer	10,000
		Early Queen (P)	5,000
		Elmus	5,000
		King of Yellows	5,000
		Peach Blossom	5,000

GROWING PRACTICES

The growers differed to some extent in methods of growing and preparing the flowers for market. A number of the more important differences may be enumerated briefly as follows:-

Type of forcing box

Three of the specialist growers (Nurseries 1, 2 and 3) used a relatively large and expensive box of the type obtained by cutting down bulb-cases (the containers in which Dutch bulbs are packed for export). One grower (Nursery 8) forced narcissi in potato chitting trays. The remaining growers used a smaller and cheaper type of box, by far the most common being the Dutch tomato tray.

Covering material

Most of the growers covered the boxes on the standing out ground with ashes or sand or soil over-topped with straw. But two growers (Nurseries 1 and 7) placed a layer of peat between the boxes and the final covering of soil.

Although peat is a relatively expensive covering material, the expense may be justified if it substantially reduces the amount of shoot damage (especially likely to occur during frosty weather) when the boxes are lifted for carrying in.

Bunching and packing

Two growers (Nurseries 1 and 6) marketed all their tulips in bunches of six, and one grower (Nursery 2) marketed some in sixes and some in dozens. The remaining tulip forcers marketed entirely in dozens.

One grower (Nursery 5) marketed narcissi entirely in sixes, and one grower (Nursery 2) some in sixes and some in dozens. One grower (Nursery 3) marketed narcissi entirely in nines. The remaining two narcissus forcers marketed entirely in dozens.

Growers varied a good deal in the type of paper they used for lining the flower boxes - the choice varying from a cheap tissue to a relatively expensive waxed lettuce paper. But only one grower (Nursery 6) mentioned using different coloured papers to contrast with the shade of the flowers, and only one grower (Nursery 7) wrapped individual bunches (tulips). Furthermore, only one grower (Nursery 1) marked individual bunches with a brand label.

Forcing on benches or on the ground

Five of the tulip crops and two of the narcissus crops were forced on benches. One tulip crop (Nursery 4) was forced on the ground and one (Nursery 6) on the raised beds of an old-fashioned vinery type of house. Three narcissus crops (Nurseries 3, 4 and 8) were forced on the ground.

Carrying in

Most of the growers used hand-barrows for moving the bulbs from the standing out ground to the forcing house. But two of the larger scale forcers were able to move much larger quantities at each journey by using a tractor and low-set trailer (Nursery 3) or a flat lorry (Nursery 9).

MARKETING

Differences between growers in the matter of marketing policy have two main aspects:-

- (i) Type of market utilised.
- (ii) Date of marketing.

(i) Type of market

The proportions by quantity and value of the flowers sold in wholesale and retail markets by each grower are shown in the following table. In addition to sales direct to the consuming public, sales to retailers have been counted as "retail sales" for the purposes of this table and subsequent discussion.

The flowers sold wholesale from Nurseries 3, 4, and 8, and a proportion of those from Nursery 9 went to large markets outside the East Midlands area. The remaining wholesale sales were made in local wholesale markets.

Nursery Code No.	T U L I P S				N A R C I S S I			
	Per cent Wholesale		Per cent Retail		Per cent Wholesale		Per cent Retail	
	Flowers	Value	Flowers	Value	Flowers	Value	Flowers	Value
1	88	87	12	13	-	-	-	-
2	37	35	63	65	67	61	33	39
3	100	100	-	-	100	100	-	-
4	73	70	27	30	60	57	40	43
5	-	-	-	-	20	20	80	80
6	97	96	3	4	-	-	-	-
7	100	100	-	-	-	-	-	-
8	-	-	-	-	100	100	-	-
9	79	76	21	24	-	-	-	-

(ii) Date of marketing

The accompanying table shows the dates between which tulips and narcissi were sold from nurseries included in the study.

Nursery Code No.	T U L I P S		N A R C I S S I	
	Date of first sale	Date of last sale	Date of first sale	Date of last sale
1	17th December	15th April	-	-
2	22nd January	1st May	20th January	24th April
3	3rd January	26th March	21st December	30th March
4	7th January	8th March	9th February	16th March
5	-	-	21st January	25th March
6	17th December	4th February	-	-
7	26th December	21st April	-	-
8	-	-	13th January	7th April
9	10th December	29th March	-	-

HEATING

The accompanying table shows the dates between which tulips and/or narcissi received heat at each nursery.

Nursery Code No.	T U L I P S		N A R C I S S I	
	Date at which bulbs first received heat	Date at which bulbs last received heat	Date at which bulbs first received heat	Date at which bulbs last received heat
1	4th December	5th April	-	-
2	1st January	15th April	1st January	15th April
3	1st December	26th March	28th November	30th March
4	12th December	8th March	10th January	16th March
5	-	-	14th December	25th March
6	28th November	4th February	-	-
7	9th November	21st April	-	-
8	-	-	9th December	7th April
9	23rd November	29th March	-	-

At Nursery 2, approximately 28,000 tulip bulbs (rather more than half the total number of bulbs costed) were grown cold. Hence the results shown for tulips at this nursery relate to a mixture of forced and cold-house grown bulbs.

All the boilers used for bulb-forcing at these nurseries were coal or coke-fired. The following table shows the type of fuel used at each nursery, and the cost per ton, together with details of certain special features of the heating installation.

Nursery Code No.	Type of fuel used	Cost per ton	Other features of heating system
1	Coke breeze	59s. Od.	Forced draught
2	Coke	107s. Od.	
3	Coke breeze	52s. Od.	Forced draught
4	Coal	88s. Od.	Automatic stoker
5	Coke (4 parts) & Nutty slack (1 part)	114s. Od. & 40s. Od.	
6	Coke	108s. Od.	Impeller pump
7	Coal	85s. Od.	Automatic stoker
8	Coal	103s. Od.	
9	Coal	65s. Od.	Automatic stoker and impeller pump

PRESENTATION OF 1953-54 RESULTS AND COMPARISON WITH 1952-53

I. TULIPS

A. Analysis of Expenses, Receipts and Margins

Table 1 shows in summary the financial results of tulip-forcing during the 1953-54 season, on each of seven nurseries. For those growers who forced prepared bulbs, details of these are shown separately from the results obtained from the forcing of natural bulbs.

