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Apples-Prices

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Adjusting to Lower Prices
for Culinary Apples

by
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Wye College

DEPARTMENT OF AGRICULTURAL ECONOMICS

1961

ECONOMICS OF FRUIT FARMING

REPORT No. 7

Adjusting to Lower Prices for Culinary Apples

A forecast of movements in supplies and requirements of culinary apples in Britain, together with some recommendations for policy on the fruit farms concerned.

Copies of this report may be obtained, price 5s. post free, from: The Secretary, Wye College, Ashford, Kent.

December, 1961.

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SUMMARY

A downward trend is evident in acreage, in tree numbers and in market price of culinary apples. Food consumption statistics indicate a declining rate of purchase of culinary apples during the six winter months. Production statistics, however, suggest that the volume of fruit harvested has tended to increase rather than decrease in the last ten years. In certain areas of Kent, grubbing has been proceeding at a rate decided by the exhaustion of the economic life of the tree. If applied over the country as a whole this would leave about 46,000 acres in bearing in 1971. This rate of grubbing is about keeping pace with the decline in demand, and if demand is to be overtaken, growers should aim to have only 40,000 acres in bearing by 1971. Working on records of known production costs and marketing costs, it is calculated that most growers will require an average 11s. 3d. a bushel at wholesale from their market fruit, with 80% of the crop of market quality (chapter 1).

In the markets, the grower's best policy is to note the premium for large fruit and endeavour to market more apples of large size. Small fruits are uneconomic to handle ; and it is worth considering whether some money spent on marketing the crop could not be better applied to producing a better sample in the orchard. Projecting the estimated growth trends in both demand and supply, it is predicted that by 1971 the "normal" crop of Bramley's Seedling will be about 135,000 tons as compared to 167,000 tons at present, and prices are likely to be rather less than they were in the period 1955/57 (i.e. before the slump), for the same quality of fruit. Although the earnings will be less than they were in 1955/57, they will be higher than they would be if the crop was still of its original volume of 167,000 tons (chapter 2).

Growers who are faced with reducing their culinary apple acreage may have to consider some reorganization of their farm. Piecemeal or partial withdrawal of trees will often not be a good policy : it will be better to remove a definite proportion and make a pro rata reduction in the labour on the farm. Where this is inadvisable, the small grower will have to look to more intensive crops (probably soft fruit) as the replacement crop, while the large grower could look to a less intensive crop (perhaps sheep). No annual crop will provide the same revenue per acre and have the same requirement of labour as culinary apples, so some reorganization on the farm affected is inevitable. The forecast net return however, from low quality fruit, is so low that the less extensive farm crop will in many cases serve the grower better than fruit. Growers whose results are already fairly good are recommended to aim at improving quality of crop. To spend more per acre may well be a better policy than to spend less, where the trees are still vigorous and of the right varieties (chapter 3).

This short report aims to give to growers of culinary apples some information which will help them to assess the prospects for their crop, and to examine some alternative ways out of their troubles, according to their separate circumstances.

INTRODUCTION

It is slowly becoming evident that a high level of national employment and prosperity will not by itself provide farmers with net incomes equal to those earned by people of equivalent status outside farming. The discontent with the results of the 1960 February Price Review and with the trend in farmers' earnings in Britain, the unrest in Southern Italy, the militancy of French farmers and the strike in Denmark, are all indicative of the recurrence of the time-honoured economic situation wherein agriculture as a whole fails to offer the same financial rewards as most other industries. The problem of the relative poverty of farm populations, which has been known to exist for two hundred years at least, has been mitigated, but not solved in the past twenty five years. In spite of an unique and far-reaching combination of special measures to support agriculture, and a level of demand for food higher than ever before, farm earnings in Britain, as in most industrialised countries, remain at about 75 per cent of non-farm earnings.

To put it another way, farmers as a class have difficulty in adjusting themselves to the evolutionary economic pressure which makes resources (labour, for example) expensive on the one hand and drives prices down in relation to costs on the other. They are often more reluctant to leave the land than are their workers. At the present time it is no disgrace for a man to give up farming: in doing so he is acting in furtherance of economic progress. What was formerly a stigma can now justifiably be called a wise and welcome move. One man too many in a low-output industry like farming is one man prevented from making a bigger contribution to the national income.

Evolutionary pressure affects commercial horticulture like all other forms of business. At the present time horticulture as a whole seems to have reached the relatively mature state of ceasing to expand. There is nothing particularly onerous or sinister about the economic pressure on horticulture—growers are in a similar plight to small business men generally—but its effects are possibly more severe because most horticultural businesses cannot readily diversify and tap the demand for the new products, or integrate and close their ranks to outsiders.

So now, when economic conditions are generally favourable, growers find that their costs continue to rise and that their prices are, at best, stationary. Market firms and wholesalers are affected as well as growers. The causes of these trends are too deep-seated for growers to counter by themselves, and they impose on the grower the onus of adjustment to them. To move out of horticulture is not everyone's solution. Some growers will be debarred from leaving—an uneconomic small farm is often not a highly-valuable asset—and the big majority of commercial fruit growers have a business large enough for success if they are aware of the need for adjustment and of the type of adjustment required.

Economic evolution (i.e. the advance in personal incomes) affects culinary fruit growers in this way: culinary apples are one commodity which consumers do not take in increasing volume as they become richer—rather the reverse. Population in Britain is not increasing fast enough for the increase in consumers to be able to offset the decline in demand per consumer, and consequently producers of culinary apples have to contend with a diminishing demand. Growers cannot expect to sell as many apples as formerly at the same price as formerly. Having recognized this, their problem is how to adjust to it—because if it is ignored or left alone the situation will not correct itself as speedily as growers would desire.

The culinary apple is a lowly form of economic life. It is largely a British phenomenon, and foreign fruit growers do not normally attempt to send such apples to Britain. English growers have a virtual monopoly in the market. In spite of this, culinary apples have been an increasingly unrewarding enterprise for the growers in the last five years, with a particularly steep dip in profits in 1959 and again in 1960.

Without enlarging upon this situation, it is possible to say that some growers' difficulties have arisen because:

(i) they were not aware that culinary apples were not truly profitable,

or

(ii) they were aware but were unwilling or unable to rectify the situation.

There are many farms growing culinary apples to which the above remarks could apply. Too often culinary apples have been so unimportant to the grower that he has not had to grow them efficiently. This sort of enterprise is quite out of tune with the times and is another argument for more specialisation.

I. THE PRODUCTION SITUATION

Capacity to produce (a) acreage

The future situation will be an outgrowth of the present situation, and since the present situation is known, the future can to some extent be foretold, under specified conditions.

What of the present? The 1957 Fruit Tree Census tells the position in England and Wales four years ago, and also the changes that have taken place since 1951, thus :

Acreage of Culinary Apples in England and Wales, 1957

	<i>acres of trees</i>	<i>acres lost</i>	<i>per cent.</i>	
	<i>7 yrs. or over</i>		<i>of whole</i>	
	<i>in 1957</i>	<i>since 1951</i>	1957	1951
Bramley's Seedling	27,516	961	55	46
Other varieties ...	23,267	9,925	45	54
TOTAL	50,783	10,886	100	100

It is evident from the above figures that acreage* is declining, that varieties other than Bramley's Seedling are disappearing fast, and that *Bramley* is increasingly becoming the dominant culinary apple.

