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Potatoes - Cost of production

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DEPARTMENT OF AGRICULTURAL ECONOMICS

dept

EARLY POTATOES IN CHESHIRE & LANCASHIRE

Some Economic Considerations

ROSEMARY WALKER AND JAMES BLUNDELL

BULLETIN No. 107/EC 60

Price: FOUR SHILLINGS

Early Potatoes in Cheshire and Lancashire

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Acknowledgements

The Department of Agricultural Economics is indebted to the farmers who kept records and provided the information upon which this report is based.

The authors of the report are also grateful to colleagues who helped them at various stages of the survey.

Summary

1. Early potato growing was surveyed in Cheshire and South West Lancashire in 1961 and 1962 (Table 1).

2. Returns and profits varied widely between growers and between years (Table II; and Section II p. 4).

3. Ulster Prince was planted on more than half the acreage surveyed: the proportions planted in the Counties were similar and increasing. (Table III and Section III p. 13).

4. Ulster Prince appears to be a high yielding variety and relatively profitable (Table VII and Section III p. 13).

5. Factors influencing yield include planting and lifting dates, weight of seed planted, fertilising. (Table IX and Section III p.p. 13 - 18.

6. Casual labour and the substitution of machinery is discussed in Section II p.p. 7 - 12.

7. Year to year fluctuations in returns and profits are discussed in Section IV (Chart 2). Early potatoes are a speculative crop.

SECTION I Introduction

The early potato crop is important to the economy of many primarily milk producing farms of North and Central Cheshire whilst it is not unimportant on the mainly arable farms of South West Lancashire. In the following pages there is a brief report of economic surveys carried out in 1961 and 1962, together with suggestions for further work on the economics of the early potato crop.

In Cheshire and South West Lancashire the crop comes on the market between the first home-grown earlies of South West England and Pembrokeshire and the second earlies and main crop potatoes. Its economic prospects, therefore, do not depend solely upon the relation between the new season's supply and the balance of last season's stocks. They are affected by seasonal conditions and the flow of supplies from other areas.

There are always some exceptionally early producers but it is normal for 80 per cent. or more of the Cornish and Pembrokeshire crops to be cleared by the time Cheshire and South West Lancashire lifting gets under way. In a year, such as 1963, when all the early crops are late but there are ample stocks of old potatoes, the price of first earlies never touches really high levels and the volume of supplies quickly reduces that opening price. However, if regional supplies are well spaced, so that North Western growers have their local mid-July market largely to

themselves, and this is associated with light crops as was the case in 1962, then they may obtain very favourable prices.

Early potatoes are, therefore, a speculative crop and returns may be expected to vary substantially from year to year regardless of yield. Readers will find that this report, whilst seeking to get the matter into proper perspective, nevertheless repeatedly underlines the uncertainty of the enterprise.

In the next two sections will be found some consideration of the costs of growing early potatoes and of the effect of such factors as seed rate, manurial treatment, and date of lifting upon yields. The final section deals with factors which determine returns for the crop. From this it emerges that further study is needed to examine, for example, the rate of bulking of the crop during the season, growers' strategy in relation to price and general uncertainty, and the individual grower's scope for manoeuvre having regard to his farming system, weather, or the pressure of 'imported' supplies. These factors, rather than technical skill in cost reduction, are likely to be the major determinants of profits, although, obviously, costs of production cannot be entirely ignored.

"Early potatoes", for the purpose of this Lancashire and Cheshire survey, have been defined as those lifted for sale before the end of July rather than by reference to variety. In this sense "early varieties" and "early potatoes" were not necessarily synonymous.

SECTION II General Examination of the Survey Results

Average financial results from the survey of 74 farms in 1961 and 68 Farms in 1962 were as follows.

	1961	1962
	£ per Acre	£ per Acre
Costs	99.1	116.1
Returns	156.3	247.0
Profit Margin	57.2	130.9

The change in the average profit margin between 1961 and 1962 is striking. However, the averages cover extremely wide variations in individual farm profitability and approximately one-third of the farms had profit margins per acre outside the range £14 to £100 in 1961 and £71 to £191 in 1962. To consider these variations it is desirable to know something about the farms.

Farm size was above average: about 130 acres in Cheshire and 160 acres in South West Lancashire. Roughly one fifth to one quarter of the acreage was devoted to potatoes, the higher proportion being found in Lancashire. The proportion of the total potato acreage devoted to earlies was much higher for the sample farms than for the average potato growing farm in the two counties; 30 per cent. for the Lancashire survey farms and over 70 per cent. in the case of the Cheshire farms. Consequently the survey results refer to a much larger acreage in Cheshire than in South West Lancashire:

	1961		1962	
	Cheshire	South West Lancs.	Cheshire	South West Lancs.
Total Early Potato Acreage Costed.	604	159	548	123
Number of Growers.	50	24	45	23
Average Acreage Costed per Grower	12.1	6.6	12.2	5.3

Most of the survey acreage was planted with comparatively few varieties which corresponded closely to the pattern for the counties as a whole. This aspect is referred to again in Section III. Ulster Prince has been increasing in popularity and accounted for 60 per cent. of the survey acreage in 1962; Arran Pilot occupied almost 20 per cent. and the remainder was shared amongst all other varieties.

Some growers grew more than one variety and different fields, even if growing the same variety, sometimes received different treatments. Consequently 142 "farm" results for the two years gave rise to 219 "crop" results. When considering the factors influencing yield (Section III) use has naturally been made of the "crop" results. For the remainder of the report, which deals largely with differences between growers, the "farm" records have been used. Whilst there is more variability between crop than between farm results the "crop" and "farm" averages are fairly close as the following figures demonstrate:

	1961		1962	
	£ per acre		£ per acre	
	"farm"	"crop"	"farm"	"crop"
Costs	99.1	98.2	116.1	114.5
Returns	156.3	155.2	247.0	254.9
Profit Margin	57.2	57.0	130.9	140.4

The increase in costs between 1961 and 1962 was due mainly to the higher price of seed for the latter year. Greatly increased returns were reflected in the much higher profits of 1962. In either year higher profits on individual farms were likewise a reflection of higher returns. High farm profits were associated with high yields in 1961 and less closely so in 1962.

Cheshire and South West Lancashire results afford an interesting contrast. There was little difference in costs between the regions in either year but Cheshire profit margins were £30 per acre greater than Lancashire's in 1962 compared with a difference of only £5 in 1961. This increase of £25 in the difference of profit margins per acre was chiefly a reflection of the greater gap between the returns obtained. Something can, perhaps, be said regarding the possible reasons for this difference.

Whilst at any given date the South West Lancashire growers appear to obtain rather higher prices, average returns per cwt. of ware sold were higher for the Cheshire growers because, on

average, they are able to lift a little earlier than the Lancashire area. Despite this earlier lifting, however, Cheshire yields were comparable with those of the Lancashire farms in 1961 and higher in 1962. This somewhat better performance on the part of the Cheshire growers may reflect greater attention to a crop which is more important in the farm economy than it is in Lancashire. It is more likely, however, to be the outcome of the farming pattern. The fact that potatoes occupy the land less frequently in Cheshire has already been noted. Furthermore, the Cheshire farms are mainly grassland (56 per cent. grass), whilst the south-west Lancashire farms are mostly under crops (72 per cent. crops). Consequently potatoes in Cheshire commonly follow a three year ley but in Lancashire they often follow a one-year ley from which a hay crop has been taken. These factors would seem to provide part of the explanation of higher Cheshire yields.