In order to facilitate comparisons between producers, most of the items shown in the table have been put on a common basis - either "per 10,000 bulbs" or "per dozen bunches" of flowers. But a few items are also shown on a per nursery basis so that each grower can see his own financial results in their entirety.

There follows a discussion of some of the most salient features of the results, as revealed by the information shown in Table 1.

(i) Cost of Bulbs

This is the cost per 10,000 of bulbs delivered at the nursery, including incidental expenses such as carriage, import duty, and the cost of cooling. The cost of prepared bulbs ranged from £103 to £66 per 10,000, and natural bulbs from £90 to £66 per 10,000.

The question may be raised as to whether the growers of the more expensive bulbs recouped themselves by getting more for their flowers than they would have done if they had forced cheaper bulbs. Although it is impossible to answer this question with any degree of certainty, it can be stated that as far as the comparison of results achieved by these growers is concerned there was no consistent relationship between the cost of bulbs and the level of receipts from the sale of flowers. For example, the grower at Nursery 6 paid £20 per 10,000 more for natural bulbs than the grower at Nursery 7; yet each of these two growers sold flowers which had virtually the same net market value of £186 per 10,000 bulbs. The evidence suggests then, that the price paid for bulbs is not the only factor affecting the level of flower receipts.

(ii) Growing Costs

These include all costs incurred from the time of planting until the time when the flowers were cut; a high proportion being accounted for by the labour used for boxing and covering the bulbs, and moving them into the forcing-house. It will be seen that the relative differences between individual growers costs for this item were quite large in some cases. It is significant that the two growers who used mechanical transport for moving the boxes to and from the forcing house (Nurseries 3 and 9) had the lowest

ANALYSIS OF THE MAIN ITEMS OF EXPENDITURE, RECEIPTS, AND MARGINS FOR
FORCED TULIPS DURING THE 1953-54 SEASON

TABLE 1

Item		PREPARED BULBS				NATURAL BULBS							
Nursery Code No.		1	3	7	9	1	2	3	4	6	7	9	
		£	£	£	£	£	£	£	£	£	£	£	
Total expenses		201	647	504	1,035	1,084	501	1,331	437	270	707	1,793	
Total net receipts		346	1,366	913	1,650	1,961	752	1,938	589	372	1,218	3,348	
Total margin		145	719	409	615	877	251	607	152	102	511	1,555	
Cost of bulbs Growing costs Picking and packing Heating costs Depreciation of boxes	Per 10,000 bulbs	103	69	66	79	85	75	67	67	90	70	66	
		5	5	13	4	5	8	5	6	9	13	4	
		7	6	10	4	7	9	6	4	11	10	4	
		8	11	13	4	8	9	7	29	23	12	4	
		3	3	3	3	3	3	3	3	3	3	3	3
		Total expenses	126	94	105	94	108	104	88	109	136	108	81
Total net receipts	217	198	190	150	196	158	127	147	186	186	152		
Total margin	91	104	85	56	88	54	39	38	50	78	71		
Average cost	Per dozen bunch	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	
Average return		3. 4.	2. 5.	2. 9.	2. 7.	2.10.	3. 3.	2. 3.	2.10.	3. 6.	2.10.	2. 2.	
Average margin		5. 8.	5. 1.	5. 0.	4. 2.	5. 2.	4.11.	3. 3.	3. 9.	4.10.	4.10.	4. 0.	
Margin per £ of total expenses		2. 4.	2. 8.	2. 3.	1. 7.	2. 4.	1. 8.	1. 0.	11.	1. 4.	2. 0.	1.10.	
		14. 5.	22. 3.	18. 0.	11.11.	16. 2.	10. 1.	9. 1.	7. 0.	7. 7.	14. 6.	17. 4.	
Per cent flowering bulbs		%	%	%	%	%	%	%	%	%	%	%	
		91	94	91	86	91	78	94	94	93	93	92	

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growing costs per 10,000 bulbs. Another grower (Nursery 1) who also had relatively low growing costs, mentioned that he made the most of his labour by combining the moving in and moving out operations. As each load of boxes was moved into the forcing-house, a load of spent bulbs from a previous batch was taken out and dumped on the journey back to the standing-out ground.

It will be noticed, however, that in no case did growing costs form more than a small proportion of total expenses.

(iii) Picking and Packing

This includes all costs incurred from the time of cutting to the time when the flowers left the nursery.

The growers with the highest costs in this category spent about $2\frac{1}{2}$ times as much per 10,000 bulbs as those with the lowest costs. This cost variation may be attributed partly to varietal differences, partly to differences in the skill of the workers who did the picking, bunching, and packing, and partly to differences in technique, such as the size of the bunch in which the flowers were tied. As previously indicated, there were also some differences between growers in the amount and type of packing materials used. The grower at Nursery 6 had only limited experience of tulip-forcing and his workers were not yet really skilled in the handling of the flowers. The grower at Nursery 7 spent 1s. 4d. per box of a dozen bunches of tulips on packing materials alone, since each individual bunch was wrapped in a good quality paper.

In most cases the magnitude of picking and packing costs was roughly comparable with that of growing costs.

(iv) Heating Costs

The composition of these costs is explained in Appendix I.

The variations in heating costs between nurseries were large both in absolute terms and relative to total expenses. This was to be expected for a number of reasons.