Nothing is happening that will reverse these present trends in the future. Re-planting of culinary apples is continuing, but only 3,800 acres have been set out in the last six years, compared with 4,640 in the previous seven years, and, of course, 10,886 acres have been taken out since 1951.

Capacity to produce (b) yield

The period 1955-60 was disappointing for culinary apple growers. Yields were never heavy, only large apples made good money, and there was frost in 1955. Thousands of acres of orchards were ageing, and progressive growers had to resort to severe measures to produce apples of reasonable size: at the same time, hundreds of acres of trees were thinned out. As a consequence, average yields of marketable fruit were tending to decline, too, over the period. Some 45 fruit farmers in Kent have been keeping yield records of culinary apple varieties for Wye

*The steeper decline in tree numbers has not been overlooked: as far as is known, *yield per acre* will still give satisfactory indications of changes in supply.

College for the last ten years, and their results since 1951 are as follows:

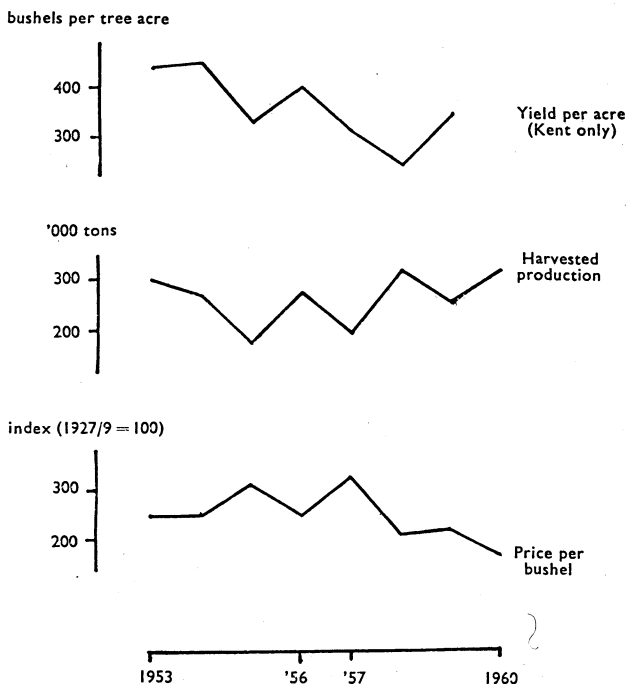
Average yields of culinary varieties of apple, 1951-57

	<i>Bushels per tree acre</i>							
	1951	1952	1953	1954	1955	1956	1957	
Early Victoria ...	235	335	209	323	333	242	196	
Grenadier ...	262	312	249	356	279	360	296	
Lord Derby ...	456	503	242	370	346	338	286	
Bramley's Seedling ...	512	466	414	450	305	466	287	
Newton Wonder ...	476	554	368	439	294	314	228	

Production and prices

The above yields have been combined into one weighted average yield for each season, and the trend in yield is shown, side by side with acreage, production and price movements, in Figure I below.

Figure I. Yield, Production, and Price per bushel, Culinary Apples, England and Wales, 1953-60.



Kent growers' yields may not have been repeated in other counties, because the "Harvested Production" figures issued by the Ministry of Agriculture, Fisheries and Food, indicate that production of culinary apples has been kept up and was no lower in 1960 than in 1953. It may be, however, that there is now more wastage of fruit on the farms, particularly of the less popular late-season varieties, than there was. If, in fact, there was the same amount of the same quality of the same varieties of culinary apples offered on the markets in 1953 as in 1960, the demand situation is more hopeful, but the production (area) situation more serious, than is assumed during the working-out of remedial measures in the following pages.

There is no doubt, however, about the trend in prices. What is not clear is the extent to which movements in supply are responsible for it, and whether or not growers are sending as many Grade I bushels as they were: if not, they must be experiencing lower average net returns on this account, apart from any change in price.

Looking back, it appears that the current trend in prices was masked early in its inception by two short crops in three years (1955 and 1957) when the price was good, but not as high as it might have been considering the shortfall in supplies. To some extent, this circumstance accounts for the rude awakening in 1958 and thereafter. It must be remembered, too, that if growers are to hold their own financially, the price should *rise*, and at the same pace as the cost of living.

To sum up the present situation, it seems fair to say that growers have maintained supplies and overall quality of market fruit, but buyers have not been similarly keen to have it. Actually, the growers' plight is worse than these bare facts indicate because not only costs of production but the expenses in marketing tend to rise each year. Some commission sales firms have ceased to provide growers with returnable boxes, leaving them to provide their own, which necessitates a cash outlay of something like 2s. 6d. a bushel in *anticipation* of revenue from the sale of the fruit.

Pointers to the future

Acreage and marketed yield per acre, taking all culinary varieties together, will continue to decline, because experience since 1957 (when the fruit tree census was last taken) will have influenced truly commercial growers to accelerate their programme for grubbing old trees, and it can be expected that inroads will be made into the acreage of *Bramley's*, which had been largely untouched. If other (less commercial) growers decide not to grub their trees, but to leave them alone, their fruit will lose market quality and will be, in effect, not available for the fresh market.

About one-third of the acreage of "other varieties" of mid-season culinary apples in England and Wales was withdrawn

between 1951 and 1957. The remaining two-thirds must be partly under the control of growers who are less inclined to take trees out, and it is to be expected that grubbing the less popular sorts will now proceed at a slower rate. The crop of the best market varieties, however, owing to increasing age of trees, and to grubbing, will shrink at a rate approximating to that for the other varieties in the 1950's. What does this imply will be the effective area of culinary apples in the near future?

Few growers would give an apple tree an economic life of more than 60 years nowadays. (The mean age of recently-grubbed trees of known age, as determined by Wye College in 1952, was 63 years.) Hence, by looking back to 1900 and thereabouts the acreage qualifying for removal on the grounds of old age can be determined—not all of it of course, is culinary apples, and some may have already been taken out.

Sixty years ago, there was a boom in planting in Kent. It was during the period 1895-1905 that Kent grew to pre-eminence: the orchard area increased by more than 50 per cent. between 1890 and 1905, and more than doubled between 1890 and 1914. This is a small span of years, and some 20,000 acres of orchards are concerned. Though in no sense precise, this information is a clear enough indication that, if the economic life of a tree is cut to 55 years, there will be some 20,000 acres of orchard in Kent alone that qualify, or have qualified, for removal during the 1960's. In other words, on commercial farms the withdrawal of trees may be severe if the market does not "pick up". The lessons of this report would endorse such action, for it is shown that expenditure on the orchards cannot be economically curtailed, and that radical renovation of the "head" of a standard tree is a very expensive process too.