Although economies in the amount of the individual inputs used and variations in the proportions in which the inputs are combined are only secondary sources of additional profits, something might be said at this stage about the labour figures in our survey results. In farm planning it is customary to regard the regular labour as a fixed resource and casual labour as variable. The requirement of casual labour, however, will vary from farm to farm according to the supply of regular labour (in relation to the demand on it by other enterprises) and the method of planting and

harvesting the crop. In the survey, Cheshire growers made much more use of casual labour, than did the South West Lancashire growers. On average, however, there was little difference in total labour use or costs. As between individual growers the use of casual labour varied from none at all to over 60 per cent. of the total. If we were to find two growers with identical cost structures, corresponding to the average for all farms shown in table II, and differing only in that one grower used no casual labour, whereas the other used more than 60 per cent., the calculated gross margins would differ by about £14. Both growers would, nevertheless, properly regard their own figures as appropriate to their own planning purposes. However, it is fairly common to take average gross margins calculated from enterprise costs, as in table IV, when planning for individual farms. To do so for such different circumstances as those exampled above, or where the requirements of a variable factor are substantially affected by the process used, may give misleading estimates of the gross margin for any particular farm.

In the case of the survey growers approximately half of them either dispensed altogether with casual labour or used it to the extent of more than 50 per cent. of their total labour requirement. Few of the South West Lancashire growers relied on casual labour to the extent of 40 per cent. of the total. In 1961 half of them, and in 1962 one third managed entirely without. In the case of the

Cheshire growers, in both years one quarter employed no casual labour, and in the case of another quarter, the ratio of casual to the total exceeded 50 per cent.

In general growers able to dispense with casual labour had a smaller early potato acreage than those relying on it to the extent of more than 50 per cent. Of those Lancashire growers who did not use casual labour, apart from two in 1961, all grew less than 10 acres. In Cheshire the position was as follows:

	1961				1962			
	No Casual		More than 50 per cent. casual		No Casual		More than 50 per cent. casual	
	Number	Av. Acreage	Number	Av. Acreage	Number	Av. Acreage	Number	Av. Acreage
Up to ten Acres	11	6.1	4	8.	9	7.0	3	5.1
More than ten Acres	2	12.0	10	23.8	2	17.3	8	25.0

These figures are such as we might expect. They suggest that comparatively small acreages can be handled by the regular farm staff but few growers of more than about 10 acres appear to be independent of casual labour. This dependence can be reduced by investing in a potato harvester. Whether or not a grower seriously considers this alternative depends in part on his combined early and main crop acreage. However, if casual labour costs rise in future more rapidly than the cost of machines to displace them or such labour becomes increasingly difficult to obtain, early potato

growers are likely to become more and more interested in comparing the costs of mechanised harvesting with those where pickers follow the elevator or spinner. An attempt is made in the ensuing paragraphs to suggest an approach which might help the grower in reaching a decision.

Investment in Potato Harvesting Machinery

The principles illustrated here are similar for all situations of machinery-labour substitution. The problem of choice only arises if both alternatives are in fact open to the grower. For a grower who cannot, or will not, engage casual labour the alternatives are, broadly, to harvest by machine or not to grow potatoes at all. If the alternatives exist then there are two parts to the problem; one is a financial calculation, the other concerns uncertainty and both arise from the passage of time.

The purchase of machine commits a grower to expenditure now, whereas the employment of casual labour would involve successive expenditures in the future. No grower can be certain about the "life" of a machine, the acreage of potatoes he is going to grow in each of the years of life of the machine, or the terms on which the alternative of casual labour is likely to be available during these years. Nevertheless the possibility of being able to arrive at a decision at all depends upon being able to make informed guesses at each of these unknowns.

If one assumes that the running costs, such as fuel, are the

same per acre as when a tractor and elevator digger are used, the costs associated with extra machinery are fixed. That is to say there will be depreciation and repairs plus interests on the average investment. For a harvester costing £775, for which a life of 7 years and a scrap value of £25 is assumed, the average annual costs would be as follows:-

Depreciation	(£750 ÷ 7)	£107
Repairs		£ 28
Interest at 6 per cent.	$\frac{0.06 \times 750}{2}$	£22,5
		£157.5

This annual fixed cost of £157.5 represents a smaller charge per acre the greater the acreage over which the machine is used. This is illustrated in Chart I in which the per acre figures are plotted over a range of 1 to 20 acre for three machines whose average annual costs are, respectively, £100, £157.5 and £200.

The saving in labour cost to be set against the extra machinery costs will consist of the wages of casual labour no longer required: Suppose that the machinery investment contemplated would reduce casual labour requirements from 50 to 10 hours per acre and that wages for casual labour are expected to average 4s. 6d. an hour. Harvesting labour expenditure will then be reduced by £9 an acre. (40 x 4s. 6d.)

Under such conditions it would pay to replace 40 hours per acre of casual labour by a harvesting machine costing £157.5, as

illustrated in Chart I, provided at least 17½ acres of potatoes (early and main crop combined) were to be harvested. (£157.5 ÷ 17½ = £9) that is to say at least 17½ acres must be grown if the per acre cost of the machine is to be no greater than the cost of the labour it will replace. The "critical" acreage for each grower will, of course, depend upon the annual machinery cost, the likely labour saving, and the wage rate he assumes.

This calculation is starting point though it may not prove decisive. A grower might feel that other factors, such as ease of organisation, speed of operation (important in difficult weather), and flexibility of lifting in the light of fluctuating potato prices, may justify the use of a machine although it cannot be shown to be cheaper. Even so, a comparison of costs will indicate how much he must pay for these other advantages.

SECTION III: Yield

Profits from early potatoes in the case of the sample farms were related to yield. The relationship was particularly close in 1961. Since Lancashire and Cheshire growers cannot lift soon enough to compete in the first stages of the home grown potato market, they need to grow a variety which will bulk rapidly by (say) early July in order to offset the falling prices caused by increasing supplies. A variety with a reputation for bulking rapidly towards the end of the early season is Ulster Prince. Yields from this variety on the sample farms exceeded the average of all other varieties by 16 cwts. per acre in 1961 and by 6 cwts. per acre in 1962.[1]

Neither survey year was typical in that, after a fall in price in late June, there was a recovery in July. Growers lifting in the first half of July thus reaped an abnormal bonus in both years. In a year when prices did not show this temporary upward turn only those growers with heavier than average crops would obtain exceptional profits from July lifting. The increasing popularity of Ulster Prince in Lancashire and Cheshire reflects the efforts of more growers to obtain this advantage.

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1. The difference in 1962 was not statistically significant at the 90 per cent. level. This means the difference could be the result of the chance, not that it necessarily was so. Part of the difference in yield in 1961 can be traced to the higher seed rate and higher rate of application of Farm Yard manure.