(a) Bulbs were forced at different parts of the season, and although it has not been possible to take account of changes in the rate of fuel consumption on any particular nursery during the season, the fact that the earlier-forced bulbs occupied the houses for a longer time is reflected in the heating costs. However, varietal differences also affect the length of the forcing period, and it will be seen that, on the same nursery, the cost of heating prepared bulbs was not invariably greater than the cost of heating natural bulbs.

(b) There were differences between growers in the type of fuel used, and due to differences in geographical location, there were differences in the price paid for any particular type of fuel.

(c) There were differences in the design of heating equipment which partially determined the type of fuel used. For example, coke breeze is only suitable for use in conjunction with a forced-draught boiler.

(d) There were differences in the design of the forcing houses and in the number of bulbs forced in a given space. The grower at Nursery 6 was forcing in old-fashioned vinery type houses where the amount of roof space was much greater than is necessary for bulb-forcing purposes. The grower at Nursery 1 increased the bulb carrying capacity of his forcing-house, by forcing partly below and partly above the bench. When first brought in the bulbs were placed below the benches, but were later moved on to the top as an earlier batch was moved out and a subsequent batch was due to be moved in.

Furthermore, whereas the majority of growers forced on benches and gave the bulbs heat from below as well as from above, two growers forced on the ground. It is noticeable, and perhaps significant that these growers (Nurseries 4 and 6) had the highest heating costs per 10,000 bulbs.

(e) One grower (Nursery 2) grew approximately half his crop cold, but for the purposes of the costing his heating costs had to be spread over the entire crop, both forced and cold grown.

At four out of the seven nurseries, heating costs represented the most important single category of cost after the cost of bulbs.

(v) Depreciation of Boxes

The cost of this item per unit quantity of bulbs was, by definition, the same at all nurseries (see Appendix I).

(vi) Total Expenses

For this group of growers considered as a whole, the average total expenses per 10,000 bulbs were approximately £105 for both prepared and for natural bulbs (see Table 3). But the average conceals quite wide differences in the expenses incurred by individual growers, and in fact, the difference between the highest-expense grower and the lowest-expense grower was £32 per 10,000 bulbs in the prepared bulb group, and £55 per 10,000 bulbs in the natural group.

The main factors contributing to higher than average total expenses appear to have been the cost of bulbs and heating costs. In the prepared bulb group, the highest cost producer (Nursery 1) paid a high price for

bulbs, but had no more than average heating costs. On the other hand, one of the two lowest cost producers (Nursery 3) combined relatively cheap bulbs with somewhat higher than average heating costs. In the natural bulb group, the highest-cost producer (Nursery 6) had expensive bulbs, and also much higher than average heating costs, whereas the lowest cost producer (Nursery 9) had the cheapest bulbs and the lowest heating costs.

With one exception (Nursery 7) the forcing of prepared bulbs was more expensive than the forcing of natural bulbs, and most of the difference in total cost between them can be attributed to differences in the cost of the bulbs.

(vii) Total Net Receipts

For the group as a whole, the average total net receipts per 10,000 bulbs were £189 for prepared bulbs, and £165 for natural bulbs (see Table 3). On the other hand, the total net receipts obtained by individual growers ranged in the prepared bulb group, from £150 to £217 - making a difference of £67 per 10,000 bulbs, and, in the natural bulb group from £127 to £196 - making a difference of £69 per 10,000 bulbs.

Thus, individual grower's net receipts varied about average net receipts rather more than their total expenses varied about average total expenses. In other words, differences between growers in total receipts tended, on average, to be greater than differences in total expenses.

What are the factors which determine the level of total net receipts per unit quantity of bulbs? Clearly they are the yield of flowers and average net return per bunch.

The yield of tulips at each nursery has been computed in terms of the percentage of flowering bulbs, and this is shown on the bottom line of Table 3. The average net return per dozen bunch at each nursery is also shown in the table.

The grower at Nursery 1 had the highest total net receipts per 10,000 bulbs both in the prepared bulb group and the natural bulb group. It can be seen that the yield of tulips obtained by this grower was only about average in each group. But his average return per dozen bunch was the highest in each group. The grower at Nursery 3, on the other hand, had the second highest yield of flowers in the natural bulb group, but his advantage in this respect was much more than offset by a low average return per bunch, and the net result was that he had the lowest total net receipts in the group. The grower at Nursery 9 had the lowest total net receipts in the prepared bulb group for a similar reason.

The conclusion, therefore, is that average return per bunch was of greater importance than yield in determining the level of total net receipts.

(viii) Total Margin

For the group as a whole, the average total margin per 10,000 bulbs was £84 for prepared bulbs, and £61 for natural bulbs (see Table 3). Nevertheless, the range between the producer with the highest margin and the producer with the lowest margin was £48 for prepared and £50 for natural bulbs.

The total margins of individual growers varied about the average total margin somewhat more than total expenses varied about average total expenses, but less than total net receipts varied about average net receipts. This implies that, generally speaking, high margins were associated with a combination either of relatively high expenses with high receipts, or low expenses with low receipts. In fact, only one grower succeeded in combining lower than average expenses with higher than average receipts - prepared bulbs at Nursery 3.

(ix) Percentage of Flowering Bulbs

The yield of tulips ranged from 94 per cent to 78 per cent flowering bulbs. However, only two growers dropped below a 90 per cent yield either for prepared or natural bulbs.

Generally speaking then, yield variations between nurseries were small, and this factor had only a very minor influence on the varying economic fortunes of these growers during the season under review.

(x) Margin per £ of Total Expenses

This is the most comprehensive measure of economic success. It is in effect, a crude measure of the return on working capital used in the bulb-forcing enterprise. The ranges were from £1. 2s. 3d. to 11s. 11d. for prepared bulbs, and from 17s. 4d. to 7s. 0d. for natural bulbs.