A local example

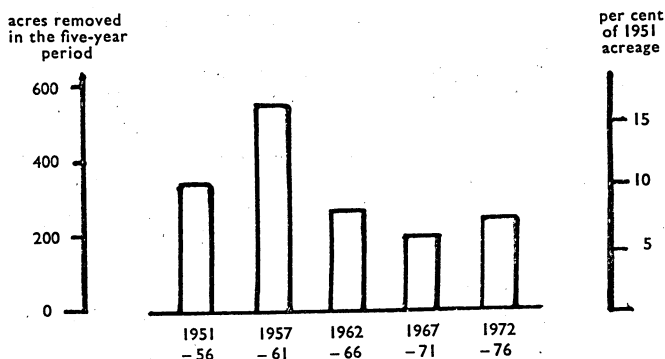
An illustration of what can happen on a local scale is appended by the results of a survey into grubbing policy conducted by the Wye College Economics Department in 1952/3. It covered five parishes in one of the most thickly-planted parts of Kent, i.e. Brenchley, Capel, East Peckham, Marden and Yalding. These five parishes contain about one fifth of the culinary trees in Kent, and Kent contains about half the culinary trees in Britain. At the time of the survey (1953), some 1,700 acres (42.5 per cent.) of culinary apple trees in these parishes were estimated (by growers, that is, who had no knowledge of *Agricultural Statistics*) to be more than 40 years old, i.e., planted before 1913. The mean age of the trees whose age was known was declared to be 54 years, which suggests that the "centre of gravity" of planting in this area was 1899. These trees will naturally reach the end of their economic life in the 1960's.

Growers' intentions to grub trees were also made known to Wye College. It was anticipated that 45 per cent. of the 1,700 acres of trees over 40 years old, were or would be grubbed in the period 1951-1961: this amounts to 800 acres and could well be the residue of the 63-year-olds planted before 1900 and retained up to the time of the survey. This recent average of 80 acres a year is less than the rate of planting 63 years previously and suggests that prices (and other events) prior to 1953 had influenced growers to retain trees which, on an objective economic judgment, could have been taken out.

Looking ahead to 1975, by that time 2,200 acres of culinary apples in the five parishes will have reached 63 years of age, of which almost 600 acres should already have been removed. Growers therefore are faced with removing something like 65 acres a year every year for 25 years, and then they will only be keeping pace with the natural senescence of the trees.

On the assumption that grubbing will take place on the exhaustion of the useful economic life of the tree, the following schedule of grubbing can be formulated for this area: 1951-6, 340 acres; 1957-61, 556 acres; 1962-66, 275 acres; 1967-71, 198 acres; 1972-76, 254 acres; a total of 1,623 acres out of a bearing acreage of 3,500 in 1951. In other words, a 47 per cent. removal during 25 years, 10 years of which has already elapsed (see Figure II). This programme cannot be guaranteed to improve prices significantly.

Figure II. Forecast of course of grubbing, as determined by senescence of trees, five parishes in Kent, 1951-1976.



Recently, however, grubbing has been on a larger scale than previously, under the influence of low prices. Suppose that growers in these parishes are now prompted to undertake a more severe programme—say, removal of all trees exceeding 55 years of age by 1971. This will involve taking out some 1,850 acres in a period of 20 years—a 52 per cent. removal. Converted to apply

to Kent as a whole, the programme would entail grubbing 12,200 acres. At this rate of withdrawal, supplies should begin to overtake the falling-off of demand, and prices should begin to rise. The examination of whether or not the growers will be financially better off with only half their 1951 acreage is held over until chapter III.

A national example

Statistically, growers' plans in the one intensive fruit area in Kent described above seem to fortify prognostications for the country as a whole, because the national rate of loss of culinary apples was somewhat higher than in the five parishes surveyed—about 16 per cent. between 1951 and 1957, compared with 14 per cent. Whilst all acres may be equal statistically, however, it is most probable that the acres taken out elsewhere were less productive than those in Kent: consequently, supplies were not reduced to the same extent as acreage.

In other words, the present incentives to grubbing seem to have had the effect so far of holding the rate of grubbing in line with the rate of natural senescence of the trees. This implies that a minimum rate of grubbing will be maintained. All too often, however, grubbing trees does nothing to reduce effective supplies.

In the situation outlined so far it is possible to specify :

- (i) an economically desirable rate of grubbing ;
- (ii) a rate of grubbing depending upon natural decline of the trees ;
- (iii) an actual rate, with many growers keeping old trees too long in production.

Developing this theme, what the future appears to hold for the culinary-apple grower is :

(i) *With a programme desirable under present market conditions.*
57 per cent. of the 1951 bearing acreage out by 1971 : 30,400 acres removed, leaving 31,269 original acres, plus 8,439 acres newly in bearing. Total in 1971—39,708 bearing acres.

(ii) *With a programme determined by natural senescence of trees.*
39 per cent. of the 1951 bearing acreage out by 1971 : 24,000 acres removed, leaving 37,669 original acres, plus 8,439 acres newly in bearing. Total in 1971—46,108 bearing acres.

(iii) *With a likely actual programme.*

With 11,000 acres removed between 1951 and 1957, assume 16,000 acres removed between 1951 and 1961, and (at half the rate after 1960) 24,000 acres between 1951 and 1971 ; The residue and new planting are as in (ii) above. Total in 1971—46,108 bearing acres.

Two opposing influences will be at work in the future. On the one hand there will be greater pressure upon profits, increasing the incentive to grub ; on the other hand, many (the less commercial) growers who will be faced with a decision, will be reluctant

to grub. In the further calculation it has been assumed that these influences will cancel out each other, and that grubbing will proceed at a rate partly determined by senescence, partly by market conditions. That is, there may be about 45,500 acres of bearing culinary apple orchards standing in 1971, but effectively supplying the market there will be no more than 35,000-40,000 acres.

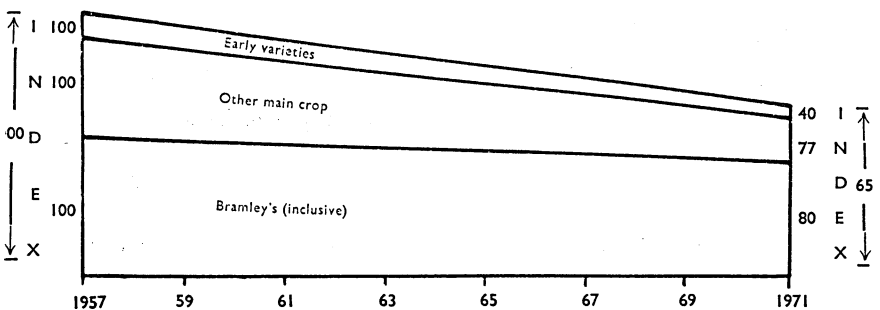
Composition of supply.