Acreage planted to All Earlies and to different varieties

		1st Earlies	2nd Earlies	Arran Pilot	Home Guard	Ulster Prince	Craigs Royal	Others
Cheshire	1960	5250	470	1425	768	2105	258	1164
	1961	4810	400	1181	419	2516	283	891
	1962	4770	460	1049	303	2726	308	840
Lancashire	1962	2484	926	507	132	1538	797	436
	1963	3060	1160	593	208	1952	604	863

Source, Potato Marketing Board

The more widely Ulster Prince is adopted, however, the less is the relative advantage which its growers obtain.

Ulster Prince Crops grown in Cheshire

Many factors affect yield. By concentrating upon Ulster Prince crops grown in Cheshire the variations associated with variety and location are removed whilst, at the same time, the group still represents an important segment of North West early potato production.

Even within this more homogeneous group it was not possible to associate more than half the variation in yields with differences in cultural practice. In 1961 the lifting date, seed rate and use of farm yard manure seemed to influence yield. In 1962, the important factors appeared to be planting date, lifting date, and use of fertilisers. All these factors - and others - will influence the yields on different farms but their individual importance will vary according the circumstances, such as the weather conditions of a particular season or situation.

This is one reason why the survey results do not correspond

closely with those obtained from early potato trials carried out on experimental farms. An experiment may measure precisely the isolated effect of a single factor but it can only be expected to have exactly that effect under conditions identical with those of the experiment. Survey results are averages of diverse conditions and, therefore, will only indicate the broader trends. For example the survey suggests that, over the period from early June to the end of July, the daily rate of increase in yield is a little under 2 cwts. per acre whereas experiments suggest a much greater rate. Our methods of relating lifting date to yield were necessarily crude,[1] this makes it the more remarkable that the estimated rates of bulking were similar (and highly significant statistically) in both years. It is not surprising that planting date is a less stable influence: quite clearly this, in turn, depends upon the weather; i.e. how soon the land is fit to be cultivated, how rapidly to the soil temperature rises, if and when late frosts strike.

Manuring and Seed Rate

The composition of farm yard manure and its physical characteristics vary widely from farm to farm. Consequently the the quantity used - even if accurately known - is only a crude measure of its contribution to nutrient supply and soil texture. The weight of artificial fertiliser applied is probably the best single measure of its nutrient content but there can be little doubt that attempts

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1. See Appendix. Definition of Terms.

to measure its influence are confused by the interaction effects of Farm Yard manure. In practice it seems likely that both sources of plant nutrient are important to the crop. Analysis of the survey results for Cheshire growers of Ulster Prince indicated that farm yard manure was the significant influence in 1961 and artificials in 1962. Unfortunately this survey does not show how these two influences interact to affect yield but it is clear that manuring is important. Most farmers recognise this by using both farm yard and artificial manures.

Fertilisers supply mainly Nitrogen, Phosphate, and Potash but all the nutrients are not completely available to the crops at the same time. Here, then are two matters of significance to the grower:

(i) What is the best ratio of plant nutrients for the crop in question?

(ii) How much of a given fertiliser is available (and should be charged) to the crop for which it is applied?

Whilst this survey is unable to add to existing information on these topics two comments may well be made.

Too high a ratio of potash to nitrogen and phosphate is said to delay the bulking of early potatoes.[1] In producing a crop whose price may normally be expected to fall from day to day, any delay in bulking will reduce income. The standard recommendation,

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1. Potatoes, Ministry of Agriculture Bulletin No. 94, page 34.

when a moderate dressing of Farm Yard manure has been applied, is a 1 : 1 : 1 ratio.[1] However, the majority of growers in the sample, having applied Farm Yard manure nevertheless used a compound fertiliser with a higher potash ratio. Assuming that fertiliser theory is correct, the loss to these growers is not the insignificant cost of the potash which their crops do not need but the significant reduction in receipts which comes about from the delayed bulding during a period of falling prices.

Availability of the chemical constituents of fertilisers depends upon various conditions such as the drainage and structure of the soil and the amount and distribution of rainfall. Standard residual values of fertilisers are calculated primarily for use in connection with tenant right valuations. It seems possible therefore that "true" availability of nutrients to a crop may be indicated just as well by the quantity of fertiliser applied as by a 'net' figure which allows for computed residues. Quantities applied have been used in the present analysis because this generally provides the best explanation of the influence of manures on the yield of early potatoes.

Finally, it should be noted that the weight of seed planted per acre apparently influenced yield significantly in 1961 but not in 1962. Here again more influences were at work than a general survey can measure. The evidence from experimental data is that size of seed and distance between sets do not in themselves

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1. Ibid page 14.

influence yield:- it is the combined effect expressed in the weight of seed planted per acre which is important.[1] Closely related to weight of seed are the obviously important factors of seed quality - a reflection of how the seed has been grown and stored over the winter - and the care exercised by the planters.

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1. Boyd and Lessels. Journal of Agricultural Science 1954 Vol. 44 pp 465 - 476

SECTION IV Year to Year Fluctuations in Returns

The wide range in profit margins between growers in each of the seasons 1961 and 1962 was indicated in Section II which also showed how different the average margins were in those two years, although both years were generally regarded as comparatively favourable for early potato growers. This section attempts to extend the analysis outside the period of the survey in order to indicate the kind of year to year variation in average margins to be expected over a period of 5 to 6 years.

Variations in margins arise chiefly from fluctuations in yields and prices although there is one item of cost - that of the seed - which may vary substantially from year to year. The factors involved in determining the price of early potato seed are too complex for any simple relation between crop prices and seed prices the following year to be established. However, it can happen that seed prices may be high in a year when prices of the crop grown from that seed are low. This occurred in 1963 and reinforced the depressing effect of the lower crop prices on profits.

In order to estimate the variation in annual average profits two simplifying steps have been taken:

1. Costs have been assumed stable at around £100 an acre each year.
2. Returns have been calculated from estimated yields and prices.

In estimating yields it has been assumed that yields on the

survey farms varied from year to year in the same proportion as national yields varied. The estimate of average prices for any season depends upon the change in price per ton during the season and the relative quantities of potatoes lifted at various stages during that season. Prices quoted by the Appleton exchange during the early potato seasons 1959 to 1963 are shown in Chart II. These prices are weighted for 1959 and 1960 by the pattern of lifting on the survey farms in 1961 since all these seasons could be regarded as "forward" for early potatoes in Cheshire. For 1963 the pattern of lifting in 1962 is used since both these seasons could be regarded as "backward". The result of these calculations is shown in the following figures:

	Average Yield England and Wales			Estimated Survey Yields (tons per acre)	Estimated Average Price (£ per ton)	Estimated Returns per Acre £	Per cent. change on Previous Year
	Tons per Acre	As per cent. of Next Year	As per cent. of Last Year				
1959	5.7	91.9		6.09	24.9	151.5	
1960	6.2	106.9		6.62	19.1	126.3	-16.6
1961	5.8			6.20*	25.2*	156.3*	+23.7
1962	4.9			6.06*	40.75*	247.0*	+58.0
1963	6.5		132.6	8.02	18.0	144.5	-41.5

* Actual survey yields, prices and returns.