It is important to notice that the ranking of growers by margin per £ of total expenses was not the same as their ranking by total margin per 10,000 bulbs. For example, in the natural bulb group, the grower at Nursery 1 had the highest total margin per 10,000 bulbs, and this was £17 greater than the margin obtained by the grower at Nursery 9. On the other hand, these two growers had margins per £ of total expenses (for natural bulbs) of 16s. 2d. and 17s. 4d. respectively, i.e. if success is measured in terms of margin per £ of total expenses, Nursery 1 was less successful than Nursery 9. The reason for this is that Nursery 1's higher total margin per 10,000 bulbs, was based on relatively high costs (or total expenses), whereas Nursery 9's somewhat lower margin per 10,000 bulbs was based on the lowest costs in the group.

B. Further Analysis of Costs

Table 2 shows the relative importance of the cost of bulbs and the cost of manual labour as elements of total production expenses. It will be seen that among the seven nurseries, the cost of bulbs ranged from 82 per cent to 62 per cent, the cost of labour from 19 per cent to 9 per cent, and other costs from 26 per cent to 9 per cent of total expenses. The "cost of bulbs" then was by far the largest of these three elements of cost on all the nurseries. Since the cost structure is of this nature, it should be clear to growers that any appreciable saving on the cost of bulbs can be expected to result in a significant reduction of total production expenses.

The relative importance of the "cost of labour" and "other costs" is not so well defined. At five out of the seven nurseries they were of almost equal importance. It was only where relatively high labour costs were combined with relatively low heating costs (the most important element of "other costs"), as at Nursery 2, or where relatively high heating costs were combined with low labour costs, as at Nursery 4, that there was an important difference in the magnitude of these two types of cost.

C. Comparison with 1952-53 Results

The average results obtained by the seven co-operating growers during the 1953-54 season may be compared with the average results obtained by the four growers whose tulip forcing was costed during the previous season of 1952-53. The nurseries included in both years' average results are Nos. 1 to 4 inclusive.

Table 3 shows that on average the results of tulip forcing were more favourable to growers in 1953-54 than in 1952-53. Average total expenses were lower and total net receipts were higher, hence for natural bulbs, the average total margin per 10,000 bulbs was nearly 100 per cent higher than in the previous season. The comparison of results for prepared bulbs reveals a difference in average total margin of the same order, though average total net receipts were slightly lower in 1953-54 than in 1952-53. But average total expenses declined by a much larger amount.

These differences between the two years stem partly from changes in the economic circumstances and economic fortunes of the growers who took part in the investigation in both seasons, and partly from the inclusion in the 1953-54 results of three additional growers who did not take part in the investigation the previous year. This should be borne in mind in comparing figures between the two years

COST OF BULBS AND COST OF LABOUR AS A PERCENTAGE OF TOTAL EXPENSE - FORCED TULIPS

TABLE 2

Item	A L L B U L B S													
	1		2		3		4		6		7		9	
Nursery Code No.	£	Per cent	£	Per cent	£	Per cent	£	Per cent	£	Per cent	£	Per cent	£	Per cent
Cost of bulbs	1,015	79	358	71	1,508	76	269	62	180	66	773	64	2,323	82
Cost of labour	125	10	84	17	225	11	55	12	45	17	231	19	263	9
Other expenses	145	11	59	12	245	13	113	26	45	17	207	17	242	9
Total expenses	1,285	100	501	100	1,978	100	437	100	270	100	1,211	100	2,828	100

COMPARISON OF AVERAGE COSTS AND RETURNS FOR FORCED TULIPS BETWEEN THE 1952-53 AND 1953-54 SEASONS

TABLE 3

Item		PREPARED BULBS		NATURAL BULBS		ALL BULBS	
		1952 - 53	1953 - 54	1952 - 53	1953 - 54	1952 - 53	1953 - 54
		£	£	£	£	£	£
Cost of bulbs	Per 10,000 bulbs	100	79	88	74	89	75
Growing costs		8	7	8	7	8	7
Picking and packing		12	7	10	7	9	7
Heating costs		12	9	15	13	14	13
Depreciation of boxes		3	3	3	3	3	3
Total expenses		135	105	124	104	123	105
Total net receipts	195	189	153	165	155	168	
Total margin	60	84	29	61	32	63	
Average cost	Per dozen bunch	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Average net return		3. 9.	2. 9.	3. 4.	2. 10.	3. 4.	2. 10.
Average margin		5. 5.	5. 0.	4. 2.	4. 5.	4. 3.	4. 6.
Margin per £ of total expenses	1. 8.	2. 3.	10.	1. 7.	11.	1. 8.	
	8. 2.	16. 8.	4. 10.	11. 8.	5. 2.	12. 2.	
Per cent flowering bulbs	%	%	%	%	%	%	
	87	91	88	90	89	90	

The most decisive factor underlying the difference in average tulip forcing costs between the two years appears to have been the cost of the bulbs themselves. Averaging all types and varieties of bulbs together, the bulbs forced by growers in 1953-54 appear to have been nearly £1.10s. per thousand cheaper than those forced in 1952-53. But all the other types of expense, except box depreciation, were also slightly down in 1953-54. This seems somewhat surprising at first sight, since wages increased between the two years, and coal and coke did not get any cheaper. But reasons can be given to explain the decrease. Some of the growers who were in the 1952-53 investigation made changes which resulted in their using less labour per unit quantity of bulbs in 1953-54 than in the previous year, and although wages per hour were higher, their total labour costs were lower. Furthermore, between the two seasons, two growers changed over to what they regard as a cheaper form of heating - one from an ordinary boiler burning large coke to a forced-draught boiler burning coke breeze, and the other from pure coke to a mixture of coke and nutty slack.

On the receipts side, the price of flowers forced from prepared bulbs was, on average, slightly lower in 1953-54 than in the previous year, but on the other hand, the prices of tulips forced later in the season held up comparatively well, especially towards the end. Yields averaged about the same in both years.