How will this acreage be made up? Make one category for commercial Bramley's Seedling, King Edward VII, and Howgate Wonder, one for early varieties, and one for the remainder, and the likely composition is as follows :

- Category 1 27,000 acres (main crop, commercial)
- Category 2 3,000 acres (early varieties)
- Category 3 12,000 acres (other varieties and non-commercial)

As the acreage declines, so is the yield per acre likely to decline. A downward trend, if not already in evidence, is likely to be experienced during the next ten years as more trees approach the end of their useful life. What the rate of decline will be is a matter for conjecture, but there is little reason to suppose that it will differ greatly from that of the previous ten years which is assessed at 3 to 10 bushels an acre a year, according to variety, in a recent Wye College report on fruit yields.* New planting has not been on a scale sufficient for the higher yields of trees of age 15-20 years to influence the general downward trend. Taking a mean rate of reduction of 50 bushels an acre for Bramley's and 70 bushels an acre for other varieties over a ten-year period, a likely trend in production between 1961 and 1971 can begin to be identified. Here it is.

Figure III. Forecast "normal" production of culinary apples, England and Wales, 1960-1971.



*Ten Years' Yields of Apples and Pears. R. R. W. Folley.

NOTES

1. Because of the difficulty of establishing a national level of yield per acre for 1957, the reduction in 1971 is expressed as a percentage of the "normal" for 1960.
2. No allowance has been made for plantings since 1957.

Broadly speaking, then, the likelihood is that marketable supplies of culinary apples of all types will be some 30-40 per cent. lower in 1970-72 than they were in about 1957-58. Under this regime (and ignoring the development of an export trade) prices would improve only slightly after 1965.

By that time, too, it can be anticipated that Bramley's, Edward VII and Howgate Wonder will have two-thirds of the market instead of just over half as at present. Rates of reduction of supplies for the three categories mentioned are likely to be as follows :

Index of marketable supplies of culinary apples	1957		1971	
Bramley's (inclusive)	100		80	
Early varieties ...	100		40	
Other sorts ...	100		67	

On the commercial farms which figure in the Wye College Yield Census, between 8 per cent. and 15 per cent. (according to the year) of the picked-down and picked-up crop was not of market quality, and was sold for processing into cider, mincemeat or other products. On less-commercial farms the proportion will be higher, and, as some processors' standards are becoming higher and their requirements more stringent, everything points to the market for fruit processing becoming more "difficult" on account of the high costs of manufacturing as well as the market for fresh fruit. If—to take a mean figure—12 per cent. of the 1957-58 supplies of mid- and late-season varieties are to continue to be of non-fresh quality, the market supplies of culinary apples ten years hence will be still further reduced. In fact, instead of the 30-40 per cent. drop previously calculated for all supplies, the reduction in supplies of fresh market-worthy fruit may well be a full 40 per cent by 1970-72.

Cost of Production : (a) Growing the crop

Five growers of culinary apples have been co-operating with Wye College in keeping costs of production over the last ten years. Taking their results as a whole, it is evident that culinary apples have been a worthwhile enterprise in that period, because the margins per acre obtained have been higher than would be expected

from general farm crops: but three qualifying statements must also be made.

First, that on some farms profits on culinary apples were neither high nor regular.

Secondly, that there has been a marked change for the worse since 1956.

Thirdly, that the average grower has high fixed production costs to meet and cannot restore his position by spending less on his trees.

Production costs will not be dealt with exhaustively in this short study, but enough can be extracted from the material available to show how the money is spent and earned in some culinary apple orchards.

To grow a good crop of apples on either bush or standard trees takes all of £100 an acre, irrespective of variety—that is the rub. The variety which sells for 12s. a bushel calls for, and often gets, all the attention of the variety selling for 30s. a bushel. It is no uncommon thing, on farms where both dessert and culinary apples are grown, for high profits an acre on a small acreage of, say, *Cox's* to be covering up small losses an acre on a large acreage of, say, *Bramley's*.

A fairly typical example of the expenses per acre incurred in the production of culinary apples for market is shown in table 1 below.

Table 1. Annual Expenses Incurred in Growing Culinary Apples c. 1959. Standard Trees, 40-60 to the Acre, on a Mixed Farm. 23 Statute Acres—Cost per Acre and per Bushel.

	per acre	per bushel	
		low yield (300 bu.)	high yield (500 bu.)
	£	s. d.	s. d.
Pruning	12.4	10	6
Spraying	22.0	1 5	10½
Cultivations	5.5	4	2½
Manuring	3.6 to 8.6	5 (av.)	4
Other attention to trees	6.1 to 8.8	6 (av.)	4
Cultural costs ...	49.6 to 57.3	3 6	2 3
Picking	18.6 to 27.3	1 6 (av.)	1 2
Operational costs	68.2 to 84.6	5 0	3 5
Business and orchard overheads	15.0 15.0	1 0	7
Rental value of land and depreciation of orchard	12.0 12.0	9½	6
Total growing costs	95.2 to 111.6	6s. 9½d.	4s. 6d.

NOTE. The above is not a cost-of-production table. It is a state-

ment of the expenses necessarily incurred each year in producing a crop from existing trees, which is the problem facing all growers, whether or not they intend to replace the trees. No allowance has been made for thinning-out, draining, laying access roads, mortgage interest, and so on (end of Note).

Of course, there are large, specialized growers getting higher yields than those shown, for little extra expense, just as there are growers getting 300 bushels an acre at less expense than £90 an acre, but it is likely that many growers who have to make a decision, either *whether* to stay in production, or also *how* to stay in production, are faced with an annual expenditure on growing the crop similar to those recorded—that is, with farm-gate, accountancy costs of between 4s. 6d. and 6s. 5d. a bushel of 40 lbs.

Costs of *growing* the crop have purposely been considered separately from costs of marketing the crop, because the two activities are separable. A grower may have the opportunity to sell his crop either on the tree, or at the foot of the ladder, or at the farm gate, in which case his marketing expenses are nil. The more usual practice, however, is for growers to spend varying amounts of money in packing and presenting their fruit attractively so that it sells for a higher price, without always realizing that is expenditure voluntarily incurred, and is only justified if it earns more than the associated costs.

(b) Marketing the Crop

It is not unknown for costs of marketing to exceed costs of growing the crop. Put another way, this means that more than the wholesale market value of the crop may be lost between the primary market and the farm. It may be significant that dealers or middlemen seem never to allow so much for their marketing costs as growers customarily spend upon marketing. Most marketing manuals lay stress on the presence in the primary wholesale markets of small firms offering specialized services at relatively low rates. Advantageous buying—advantageous to both grower and wholesaler—may be one reason for the continuance in business of these firms. If buyers *did* allow as much for marketing as many growers actually spend, their offers for fruit “on the tree” or “at the foot of the ladder” would be about 2s. a bushel lower than they actually are. It may be, again, that there are only limited outlets for “tree run” fruit, however good the sample, but the practice has enough to recommend it to suggest that the auctioning of culinary apple crops, in the manner of cherry crops, will be deserving of more attention if the fruit should become relatively more scarce.

In view of what follows, the build-up of marketing costs is now explained. Deductions from returns, as exacted by packing stations, have been considered expenses equally with actual outlays by growers on performing the same service for themselves.

Reduced to its simplest elements, the cost of marketing can be construed as under in Table 2. (Half the cost of the containers into which the fruit is picked and subsequently transported has been included as a cost of marketing ; the other half has been considered a cost of storage on farms where the crop is customarily stored.)