The average year to year change in returns per acre was 35 per cent. during the period 1959-63, on the basis of the estimated figures given above. An alternative statement of the same fluctuating

results is that, assuming costs to have been constant during the period, profits varied from year to year by an average of over £61 per acre. Such variation means that early potatoes can fairly be described as a speculative crop and an uncertain source of income for any single year. Yet the crop occupies less than ten per cent. of the survey farms' acreage and the influence of these fluctuating returns on farm income, though important, should not be exaggerated.

Quite clearly individual growers will have differing approaches towards speculative crops. If they intend to grow early potatoes regularly farmers may usefully observe from the approximate estimates of this section; first, that the "average" profit may be halved or doubled between one year and the next: secondly, than an exceptionally good profit occurred only once in the past five years.

CHART I PER ACRE COST OF POTATO HARVESTER IN RELATION TO ACREAGE HARVESTED

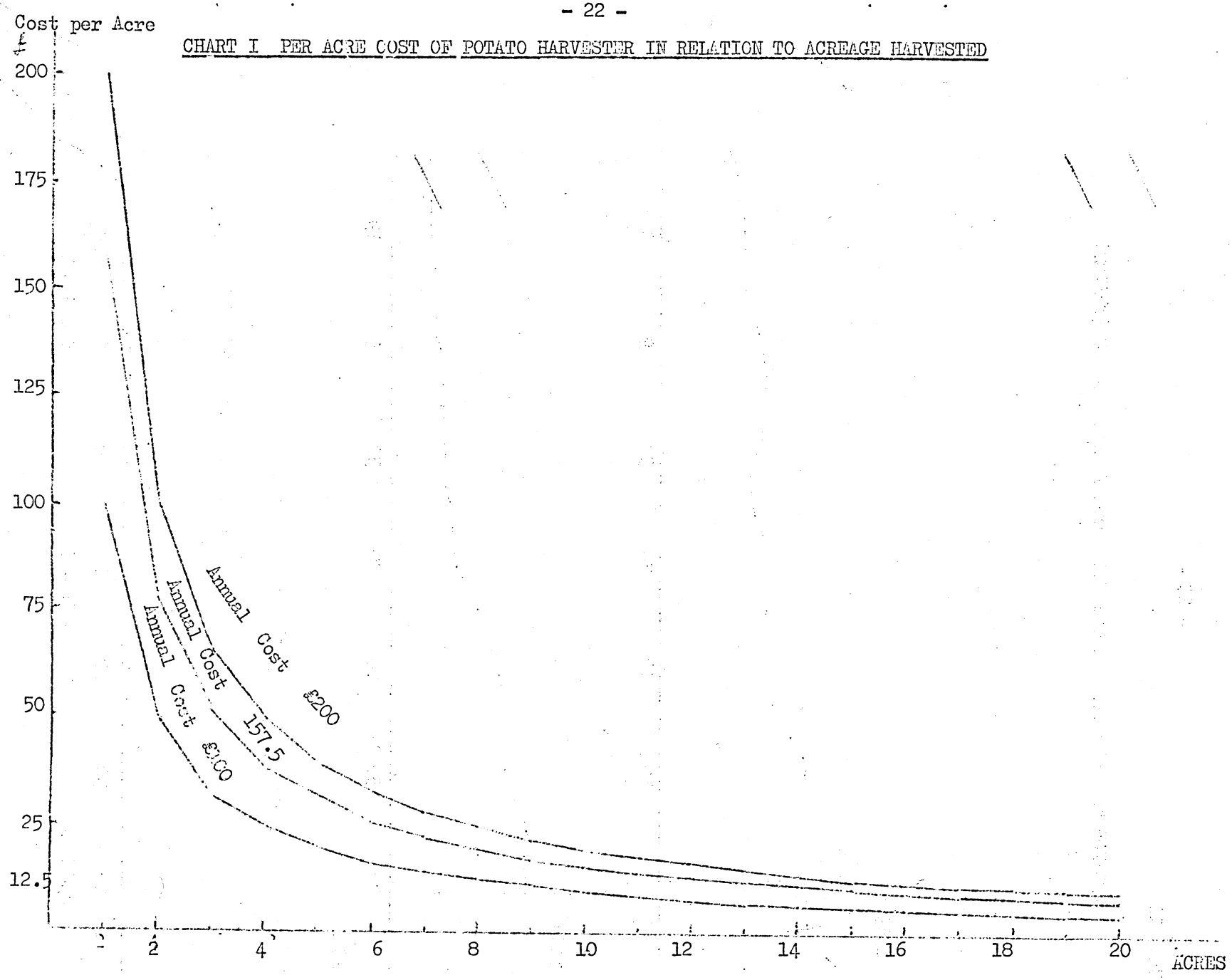
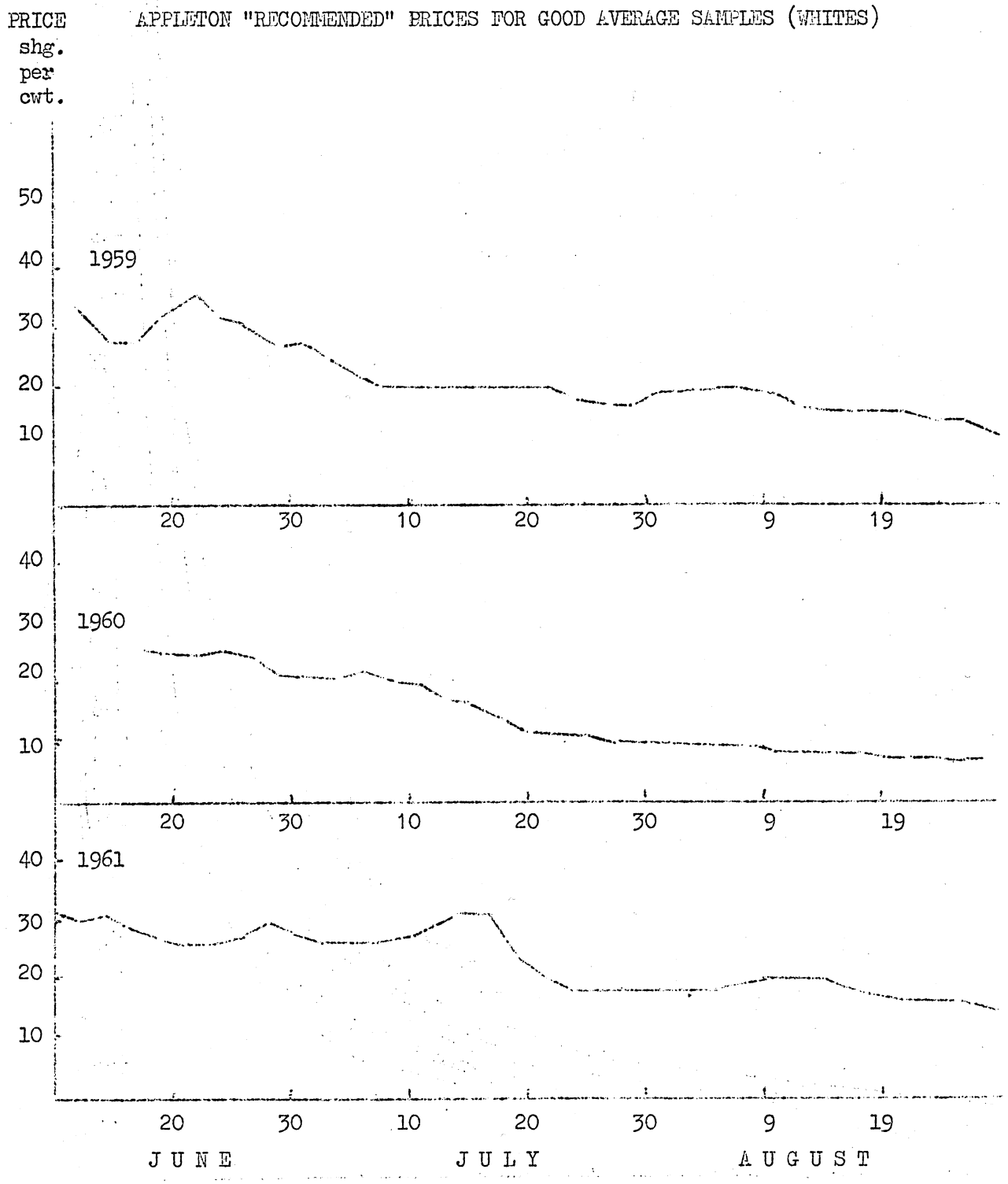