D. Summary and Conclusions

It has been found that amongst a small group of seven growers who forced tulips during the 1953-54 season, the average total margin per 10,000 bulbs was £84 for prepared bulbs, and £61 for natural bulbs. But individual growers' total margins ranged from £104 to £56 per 10,000 for prepared bulbs, and from £88 to £38 per 10,000 for natural bulbs.

What explanations can be offered for the varying degrees of success accomplished by these growers? Obviously, every grower tries to manage his bulbs so as to obtain the maximum margin between total expenses, and total net receipts, and further to achieve this at the lowest possible cost. He does not aim at low costs irrespective of net returns, nor does he aim at high net returns irrespective of costs. The problem he sets himself is that of balancing costs and returns so as to achieve the objective of maximum total margin at the lowest cost. For any particular grower, the successful solution of this problem depends upon his own individual circumstances. Thus, no two growers are likely to reach a successful solution in exactly the same way. Nevertheless, amongst a group of growers such as the one participating in this investigation, there should be enough common ground to make a pooling of experience profitable, and for each individual to learn something from the others.

Dealing first then, with the cost side of the account, it has been demonstrated that relatively expensive bulbs and relatively high heating costs were the two most important factors contributing to higher than average total expenses.

The original cost of the bulbs, plus incidental expenses incurred in getting them to the nursery, varied from just over 60 per cent to over 80 per cent of total production expenses. Thus it is quite clear that even a quite small percentage reduction in the cost of bulbs could lead to a substantial reduction in total costs. Furthermore, since there is no evidence to suggest that the price received on the market for forced tulips is rigidly related to the cost of bulbs, such a reduction in total costs might well result in the widening of the margin between costs and returns.

Heating costs varied a good deal according to the type and design of glasshouses and heating equipment, type of fuel used, season of production, and perhaps on whether forcing took place on benches or on the ground. All these points should be carefully considered by the grower who wants to make the best of his bulb-forcing. Some growers might well consider changing over to a cheaper type of fuel such as coke breeze, or they might consider the "under and over the bench" method of forcing which effectively increases the bulb-carrying capacity of the forcing-house.

The other main item of cost was labour, and the differences in the labour costs incurred by growers taking part in this investigation suggest that some growers could make economies in this respect. A good deal depends on the experience and skill of the workers, but organisation of the work is important, particularly for such key operations as boxing the bulbs, moving the boxes in and out of the glasshouse, and picking, bunching, and packing the flowers. As was shown in last year's report on the results of this investigation, the latter tends to be the most labour consuming operation and therefore, merits the close attention of the manager. (1)

Turning now to the receipts side, it has been observed that total net receipts depend upon the yield of saleable flowers and the average net return per bunch. It has been shown that taking the group as a whole, yield variation was not an important source of variation in the level of total net receipts. The important difference between growers was the average net return per dozen bunch. Although it is very difficult to determine precisely why some growers managed to obtain higher net returns per bunch than others, such matters as choice of market, manner of presentation in the market, and time of sale are all obviously important. Furthermore, the variety and quality of the flowers are also very important, since as was observed in the earlier report, forced tulips are normally regarded as

(1) Ingersent, K. A. The Cost of Forcing Narcissus and Tulips during the 1952-53 Season. University of Nottingham, Department of Agricultural Economics, Sutton Bonington. September, 1953.

something of a luxury, and therefore most markets are very sensitive to the preferences of buyers for particular types and varieties of flowers, and easily become glutted with unpopular varieties, or flowers of inferior quality.

To sum up, the second year's results of this investigation have confirmed the conclusions that success in tulip-forcing depends on careful attention to costs, particularly the costs of bulbs, heating and labour, and the improvement of returns, through catering for the special requirements of the market.

II. NARCISSI

A. Analysis of Expenses, Receipts and Margins

Table 4 shows in summary the financial results of narcissus-forcing during the 1953-54 season on each of five nurseries. For the one grower who forced prepared bulbs, details of these are shown separately from the results obtained from the forcing of natural bulbs.

In order to facilitate comparisons between producers, most of the items shown in the table have been put on a common basis - either "per ton" or "per dozen bunch" of flowers. But a few items are also shown on a per nursery basis so that each grower can see his own financial results in their entirety.

There follows a discussion of some of the most salient features of the results, as revealed by the information in Table 4.

(i) Cost of Bulbs

This is the cost per ton of bulbs delivered at the nursery, including incidental expenses such as carriage, import duty, and the cost of cooling. The cost of natural bulbs ranged from £168 to £71 per ton, and the one grower who purchased prepared bulbs paid an average of £95 per ton for them.

There is little or no evidence to suggest that a consistent relationship exists between the cost of bulbs and the level of receipts from the sale of flowers. For example, the grower at Nursery 2 paid twice as much per ton for bulbs as the grower at Nursery 3, yet the former's total net receipts per ton were somewhat lower than those of the latter. Comparisons between Nurseries 2 and 4, or 3 and 4 yield similar results. At Nursery 5, however, the extra high cost of bulbs does appear to have been covered by increased returns, though there is reason to believe that other factors were equally or more important in securing the high level of total net receipts e.g. type of market supplied and time of sale.

Nursery 8 was a special case because the bulbs were not purchased but grown on the holding from a stock imported from Holland in 1951. They therefore, had to be valued arbitrarily at the estimated 1953 average market value of English grown bulbs of that variety. However, this almost certainly overestimated their real value, because the bulbs were known to be infected with eelworm. As this nursery's results show, the disease adversely affected the yield of flowers, and even more so, the average net return per bunch.

ANALYSIS OF THE MAIN ITEMS OF EXPENDITURE, RECEIPTS, AND MARGINS FOR FORCED NARCISSI
DURING THE 1953-54 SEASON

TABLE 4.