Table 2.—The Composition of Marketing Costs (without storage)

Service or Operation	Handling into market boxes, on farm	Sorting, grading, handling, on farm	Use of Station for handling and grading	Wrapping and Packing	Container Costs (inc. box paper) ret'ble (hire)		Transport to Market	Market Costs returnable		Total
	(a)	(b)	(c)	(d)	(e)	(f) non-ret'ble.		(h)	(i) non-returnable	
Price or cost assumed	s. d. - 3	s. d. 1 2	s. d. 1 7	s. d. - 9	s. d. - 8	s. d. 2 9	s. d. - 7	s. d. 1 4	s. d. 1 1	
Type of Pack										s. d.
1. Tree run fruit a.	*				*		*	*		2 10
2. " " " b.	*					*	*		*	4 8
3. Loose Pack a.		*			*		*	*		3 9
4. " " b.		*				*	*		*	5 7
5. " " c.			*		*		*	*		4 2
6. " " d.			*			*	*		*	6 0
7. Packed orchard a.		*		*	*		*	*		4 6
8. " " box b.			*	*	*		*	*		4 11
9. Packed non-ret'ble a.		*		*		*	*		*	6 4
10. " " b.			*	*		*	*		*	6 9

NOTES. (a) more correctly, a bonus for rough sorting at time of picking ; (b) suitable for small quantities of fruit only ; (c) operating cost only, no capital levy or interest in capital included ; (d) mainly cost of wrappings ; (e) half the cost of hiring only ; (h) 10 per cent. commission and 2d. market toll ; (i) 7½ per cent. commission and 2d. toll.

Between the market and the farm therefore, the grower may lose between 2s. 10d. and 6s. 9d. a bushel, without storage, depending upon the policy and practices he adopts.

In this connection there is an important shade of difference between theory and practice. Theory would say "adopt the policy and practices that give the highest reward". Practice requires the grower to observe the overall quality of his crop and utilize the available practices to best advantage, taking the crop as it is. An independent grower has possibly more potential flexibility in marketing than a grower who is tied in with a commercial or co-operative packing shed.

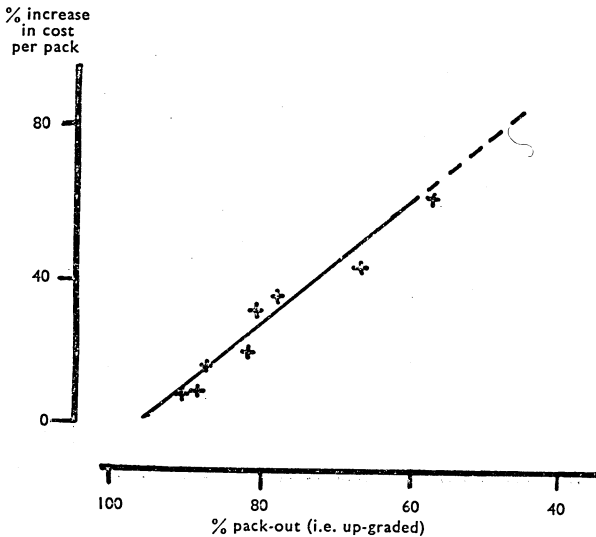
All in all, a grower is in the happiest position for marketing when he has a good quality crop—good size comes close second

to high yield in economic importance. More often than not, a grower's financial difficulties in marketing begin when he tries to up-grade a crop of low initial quality. Many farm packing sheds are none too efficient, and unless there is a good percentage pack-out, the cost of grading, when charged to those bushels which benefit from it, can be excessive.

In 1954 and 1955 Wye College found that in a number of farm packing sheds the end product—the market pack—was absorbing about 20 minutes per pack if all packing shed labour was included. Labour cost alone would exceed 1s. a packed bushel in these circumstances today.

Many of the actual costs of grading and packing are joint costs and cannot readily be charged to any single grade or pack. The only fair test of what preparation for, and presentation of, a crop to market costs, would be to see how the net returns from the graded and packed crop compare with the assumed value of the crop if marketed "as picked". The answer will not always be one-sided. For certain grades of crop, and in certain outlets money has probably been lost in the past on preparation and presentation. It is understandable that market firms prefer to sell a high-quality, high-price article; but this is equally an argument in favour of a cheaper form of marketing (e.g. auction) for culinary fruit.

Figure IV. Cost per package for grading and packing on the farm, Bramley's Seedling, in relation to initial quality of sample.



The question of the additional value which culinary apples gain by being of uniform quality—whether low or high—for the purpose in view, is considered in ‘marketing’. For the present, it will suffice to show how market fruit becomes increasingly expensive to prepare as quality in the sample deteriorates, and this is done in Figure IV (p.18). The costs for eight packers of Bramley’s Seedling were available, and the pack-out on these farms varied between 95 per cent. and 58 per cent. At a pack-out 70 per cent., the cost of a market pack for items other than containers or box paper (the *specific* expenses), is increased to 45 per cent. above the lowest cost (excluding containers and paper) per bushel handled.

It will be found on further analysis, that with a pack-out into 27 per cent. Grade I and 54 per cent. Grade II, an average cost per Grade I bushel, wrapped and in a non-returnable container, was close to 8s. 1d. a bushel. It cannot be too often repeated that *all* apples share in some costs of a packing shed, but relatively few may benefit from it. Moreover, the level of costs in grading and packing is high in relation to costs of growing. It would almost pay a grower to go to any lengths to produce a straightaway-marketable sample of a popular variety so long as it was carefully handled in marketing. For example, to raise the proportion packing-out Grade I from 27 per cent. to 47 per cent. would reduce the effective cost of the packing shed operations by 2s. 3½d. a bushel, so that it would be worthwhile to spend up to £46 an acre (at 400 bushels an acre) more in the orchard if the higher quality crop could be ensured thereby.

If in the circumstances described above, the grower’s price for Grade II consignments were no more than he would have got for the tree-run fruit, rough-sorted, then he would require a “lift” of 8s. 1d. a bushel on Grade I consignment over the “tree-run” price before he broke even on his grading and packing operations.

An economic price

To sum up, the grower of culinary apples will need to get an *average* market price of between 7s. 4d. (4s. 6d. growing and 2s. 10d. marketing) and 13s. 2d. (6s. 5d. growing and 6s. 9d. marketing) according to his circumstances before he profits from his crop. In practice, the range in price required can be narrowed, because the high-cost producer, being by interpretation a better grower, will elect to adopt an expensive marketing policy. This being so, the *average* price per bushel marketed (i.e. not sold in the orchard) will need to fall between 9s. 3d. a bushel and 11s. 3d. a bushel at wholesale for sales in the season (October-December) before the majority of growers can cover their necessary costs. If cull fruit has a standard price of 5s. a bushel, and constitutes 20 per cent. of the crop, the *minimum* price for marketed fruit rises from 9s. 3d. to 11s. 3d. a bushel (1s. 3d. a bushel more for market fruit is needed to compensate for the low price of culls, and 9d. a

bushel in the market is needed to bring back to the farm the extra 8d. that is needed to compensate for handling 20 per cent. culls).