CHART II


PRICE
shg.
per
cwt.
APPLETON "RECOMMENDED" PRICES FOR GOOD AVERAGE SAMPLES (WHITES)
50
40
30
20
10
1959
20
30
10
20
30
9
19
40
30
20
10
1960
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1961
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JUNE
JULY
AUGUST

CHART II

APPLETON "RECOMMENDED" PRICES FOR GOOD AVERAGE SAMPLES (WHITES)

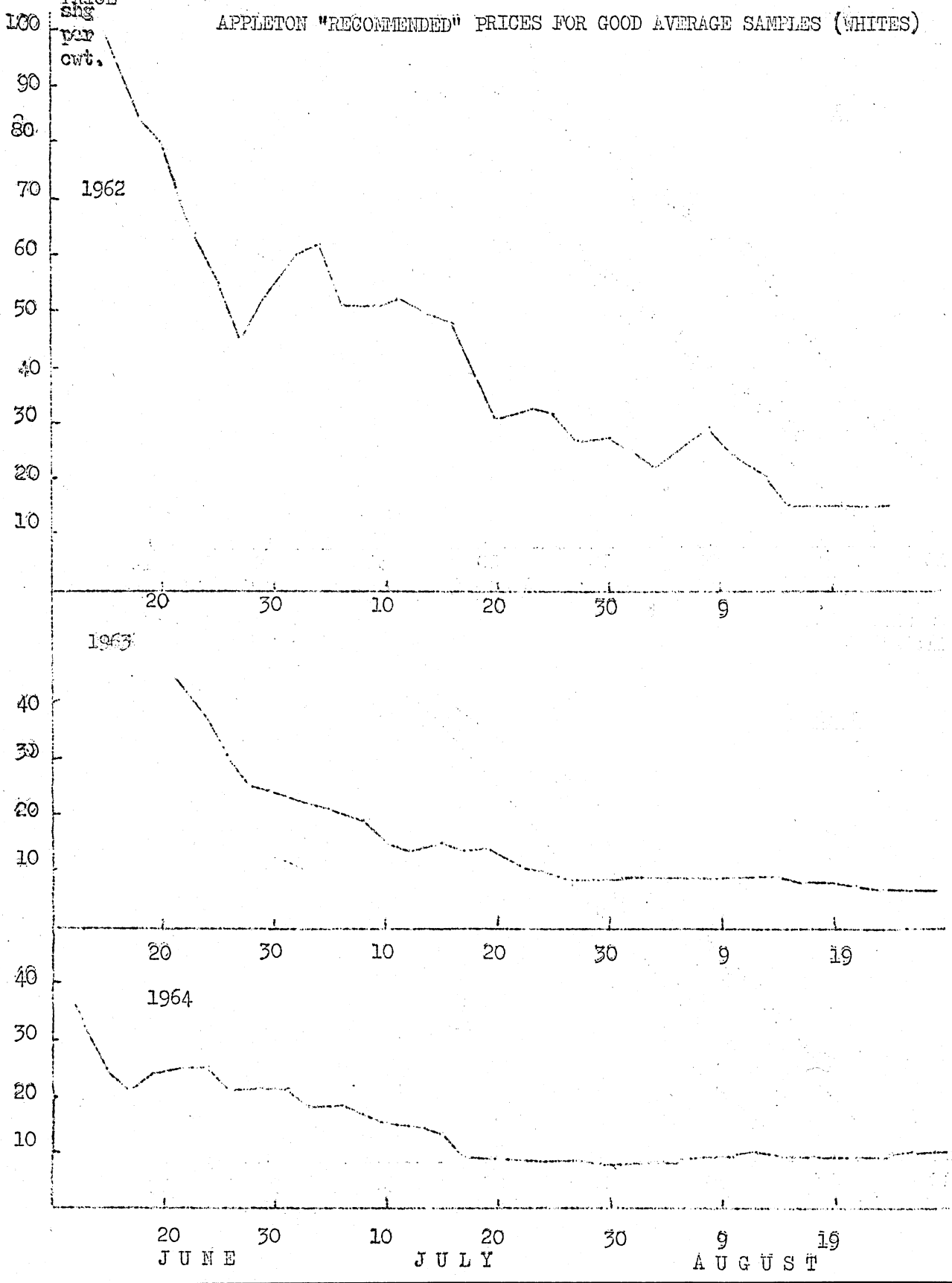
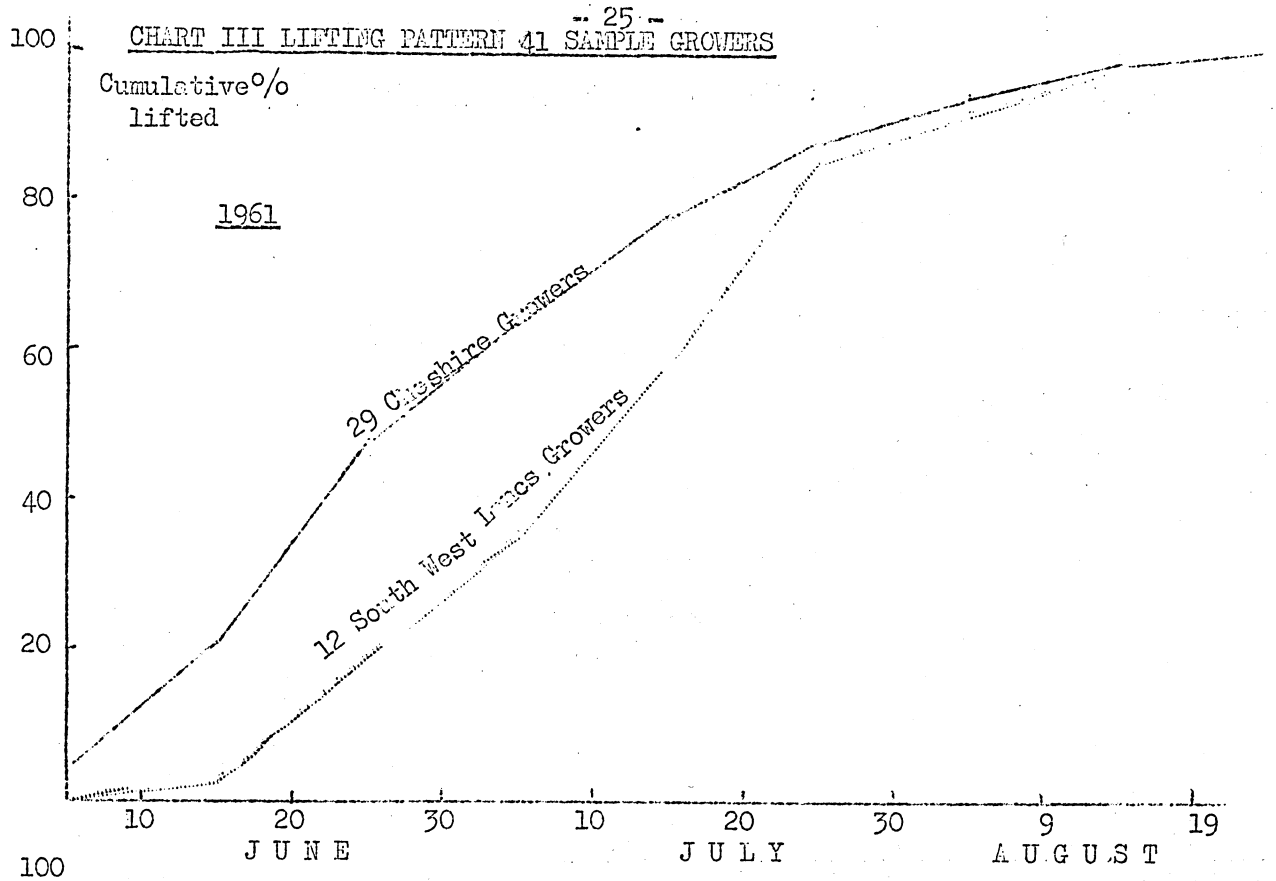