Item		PREPARED	N A T U R A L B U L B S				
		BULBS	2	3	4	5	8
Nursery Code No.		3	2	3	4	5	8
Total expenses		£ 419	£ 1,718	£ 721	£ 244	£ 174	£ 511
Total net receipts		614	1,979	1,305	282	279	407
Total margin		195	261	584	38	105	(-) 104
Cost of bulbs Growing costs Picking and packing Heating costs Depreciation of boxes Total expenses Total net receipts Total margin	Per ton	95	145	71	110	168	94
		12	7	11	13	10	17
		14	15	19	8	27	6
		23	9	19	38	2	23
		6	6	6	6	6	6
		150	182	126	175	213	146
219	210	229	202	341	116		
69	28	103	27	128	(-) 30		
Average cost Average net return Average margin	Per dozen bunch	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
		1. 9.	2. 6.	1. 1.	1. 11.	2. 5.	2. 2.
		2. 7.	2. 11.	2. 0.	2. 3.	3. 10.	1. 9.
10.	5.	11.	4.	1. 5.	(-) 5.		
Margin per £ of total expenses		9. 3.	3. 1.	16. 5.	3. 1.	12. 0.	(-) 4. 1.
No. of flowers sold per ton		20,666	17,340	27,658	21,348	21,420	16,104

(ii) Growing Costs

These include all costs incurred from the time of planting up to the time when the flowers were cut. On the whole, differences between growers were not very large in this respect, but differences in experience and skill are evidenced e.g. between Nursery 2 and Nursery 8.

In no case did growing costs form more than a small proportion of total expenses.

(iii) Picking and Packing

This includes all costs incurred from the time of cutting to the time when the flowers left the nursery. The grower with the highest cost in this category spent about three times as much per ton of bulbs as the grower with the lowest cost. Picking and packing costs per ton of bulbs must, of course, vary to a considerable extent with the number of flowers cut per ton. Even after taking this into account, however, cost differences between growers remain which may be attributed partly to varietal differences, partly to differences in the skill of the pickers and packers, and partly to differences in technique such as the size of the bunch in which the flowers were tied. There were also differences between growers in the amount and type of packing materials used.

In the majority of cases, picking and packing costs were somewhat higher than growing costs.

(iv) Heating Costs

The composition of these costs is explained in Appendix I.

The variations in heating costs between nurseries were large both in absolute terms and relative to total expenses. This was to be expected for a number of reasons, some of which are as follows:-

(a) Bulbs were forced at different parts of the season, hence the length of the forcing period varied.

(b) There were differences between growers in the type of fuel used, and in the price paid for the same type of fuel.

(c) There were differences in the design of the heating installation.

(d) There were differences in the design of forcing-houses, and whereas two growers forced on benches, three forced on the ground. It may be of some significance that the growers forcing on benches both had considerably lower heating costs than any of the growers forcing on the ground.

At three out of the five nurseries, heating costs represented the most important single category of cost after the cost of bulbs.

(v) Depreciation of Boxes

The cost of this item per ton of bulbs was, by definition, the same at all nurseries (see Appendix I).

(vi) Total Expenses

For this group of growers considered as a whole, the average total expenses per ton of bulbs were £174 for natural bulbs, and the one grower who forced prepared bulbs incurred total expenses of £150 per ton, (see Table 6). But the average for natural bulbs conceals quite wide differences in the expenses incurred by individual growers. There was in fact, a difference of £87 per ton between the highest expense grower and the lowest expense grower. (1)

By far the most important factor contributing to higher than average total expenses appears to have been the cost of bulbs. In fact, the ranking of growers by magnitude of total expenses per ton is exactly the same as their ranking by cost of bulbs per ton.

Although the total expenses incurred for forcing prepared bulbs at Nursery 3 were £24 per ton higher than for forcing natural bulbs, this grower's forcing of prepared bulbs cost considerably less than the forcing of natural bulbs at three other nurseries.

(vii) Total Net Receipts

For the group as a whole, the average total net receipts per ton of bulbs were £245 for natural bulbs, and the one grower who forced prepared bulbs obtained total net receipts of £219 per ton (see Table 6). On the other hand, the total net receipts obtained by individual growers ranged from £341 to £202 per ton of natural bulbs.

Two factors jointly determine the level of total net receipts per ton of bulbs. These are the yield or number of flowers cut per ton, and the average net return per bunch.

The numbers of flowers sold per ton of bulbs, and the average net returns per dozen bunch at each nursery are shown in Table 6.

The grower at Nursery 5 had the highest total net receipts per ton of bulbs in the group. Since his yield of flowers was only about average,

(1) The results of the grower at Nursery 8 have been excluded from the averages and ranges because of the exceptional circumstances explained on page 21.

his higher than average total net receipts are attributable mainly to his average net return per dozen bunch, which was 11d. per dozen higher than that obtained by anyone else. Leaving out of account the grower at Nursery 8, whose circumstances were quite exceptional, the grower at Nursery 4 had the lowest total net receipts per ton. This grower's yield of flowers was also about average, but his average net return per dozen bunch was 6d. lower than the average for the group. Hence average net return per bunch was a key factor contributing to the results obtained by the most successful and the least successful growers. On the other hand, the fact that yield variations can also have a very pronounced affect on the level of total net receipts is demonstrated by the results obtained by Nurseries 2 and 3. Nursery 2 had the lowest yield (excepting Nursery 8) and the second highest average net return per dozen bunch. Nursery 3's average net return per dozen bunch was 11d. less than Nursery 2's but the yield of flowers per ton was nearly 60 per cent higher (mainly as a result of growing the variety Cheerfulness). The net result was a difference of £19 total net receipts per ton in favour of Nursery 3.

Hence, considering the group as a whole, the yield of flowers per ton and the average net return per dozen bunch were of about equal importance in influencing the level of total net receipts.