Merely to make it possible for him to continue in business, then, the average grower requires 11s. 3d. a bushel in the market. As the average premium of first grade over second is about 42 per cent. a grower sending 50 per cent. Grade I consignments and 50 per cent. Grade II, would fulfil these conditions at the following prices :

Grade I—13s. 3d. a bushel

Grade II—9s. 3d. a bushel

So long as Grade II samples fetch 8s. to 8s. 6d. a bushel (and, correspondingly) Grade I 11s. to 11s. 6d., a grower can only hope to cope by growing 90-95 per cent. Grade I fruit. This last question, too, is examined more closely at a later stage, but it is clear already that only first-grade market packs can make money for the grower.

II. THE MARKET SITUATION

So far supplies and costs have been examined. In what circumstances will demand be high enough for the market price to be economic? That question is answered at the end of this chapter.

Recent trends in prices

Culinary apples grown on a considerable scale have, until recently, been the staple crop on many large fruit farms in Kent. Such farms are heavily capitalised and have insured against low prices early in the marketing season by storing their fruit until after Christmas each year. This report is not addressed to the growers who are already committed to certain lines of action, but to those, generally smaller, more mixed and less successful growers who are doing neither a high-cost job nor a no-cost job and could move towards either the one or the other.

The present financial trouble has arisen within the last three years. Its history can be traced from the economic trends in the culinary apple market in the last five years shown in the diagram on p.22 which gives the average wholesale price of first and second-quality Bramley's Seedling for each of the last six years. (Figure V). Three movements are obvious :

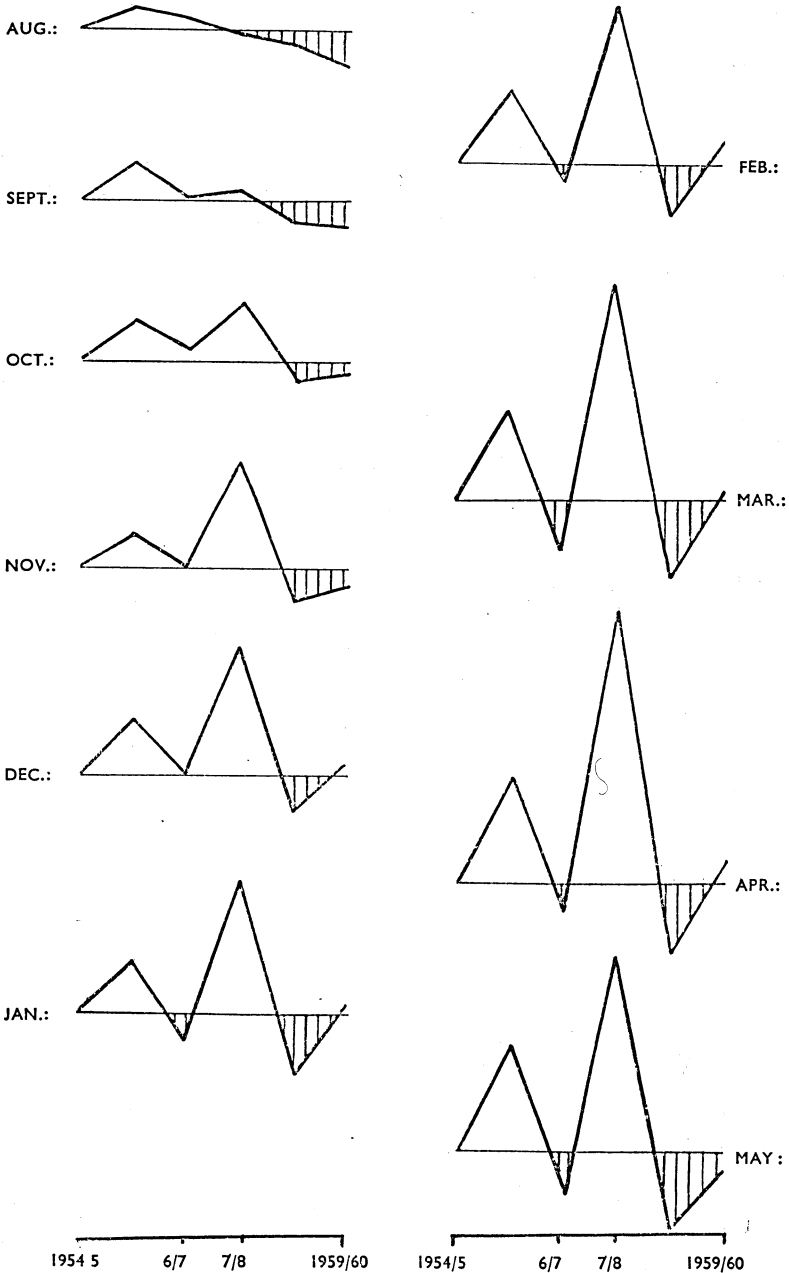
1. An annually-declining price early in the season (August-September) ;
2. A relatively steady price in October (remarkable this, for it is the time of peak availability) ;
3. Increasing deficits during the season of a season of storage (January to July).

In spite of appearances, long-term storage has been beneficial both to the growers who store and to those who do not. For four of the last six years the "lift" in price per bushel between November and May has been more than the estimated total cost of storage, including interest on capital and depreciation, which is taken to be 6s. a bushel. Keeping the fruit in store until June or July, however, has little to recommend it nowadays. It looks as if some of the accommodation given to long-keeping Bramley's Seedling is in excess of market requirements now that more fresh fruit of all sorts is becoming available in the early summer.

Whether prices of culinary apples will recover and rise again, or continue to fall, will depend upon how demand moves in relation to supplies. It has been estimated previously that market supplies of good-quality consignments are likely to fall at the rate of about $2\frac{1}{2}$ per cent of 1957-8 level a year (p.14). The rate of change of demand cannot be estimated at all precisely, and the rate for mid-season is clearly not the same as the rate for May-June-July.

The rate of change in demand can be estimated as rather less than 3 per cent. a year. In arriving at this estimate *demand* has not been directly measured (only its reflection—the rate of change in price) ; and secondly, there is the further point that the value of

Figure V. Monthly movements in price, Bramley's Seedling
1954/5 to 1959/60.



money has been considered stable. So if *all* prices rise (i.e. if the value of money falls, prices may be higher than anticipated but the purchasing power of the grower's net returns may not. In times of inflation the prices for a short crop are not as high in real terms as they appear to be. By quoting the steady-money equivalent of the price, the diminution in demand is made to look more serious, but it represents a truer state of affairs.

This indication of average rate of decline could be more usefully expressed as a lower rate (approximately 2 per cent.), early in the season, and a higher rate (approximately 5 per cent.), late in the season. The late-season decline may be, partly at least, a transferred effect or "lag", resulting from withholding of marketings during March, April and May. This again, may be partly due to supplies for processing being bought earlier in the season than formerly.