CHART III LIFTING PATTERN 41 SAMPLE GROWERS



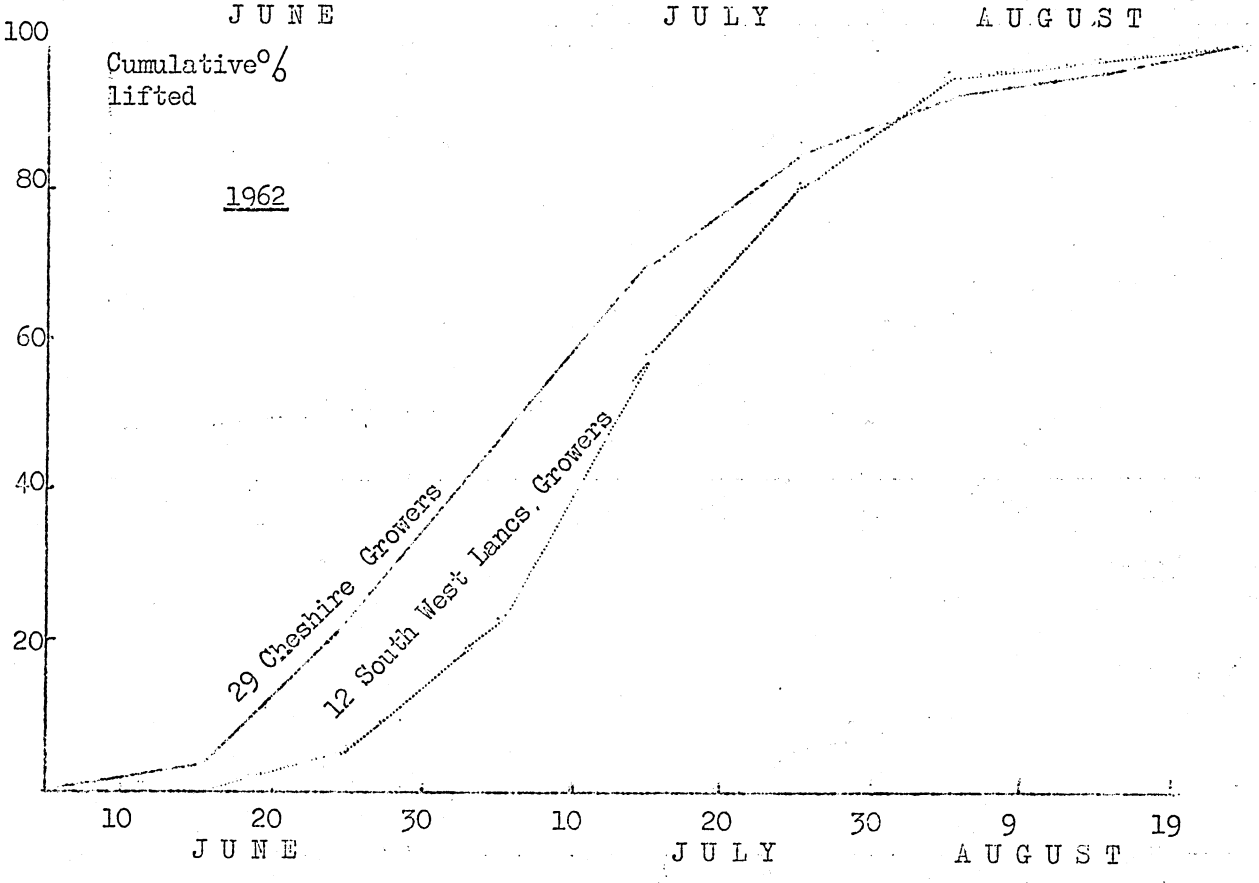


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TABLE I: Some General Information Concerning the Farms in the Sample

	1961			1962		
Area	Cheshire	S.W. Lancs	All	Cheshire	S.W. Lancs	All
No. of Farms	50	2	74	45	23	68
Average farm Size (Acres).	130	158	139	136	156	145
Average total Potato acreage.	18	24	20	18	24	20
Average early potato acreage.	13	8	11	13	6	10
Total potatoes as per cent farm size.	13.8	15.2	14.4	13.0	15.2	13.9
Early potatoes as per cent total potatoes	73	31	56	75	27	55
Total acreage of earlies costed.	604	159	763	548	123	671
Average acres costed per farm	12.1	6.6	10.3	12.2	5.3	9.9