(viii) Total Margin

For the group as a whole, the average total margin per ton was £71 for natural bulbs and the one grower who forced prepared bulbs obtained a margin of £69 per ton (see Table 6). However, the range between the highest and the lowest individual margin per ton (for natural bulbs) was £101.⁽¹⁾

Although the total net receipts of individual growers tended to vary around average total net receipts more than their total expenses varied around average total expenses, it is not possible to say from the limited information available whether differences in total net receipts per ton, or differences in total expenses per ton were the more important in determining the differing levels of total margin per ton.

(ix) Margin per £ of Total Expenses

This is the most comprehensive measure of economic success. It is in effect, a crude measure of the return on working capital used in the bulb-forcing enterprise. The range was from 16s. 5d. to 3s. 1d. for natural bulbs. The grower who forced prepared bulbs obtained a margin of 9s. 3d. (compared with 16s. 5d. for his natural bulbs).

It is important to notice that the ranking of growers by margin per £ of total expenses was not the same as their ranking by total margin per ton.

(1) See footnote on page 24.

Thus the total margin per ton obtained at Nursery 5 was £25 greater than that obtained at Nursery 3. On the other hand, Nursery 5's margin per £ of total expenses was 4s. 5d. lower than that obtained at Nursery 3. The reason for this is that Nursery 5's higher total margin per ton was based on much higher than average costs (or total expenses) whereas Nursery 3's somewhat lower total margin per ton was based on much lower than average costs.

B. Further Analysis of Costs

Table 5 shows the relative importance of the cost of bulbs and the cost of labour as elements of total production expenses. It will be seen that amongst the five nurseries, the cost of bulbs ranged from 80 per cent to 59 per cent, the cost of labour from 23 per cent to 12 per cent, and other costs from 23 per cent to five per cent of total expenses. The cost of bulbs then, was by far the largest of these three elements of cost on all the nurseries. Since the cost structure is of this nature, it should be clear to growers that any appreciable saving on the cost of bulbs can be expected to result in a significant reduction of total production expenses.

The relative importance of the "cost of labour" and "other costs" is not quite so well defined, though at four out of the five nurseries, the cost of labour was the larger of the two. A high proportion of "other costs" was accounted for by heating costs, and it was only on the nursery where these were exceptionally high that labour ranked as the least important element of total production costs.

C. Comparison with 1952-53 Results

The average results obtained by four of the co-operating growers during the 1953-54 season may be compared with the average results they obtained during the previous season of 1952-53. The nurseries concerned are Nos. 2 to 5 inclusive. Whilst the averages for natural bulbs are based on the results of all four nurseries in both years, the figures shown for prepared bulbs are the individual results obtained at Nursery 3.

Table 6 shows that on average, the results of narcissus-forcing were somewhat more favourable to growers in 1953-54 than in 1952-53. Average total expenses per ton were lower, and, excepting prepared bulbs, average total net receipts per ton were slightly higher this season than last.

The most decisive factor underlying the difference in average narcissus-forcing costs in the two years appears to have been the cost of the bulbs themselves. Averaging all types and varieties of bulbs together, the bulbs forced by growers in 1953-54 appear to have been £13 per ton cheaper than those forced in 1952-53. But picking and packing costs and heating costs were also slightly down from the 1952-53 level. This may

COST OF BULBS AND COST OF LABOUR AS A PERCENTAGE OF TOTAL EXPENSES - FORCED NARCISSI

TABLE 5

Item	ALL BULBS									
	2		3		4		5		8	
Nursery Code No.	£	Per cent	£	Per cent	£	Per cent	£	Per cent	£	Per cent
Cost of bulbs	1,372	80	672	59	154	63	137	79	330	64
Cost of labour	204	12	261	23	35	14	28	16	102	20
Other expenses	142	8	207	18	55	23	9	5	80	16
Total expenses	1,718	100	1,140	100	244	100	174	100	512	100

COMPARISON OF AVERAGE COSTS AND RETURNS FOR FORCED NARCISSI BETWEEN THE
1952-53 AND 1953-54 SEASONS(1)

TABLE 6

Item	PREPARED BULBS		NATURAL BULBS		ALL BULBS	
	1952 - 53	1953 - 54	1952 - 53	1953 - 54	1952 - 53	1953 - 54
	£	£	£	£	£	£
Cost of bulbs	128	95	139	124	139	126
Growing costs	13	12	9	10	9	10
Picking and packing	36	14	22	17	22	17
Heating costs	35	23	18	17	18	17
Depreciation of boxes	3	6	3	6	3	6
Total expenses	215	150	191	174	191	176
Total net receipts	266	219	240	245	245	244
Total margin	51	69	49	71	54	68
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Average cost	1.11.	1. 9.	1.10.	2. 0.	1.10.	2. 1.
Average net return	2. 4.	2. 7.	2. 3.	2. 9.	2. 4.	2.10.
Average margin	5.	10.	5.	9.	6.	9.
Margin per £ of total expenses	4. 9.	9. 3.	5. 8.	8. 9.	6. 0.	8. 1.
No. of flowers sold per ton	27,228	20,666	26,338	21,942	26,078	21,366

(1) Nursery 8 is not included in the average results for 1953-54

soon surprising at first sight, since wages increased between the two years and fuel did not get any cheaper. But reasons can be given to explain the decreases. In the first place, one grower showed an increase in the rate of cutting and bunching, and another in the rate of bunching and packing; and, although these growers had to pay higher wages per hour, their total labour costs were lower. In the second place, one grower changed over, between the two seasons, from an ordinary boiler burning large coke to a forced-draught boiler burning coke breeze, which resulted in a big drop in heating costs per ton of bulbs.

On the receipts side, the average price of flowers was some 5½d. per dozen higher in 1953-54 than in the previous season, and this more than compensated for a quite considerable drop in the average number of flowers sold per ton.