Thus, although English growers of culinary apples have the market to themselves, with no trouble from imports and no alternative single product obviously competing with the culinary apple, they have not been able to maintain both price and volume of sales. This shift of demand away from culinary apples must be considered to be part of the evolutionary change in consumption habits. If further evidence is needed that demand for culinary apples is not now as high as it was, it can be found in the consumption data for apples published in the annual *Domestic Food Consumption and Expenditure* reports. Since 1950, the October to February (inclusive) recorded purchases of apples and pears have fallen from 18d. a week to 15½d. a week—a reduction of 14 per cent. No distinction is made between culinary apples and dessert apples in these reports, but the likelihood is that the overall reduction is really the balance of two movements: first, a rise in the consumption of dessert apples; secondly a more pronounced fall in the consumption of culinary apples.

Consumption per person of apples and pears 1950-1958

	1950	1951	1952	1953	1954	1955	1956	1957	1958
Oct.- Dec.	10.13	10.42	9.70	8.71	8.05	8.96	8.52	8.05	8.39
Jan.- Feb.	7.97	7.75	7.17	7.23	6.27	6.46	6.06	7.57	4.84

The cooking apple must be assumed to have some of the economic characteristics of potatoes and bread—commodities that tend to be passed over by affluent consumers in favour of more desirable alternatives, the consumption of which is declining.

Presumably, no cross-elasticities of demand concerning culinary apples can be traced because consumers choose not one alternative food, but many.

The best supposition for the future, then, is that in the next ten years, unless there is a big improvement in overall quality and a succession of hard winters (or spring frosts) growers' net returns should about keep pace with the change in the value of money, but that if prices are to *improve* in real terms, an accelerated grubbing programme will be necessary. What seems to be required is a continuation of the effort mounted in the 1950's, when 11,000 acres were taken out, reducing the bearing acreage (in round figures) from 60,000 acres to 50,000 acres. The next move will be to get down to 40,000 acres in bearing as quickly as possible.

This need has obviously been recognised by the larger Kentish fruit growers. The area of culinary apples known to have been grubbed in the county during the three winters 1959-61 exceeds 2,000 acres, which is almost 10 per cent. of the 1951 acreage. As far as is known, some 5,200 acres of culinary apples were grubbed between 1951 and 1961. To realise a target of 52 per cent. removal the effort in Kent (to remove a further 6,800 acres by 1971) would need to be 30 per cent. greater than in the past decade.

Market premium and discounts

A section on marketing would not be complete without some mention of relative prices—that is, the comparative prices of large and small apples, of clean apples and marked apples. One of the larger wholesale concerns in Covent Garden market has kindly provided the following statement of average prices for Bramley's Seedling packed in returnable containers and sold between October and December in 1957, 1958 and 1959.

Bramley's Seedling—Prices by size, October to December, 1957-8-9 seasons.

	quoted price			premium over size below			
	1957	1958	1959	1957	1958	1959	av.
	<i>shillings per bushel</i>						
Over 3in. diam.	23/-	10/9	13/2	3/-	2/11	3/8	3/2½
2¾in.-3in. „	20/-	7/10	9/6	4/4	2/3	4/8	3/9
2¼in.-2¾in. „	15/8	5/7	4/10	—	—	—	—

Although the levels of price for apples of a minimum diameter of 3in. have varied between 10s. 9d. and 23s. 0d. a bushel, the premium over apples having a diameter ½in. less has only varied between 2s. 11d. and 3s. 8d. a bushel. The average premiums over the past three years have been 3s. 9d. a bushel for the intermediate sizes of apple, and 3s. 2½d. a bushel for the large apples.

This table gives a grower something to work on, because it now becomes possible for him to gauge not only the additional cost but also the additional return from any new course of action, if he is skilled enough to be able to judge correctly the effect on the crop of the course of action he proposes.

The alternatives in marketing policy open to the general grower are these :

- (a) to sell during the natural life of the apple, or to store ;
- (b) to sell apples on the fresh market or for processing ;
- (c) to sell on the farm or in the market ;
- (d) to grade and pack, or to jumble ;
- (e) to grade and pack on his own farm or to join a packing organisation.

No grower is likely to be thinking about additional storage for culinary apples now, and the alternatives under (a) are between earlier and later opening of stores.

As regards (b), no culinary-apple grower is likely to *choose* the process market, particularly if he is in a small way of business. Much of the "cull" trade is provided by genuinely non-market fruit from the largest growers. The processors offering a relatively high price are more selective and may specify (i) freedom from insect damage ; (ii) minimum size of 2½ in. ; and (iii) preference for Bramley's Seedling, but the prospective return from some process outlets after paying marketing costs, would seem to be the equal of returns obtained from "domestic" quality fruit in the fresh market, though for a limited quantity.

As regards (c), can one say more than that selling on the tree or at the foot of the ladder is a desirable feature if the price is right? And that the price is more likely to be right if the crop is right? The grower who knows his costs can even decide whether a price offered is advantageous or not. Possibly, the buyer or agent who has no need of all Grade I bushels, or of a salesman's services, represents a rather different type of trade and serves a different class of customer from the normal retailer, and prefers to develop his own methods. By all accounts, such buyers are each year losing trade to the larger buying organisations, but this general situation may not apply in the particular case of culinary apples. Would advertisement of a crop help a grower in these circumstances? After all, however, a grower cannot hope by this method of selling to overcome completely any defects in market quality in the crop.

As regards grading and packing, if the business aspects of marketing be considered more important than the prestige or comfort aspects, in the writer's experience it is unlikely that heavy outlay on grading, packing and presentation will prove to be worthwhile for unstored fruit in two sets of circumstances : first, when a rough-sorted crop is of uniformly high market quality ; second, when the crop as picked has a high proportion of fruit of low market quality. It is realised that these are two extreme cases, and that most growers in most years can only find out by experiment what it is best to do : but in the first case, initially good fruit would have to sell for 4s. 6d. a bushel more, on account of presentation alone, to pay back the grower for his additional costs ; and in the second case—to repeat a former statement—an up-

graded bushel can cost the grower about 8s.; add this to his production cost of 6s., and the margin on sales in the market at below 16s. a bushel is non-existent to begin with.

Desirous as salesmen are of handling good samples, the market is not always prepared to pay for the cost of good presentation—the premiums for “fancy” samples, for example, is nothing like as high as with dessert apples or pears. Note the prices below, which are the net returns per bushel at a well known packhouse for the period 1947-1957.

Average price per bushel, at packhouse, Bramley's Seedling and Cox's Orange Pippin in 1947-57

Grade	Bramley's		Cox's	
	s. d.	s. d. diff.	s. d.	s. d. diff.
Fancy	18 0	+1 6	38 2	+ 4 6
Choice	16 6	+5 0	33 8	+15 4
Others	11 6	—	18 4	—

Finally, as regards (e), in spite of the clamour and public pressure for “organized” marketing, a culinary-apple grower can retain more flexibility in his marketing if he does not commit himself to paying high fixed charges to an organization to do his marketing for him. The good grower has less to lose in this respect than the not-so-good, because the penalties of putting in a low-quality sample are high. Large-scale buying does not yet apply to culinary apples in the same way as for more expensive produce. The effect on marketing policy of the likely developments in demand for culinary apples is considered more fully at the end of this chapter.