TABLE II: Average Costs, Returns, and Margins per Acre

	1961			1962		
	Cheshire £	S.W. Lancs £	All £	Cheshire £	S.W. Lancs £	All £
Regular Labour	14.6	17.2	15.1	14.9	18.9	16.3
Casual Labour	6.1	2.7	5.2	6.4	1.5	4.8
Tractor and Horse	4.9	5.1	4.9	5.0	5.9	5.3
Machinery Repairs and Depreciation	9.1	9.4	9.2	9.[illegible]	11.4	9.8
Contract Charges	0.2	-	0.1	0.4	-	0.3
Seed	31.7	30.[illegible]	31.1	45.4	42.[illegible]	44.6
Farm Yard Manure (net)	9.2	8.3	8.9	8.3	9.8	8.8
Artificials and Lime (net)	9.0	9.6	9.[illegible]	9.1	9.7	9.1
Miscellaneous	0.9	1.0	0.9	1.1	1.6	1.4
Rent	3.3	3.7	3.5	3.4	4.6	3.[illegible]
Overheads	11.0	11.0	11.0	11.8	12.0	11.9
Total Costs	100.0	98.0	99.1	114.8	118.2	116.1
Standard Deviation of* Costs	13.1	14.6	13.6	12.9	12.5	13.0
Returns	158.7	151.3	156.3	256.6	229.5	247.0
Standard Deviation of* Returns	45.3	51.1	47.4	63.7	59.3	63.3
Margin	58.7	53.3	57.2	141.8	111.3	130.9
Standard Deviation of* Margin	39.9	49.0	43.1	59.4	56.5	60.2
Yield (cwts)	124.1	123.8	124.0	124.7	114.3	121.2
Return per cwt when sold (Shgs)	26.2	24.4	25.2	41.15	40.15	40.75

* Standard Deviation: Approximately two-thirds of the individual results lay within a range Average minus One Standard Deviation to Average plus One Standard Deviation.

TABLE III: Acreage Planted to Different Varieties in 1961 & 1962

VARIETY	1961		1962	
	ACRES	Per Cent.	ACRES	Per Cent.
Ulster Price	374	53	360	60
Arran Pilot	124	18	106	18
Home Guard	73	10	56	9
Ninetyfold	37	5	27	5
Premier	54	8	25	4
Others	41	6	26	4
All Varieties	703	100	600	100

TABLE IV: Gross Margins per Acre

	1961			1962		
	Cheshire	S.W. Lancs	Total	Cheshire	S.W. Lancs	Total
Casual Labour	6.1	2.7	5.2	6.4	1.5	4.8
Contract	0.2	-	0.1	0.4	-	0.3
Fuel (0.63 galls per tractor hour at 17.857d/ gall.)	1.4	1.4	1.4	1.3	1.7	1.5
Seed	31.7	30.0	31.1	45.4	42.8	44.6
Miscellaneous	0.9	1.0	0.9	1.1	1.6	1.4
Fertilisers	9.0	9.6	9.2	9.1	9.7	9.1
Total V. Costs	49.35	44.79	47.86	63.7	57.3	61.7
Total Returns	158.70	151.30	156.30	256.60	229.50	247.0
Gross Margin	109.4	106.6	108.54	192.9	172.2	185.3

TABLE Va: Distribution of Growers by Proportion of Casual Labour Hours to Total Labour Hours

Casual Labour Hours as per cent. total Labour Hours	1961		1962	
	Cheshire	S.W. Lancs.	Cheshire	S.W. Lancs.
NIL	13	12	11	8
< 10	3	1	-	4
10.1 - 20	5	4	2	5
20.1 - 30	3	-	6	-
30.1 - 40	6	4	7	4
40.1 - 50	6	3	8	1
> 50	14	-	11	1
	50	24	45	23

TABLE Vb: Comparison of Labour use of Growers employing no Casual Labour and employing more than 50 per cent. Casual Labour

	Number of Growers	Labour Hours per Acre				Average Acreage Costed
		All operations		Planting (Av.)	Harvesting (Av.)	
		Average	Range			
1961						
Cheshire N.C.	13	91	54-147	15.2	54.7	7.0
" ▷ 50% c.	14	140.3	100-178	19.2	92.9	18.3
S.W. Lancs	12	122.4	69-183	15.9	46.9	6.2
1962						
Cheshire N.C.	11	106.4	43-107	18.0	64.5	8.9
Cheshire 50% c.	11	136.9	90.8-190	20.7	88.9	19.6
S.W. Lancs	8	131.4	94-187	19.6	50.8	3.8

N.C. = No Casual
▷ 50% c = More than 50 per cent. Casual

TABLE VI: Average Monthly Labour Use Per Acre.

	1960/61					1961/62				
	Regular Workers			Casual Workers	Total	Regular Workers			Casual Workers	Total
	Men	Youths	Women			Men	Youths	Women		
	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours	Hours
September	-	-	-	-	-	0.04	-	-	-	0.04
October	0.15	-	-	-	0.15	0.11	-	-	-	0.11
November	0.48	-	-	-	0.48	0.85	-	-	-	0.85
December	0.58	-	-	-	0.58	0.88	-	-	-	0.88
January	0.75	0.03	-	-	0.78	0.62	-	-	-	0.62
February	1.74	-	-	0.27	2.01	1.18	-	-	0.06	1.24
March	9.89	0.73	0.05	3.59	14.26	9.10	0.25	-	3.04	12.39
April	6.03	0.17	0.01	0.65	6.86	6.37	0.48	0.04	1.67	8.56
May	7.21	0.40	0.29	1.22	9.12	6.34	0.30	-	0.75	7.39
June	14.31	2.07	0.12	14.03	30.53	10.18	0.73	-	6.59	17.50
July	19.02	2.46	0.21	10.58	32.27	25.20	2.08	0.37	17,70	45.35
August	3.65	0.27	0.05	2.24	6.21	3.35	0.83	0.03	1.72	5.93
Total	63.61	6.13	0.73	32.58	103.25	64.22	4.67	0.44	31.53	100.86

TABLE VII Yield per Acre in Relation to Returns and Profits per Acre (r^2)

	Number of Crops	r^2 Returns	r^2 Profits
1961			
CHESHIRE			
Ulster Prince	35	0.9502	0.8871
Other Varieties	52	0.7030	0.5669
S.W. LANCS			
Ulster Prince	22	0.8101	0.6756
Other Varieties	19	0.7858	0.7522
1962			
CHESHIRE			
Ulster Prince	36	0.6545	0.5459
Other Varieties	30	0.4483	0.3812
S.W. LANCS.			
Ulster Prince	16	0.3444	0.3648
Other Varieties	8	0.0962	0.0709

r^2 is a measure of the proportion of the Variation in Returns and profits per acre explained by variations in yield per acre.

TABLE VIII: Comparison of Costs, Returns, Margins per acre and other data for Ulster Prince and Other Varieties.