D. Summary and Conclusions

It has been found that amongst a small group of four growers who forced narcissus during the 1953-54 season, the average total margin per ton of natural bulbs was £71. One grower who forced prepared bulbs obtained a margin of £69 per ton from this source.

What explanations can be offered for the varying degrees of success accomplished by these growers? As has been pointed out in the section of this report dealing with the forcing of tulips, since no two growers' circumstances are exactly alike, it is difficult to generalise about factors which were associated with the success achieved by the growers with the most satisfactory results. Nevertheless, there should be enough common ground amongst these growers to make a pooling of experience profitable, and for each individual to learn something from the others.

Dealing first then with the cost side of the account, it has been demonstrated that expensive bulbs were by far the most important factor contributing to higher than average total expenses.

The original cost of the bulbs, plus incidental expenses incurred in getting them to the nursery, varied from just under 60 per cent to over 80 per cent of total production expenses. Thus it is quite clear that even a quite small percentage reduction in the cost of bulbs could lead to a substantial reduction in total costs. Furthermore, since there is no evidence to suggest that the price received on the market for forced narcissi is rigidly related to the cost of bulbs, such a reduction in total costs might well result in the widening of the margin between total costs and returns.

Heating costs varied a good deal according to the type and design of glasshouses and heating equipment type of fuel used, season of production, and perhaps on whether forcing took place on benches or on the ground. All these points require careful consideration by the grower, and some growers might well consider changing over to a cheaper type of fuel, such as coke breeze, even though this involves the acquisition of a forced-draught fan.

The other main item of cost was labour, and the differences in the labour costs incurred by growers taking part in this investigation suggest that some growers could make economies in this respect. As was shown in last year's report on the results of this investigation picking, bunching, and packing tends to be the most labour consuming operation, and therefore merits the close attention of the manager.

Turning now to the receipts side, it has been observed that total net receipts depend upon the yield of saleable flowers per ton of bulbs and the average net return per bunch. On the whole, differences in the average net return per bunch seem to have been most influential in the determination of the level of total net receipts, though the example of one nursery illustrates the advantage of growing higher than average yielding varieties.

It is difficult to say precisely why some growers managed to obtain higher net returns per bunch than others. Such matters as choice of market, manner of presentation in the market, and time of sale are all obviously important; also the variety and quality of the flowers offered for sale, because since the flower market deals in a commodity which is still regarded as a luxury by most people, it is very sensitive to the preferences of buyers for particular varieties and types of flowers, and easily becomes glutted with unpopular varieties or flowers of inferior quality. As has been suggested in the earlier report however, the narcissus generally being a somewhat "cheaper" flower, may not be quite so sensitive in this respect as the tulip.

To sum up, the second year's results of this investigation have confirmed the conclusions that success in narcissus-forcing depends on careful attention to costs, particularly the costs of bulbs, heating and labour, and the improvement of returns through catering for the special requirements of the market.

APPENDIX I

Costing Procedure

In the main, only the direct costs of bulb-forcing have been taken into account. These cover all items of expenditure incurred specifically for bulb-forcing, but do not cover any part of overheads such as the maintenance and repair of glasshouses and heating apparatus or, water and lighting charges.

Man Labour

This was charged as follows, unless the grower paid more than the standard rate when the full amount was charged:-

<u>Per hour</u>	s. d.
Men (21 and over)	2.10.
Women	2. 2.

Youths under 21 years of age were charged at a lower rate per hour, based on current statutory minimum weekly wage rates.

The grower's own labour was charged at the standard rate.

Tractors and Lorries

Where these were used for moving the bulbs about the nursery only the grower's estimate of the fuel consumed was charged.

Where lorries and vans were used for the transport of flowers off the nursery, a charge was made based on the estimated petrol consumption, plus an additional charge of 6d. per mile to cover the costs of lubrication and repairs.

Marketing Costs

No marketing costs incurred by the grower after the flowers had left the nursery, such as carriage and wholesaler's deductions are specifically shown, since these items were deducted from gross market receipts in arriving at the figure for total net receipts shown in the tables.

No selling costs were allowed for sales of flowers at the nursery.

Heating

Heating costs include only the costs of fuel, electric power (for forced draught fans and automatic stokers) and stoking labour.

The grower was asked to give his best estimate of the fuel and power consumption, and man hours of stoking labour during the forcing season, and these were then charged up at the appropriate rates to give the total heating cost for the season.

The allocations of heating costs between "prepared bulbs" and "natural bulbs" was on the basis of the number of "bulb-weeks" (tulips), or "ton-weeks" (narcissi) of heating represented by each of these categories. For example, 10,000 prepared tulip bulbs receiving heat for four weeks would represent $10,000 \times 4 = 40,000$ bulb-weeks of heating cost. Similarly, 20,000 natural tulip bulbs receiving heat for three weeks would represent $20,000 \times 3 = 60,000$ bulb-weeks of heating cost. Therefore, in a case where prepared and natural bulbs were being forced in these proportions, the total heating cost during the season would be allocated between prepared tulips and natural tulips in the ratio 4:6 (= 40,000:60,000). It should be noted that no attempt was made to reflect differences in the rate of fuel consumption at different periods of the season.

Box Depreciation

Each grower was asked for his estimate of the average life of the boxes he used for forcing, and hence, given the total number of boxes utilised during the season, the average annual replacement cost (assuming a constant annual rate of replacement) at current prices was calculated. The individual nursery averages were then pooled and averaged to give an overall average annual replacement cost per unit quantity of bulbs which was used throughout the costings as the basis of box depreciation.

Margins

Each of the measures of relative "profitability" used in this study is referred to as a "margin". Every margin is based on the difference between total net receipts and the sum of all the direct costs of which account has been taken - referred to as "total expenses". The term "profit" has deliberately been avoided, since its use might be taken to imply that all costs, including a proportion of overheads, had been charged to the bulb-forcing enterprise.