	1961		1962	
	U. Prince	Others	U. Prince	Others
Number of Crops	58	71	52	38
Total Net Cost £	101.7	95.4	114.5	114.5
Gross Return £	172.2	140.8	263.8	242.6
Margin £	70.5	45.4	149.3	128.1
Yield cwt.	132	116	119	113
Average Receipts per cwt. ware sold sh.	26.4	25.1	45.4	45.3
F.Y.M. (net) £	9.3	7.8	8.7	8.6
Artificials & Lime (net) £	9.4	9.2	9.6	9.2
Seed £	31.9	27.7	44.1	42.3
Seed Rate cwt.	24.5	22.6	24.5	23.9
Start Planting	22nd March	21st March	27th March	25th March
Start Lifting	23rd June	27th June	28th June	29th June
Interval Days	93	98	93	96
Yields (over 6 tons	34 (59%)	29 (41%)	25 (48%)	16 (42%)
Yields (under 6 tons	24 (41%)	42 (59%)	27 (52%)	22 (58%)

TABLE IXa: 36 Crops Ulster Prince: Cheshire 1961

EQUATION NO. / VARIABLES		I	II	III
SCALE CONSTANT		-48.68	-45.8	-38.93
	AVERAGE VALUE			
Yield cwts.	135.89			
Fertiliser: cwts applied	10.69		1.2881 (2.6325)	
Fertiliser: Expenditure	10.63	1.5559 (2.8541)		
Fertiliser: Net Cost	9.26			0.6472 (1.0522)
Farm Yard Manure: Tons Applied	14.5	2.2428 (0.9860)	2.2557 (1.0017)	
Farm Yard Manure: Net Cost	9.33			3.5836 (1.5760)
Seed Rate: cwts	26.8	3.6218 (1.2264)	3.6994 (1.2156)	3.7717 (1.2086)
Planting Date: mid point	Mar. 22		-0.3068 (1.21)	
Average Date planting began	Mar. 18			
Lifting Date: mid point	June 30	1.8745 (0.6627)	2.0963 (1.1195)	1.6755 (0.6529)
Average Date Lifting began	June 18			
R^2		0.49289	0.49426	0.49525

Standard Errors of Regression Coefficients in brackets

TABLE IVb: 36 Crops Ulster Prince: Cheshire 1962

VARIABLES / EQUATION NO.		I	II	III	IV	V
	SCALE CONSTANT	2.73	1.87	1.07	9.21	6.53
	AVERAGE VALUE					
Yield cwts.	122.5					
Fertiliser: cwts applied	11.07					4.1553 (1.9974)
Fertiliser: Expenditure	11.04			4.0201 (2.4801)	4.1471 (2.3459)	
Fertiliser: Net Cost	9.34	2.3509 (2.8498)	3.2126 (2.6383)			
Farm Yard Manure: tons applied	12.8		1.1385 (0.6399)		0.9825 (0.6322)	1.0311 (0.6164)
Farm Yard Manure: Net Expenditure	8.57	1.2952 (1.1252)		1.0566 (1.0881)		
Mid point of Planting Date	March 26	1.2674 (0.6738)	1.1904 (0.6541)	1.3386 (0.6223)	1.2085 (0.6178)	1.1340 (0.5923)
Average Date planting began	March 22					
Mid point of Lifting Date	July 9	2.0290 (0.5389)	1.9460 (0.5069)	1.7639 (0.5571)	1.7077 (0.5223)	1.8684 (0.4877)
Lifting Began	June 26					
R^2		0.5185	0.5444	0.5464	0.5663	0.5813

TABLE X: Proportion of Crop Lifted During Specified Periods

DATE LIFTED	29 CHESHIRE GROWERS			12 S.W. LANCASHIRE GROWERS			41 GROWERS, CHESHIRE AND S.W. LANCS.		
	Per cent. Lifted	Cumulative (end of period)	Average Price s/cwt	Per cent. Lifted	Cumulative (end of period)	Average Price s/cwt	Per cent. Lifted	Cumulative (end of period)	Average Price s/cwt
1961 on or Before June 10	4.32	4.32	38.3	0.28	0.28	39.0	3.6	3.6	38.3
June 11-20	16.98	21.30	27.5	2.23	2.51	31.8	14.3	17.9	27.6
June 21-30	26.67	47.97	26.7	17.63	20.14	30.0	25.1	43.0	27.2
July 1-10	16.26	64.23	25.6	15.99	36.13	27.7	16.2	59.2	26.0
July 11-20	14.14	78.37	26.3	22.86	58.99	30.0	15.7	74.9	27.2
July 21-31	9.89	88.26	18.5	27.32	86.31	19.7	13.0	87.9	18.9
Aug. 1-10	6.00	94.26	17.8	5.41	92.72	19.3	6.1	94.0	18.1
Aug. 11-20	3.63	97.89	18.2	5.12	97.84	21.2	3.9	97.9	18.9
After Aug. 20	2.01	100.0	13.6	2.16	100.0	18.3	2.1	100.0	14.3
1962 on or Before June 10	0.30	0.3	134.6	-	-	-	0.2	0.2	134.6
June 11-20	3.18	3.48	80.0	0.41	0.41	80.0	2.8	3.0	80.0
June 21-30	19.20	22.68	52.2	5.91	6.32	54.0	17.3	20.3	52.3
July 1-10	24.86	47.54	55.3	16.83	23.15	57.5	23.7	44.0	55.6
July 11-20	23.11	70.65	43.6	35.30	58.45	44.1	24.9	68.9	43.7
July 21-31	14.62	85.27	28.7	23.17	81.62	33.7	15.9	84.8	29.7
Aug. 1-10	7.84	93.11	24.7	13.95	95.57	26.3	8.7	93.5	25.1
Aug. 11-20	2.69	95.80	17.7	1.83	97.40	21.5	2.6	96.1	18.1
After Aug. 20	4.20	100.0	13.6	2.60	100.0	14.8	3.9	100.0	13.7

DEFINITION OF TERMS

Manual Labour

Hourly rates were based on the wages paid on each farm with appropriate allowances for overtime work, holidays with pay, the employer's share of National Insurance and any free perquisites etc.

In the case of employees receiving the minimum wage the hourly rates applicable were:

1961 - 4/3d 1962 - 4/4½d

Tractors

A charge of 4/- per hour was made to cover the cost of fuel, repairs and depreciation on tractor.

Depreciation and Repairs to Implements and Machinery

A charge of 6/- per hour of use was made for all implements and machinery except complete harvesters for which an allowance was made on the basis of age and initial cost.

Artificial Fertilizers

These were charged at cost net of subsidy. An allowance of 25% of the cost of compounds was made in respect of manurial residues.

Lime

A charge of 25% of the net cost of lime applied during the preceding three years.

Farm Yard Manure

Farm Yard Manure produced on the farm was charged at £1 per

ton (purchased manure at cost on the farm) plus the cost of spreading. Appropriate adjustment was made for residual values.

Rent

Where the early potato crop was followed by a catch crop the rent was apportioned on a 50/50 basis.

Seed

Home grown seed was charged at the following basic rates per cwt. plus any costs incurred in chitting and storage:

1961 - 21/- 1962 - 29/-

Share of General Farm Expenses

A sum of £10 per acre plus the Potato Marketing Board levy.

End-point of the Costs

This was taken as being when the potatoes were loaded on the merchant's lorry in the farm-yard or field.

When the grower himself delivered to a wholesale market or a retail shop prices received were discounted appropriately.

Planting and Lifting dates

These were taken as being the mid-points between the dates each operation commenced and was completed.