Marketing Policy : (a) the present

Grower-salesman (and there are several such firms) have the feel of the market very well, and have their own rules-of-the-thumb. In the writer's experience, their idea of remunerative price for culinary apples nowadays coincides with the figure of 11s. 3d. a bushel *without profit*, given on page 20. The price structure in the market imposes unwritten laws, too, and growers would be no worse off if something like the following procedure could become the understood practice in consigning to *central wholesale markets* in years of no scarcity :

- (i) for varieties other than Grenadier, Derby and Bramley's send only first quality samples ;
- (ii) send only apples of $2\frac{5}{8}$ in. diameter or more of *any* culinary variety ;
- (iii) relate the cost of packing and presentation to the expected value of the apple ;
- (iv) try to share in a processing contract with clean apples of $2\frac{1}{2}$ in. diameter ;
- (v) if possible, sell any remaining apples for juice or cider.

As the scale in pricing may be of the following order :

Market fruit	—	12s.—14s.	a bushel
Process fruit	—	5s.— 6s.	a bushel
Cull fruit	—	3s.— 4s.	a bushel

there would be a strong incentive to produce a sample of high marketable quality.

Many growers' difficulties arise from the low quality of their crop, which is deficient in both yield and size. Yields are not high enough to make *any* quality of fruit relatively cheap to grow, and the predominantly small size of the fruits makes grading costly and militates against a high average price for sales.

Marketing Policy : (b) the future

To sum up, the market for culinary apples is beginning to have, and may well develop, more *form* than previously. The fresh market is becoming more selective, but still offers the best prospect to the good grower. Process outlets are becoming separated from fresh outlets. One or the other may branch out into an exporting agency. This division is all to the good, for each outlet handles different qualities of fruit, and each quality can only bear certain costs for marketing.

It would not be surprising if culinary apples (during their natural-life season) became more of a broker's trade than a salesman's trade. Some radical changes in marketing and distribution would be involved—but who can say that the present system is outstandingly the best?

As regards the size aspects of marketing, a question of principle in marketing cannot be overlooked. The immediate problem in marketing is to reduce the supplies passing on to the wholesale markets. In Chapter I it was assumed that grubbing was the most practical way of reaching the desired end. To withdraw whole orchards, of course, means denying consumers good samples as well as inferior samples. The more satisfactory approach would be (as has been already attempted in potato marketing) to ration the markets by withholding the smaller apples as required by the ruling demand situation. At this stage, an apple "riddle" can only be an approach, because (a) neither the organisation nor the self-discipline exists among growers to make it practicable, and (b) it is thought that it would be uneconomic to improve very many of the trees now in bearing to the extent of producing, under "riddle" restrictions, a marketable crop.

As compared with an overall reduction of supply, rationing-by-size would (i) encourage the better grower, (ii) penalize the inferior grower, (iii) focus attention on work in the orchards (where it is needed), and (iv) offer the consumer a better article at the same price. Looked at objectively, this is a formidable list of advantages.

Whether the one or the other means of reducing supplies be adopted, a policy of grading-up supplies, where it is economic to do so, is also enjoined in any programme of volitional adjustment to changing demand. Some salesmen say that there is no chronic over-production of first quality culinary apples, whereas there is far more fruit available for processing than processors normally want.

If, in fact, as many (or more) culinary apples would be sold on the wholesale markets if they were of a quality averaging 14s. a bushel (£39 a ton) than if they were of a quality averaging 11s. a bushel (and this is what is implied by most "trade" market comment) growers as a whole are not making the best of the market and they would benefit if the higher value can be put *into the crop* rather than into marketing aids. In the diagram on p.29, the shaded area represents the possibly untapped demand for better-quality *Bramley* culinary apples. In money terms the amount involved could be about £500,000 in a normal year. If this is correct, a round sum of £400,000 could be available on the farm to pay for improved practice (*not* more expensive marketing) which would allow for up to £10 an acre more to be spent on all culinary trees.*

The best prognostication possible at this stage is that the market for culinary apples will continue to shrink, but that quality will become increasingly important. Growers of culinary apples have been large users of returnable containers, but salesmen are finding these too heavy a capital commitment under present trading conditions, and they must shortly be replaced by non-returnables—which will add to the grower's marketing costs, and make second-grade consignments increasingly uneconomic.

The division-of-the-market philosophy is behind the examination of the decisions facing growers contained in Chapter III. It cannot be gainsaid that the middle-of-the-road grower tends to miss the best of both worlds. He is not potent enough to succeed in the fresh market and he is too expensive for the process market. Unfortunately, in the worst cases, the grower is too handicapped by mixed orchards and trees of unwanted varieties for improved production to be economic, and the best policy is to take the trees out.

Policy Considerations for the Industry

There are many unknowns in the situation facing the grower. He cannot foretell the market, or the weather; and he cannot be sure of the response that his trees will make to his efforts to improve their performance. All he can do is to formulate a policy and act along it, anticipating that the change will be in the right *direction*, if not exactly right in quality or amount.

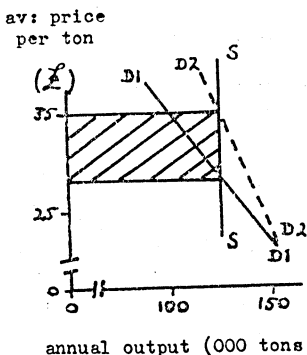
When his aim is maximum profit per acre, he will need to consider both the growing and marketing aspects of production, and to harmonise the two to best effect, and particularly to ponder

whether he has got a reasonable balance between his effort in growing the crop and his effort in marketing it, bearing in mind that the former is more deserving than the latter. Many a grower will willingly venture 3d. a bushel on improving marketing when he will not venture £5 an acre (the equivalent of 3d. a bushel) on improving his growing.

Transference of consumers' purchasing power from culinary apples to other commodities at a time of economic advance, as is happening at present, has similar effects upon the grower to restriction of demand at a time of economic depression. In both cases, the purchasing power of the fruit will fall, and the grower has to think out ways in which he can produce more bushels of fruit per man-hour and per £100 expended. There is a difference, however, between adjusting to a transference of and to a temporary decline in demand, in that an evolutionary transference of demand is less likely to be reversed. Subsequent recovery of demand is not to be expected, and there is much more incentive for a grower to aim to raise the quality of his crop; he need not necessarily, or wisely, be concerned to produce fruit at minimum cost per unit in the circumstances.

At times like the present, a grower will be lost unless he can have a policy which he believes in, and unless he understands what the furtherance of the policy requires of him.

*A demand and supply situation valid for the future would have certain novel features. For one thing, a high price (meaning good average quality) and not a low price, may be concomitant with high consumption: and for another, a high price for apples (i.e. the premium for quality) will not increase the supply, because the high cost of "good marketing" absorbs the price differential and deters the high-cost producer from competing in the high price market. Demand is price-inelastic in the short term, possibly positively (not negatively) elastic in the long term, and supply is inelastic at all times.



The line D1 D1 represents the demand in the long term for an "unimproved supply", and D2 D2 represents the demand for a supply of higher average quality than at present. By definition, demand is inelastic, and almost the same quantity would be demanded at a higher average price (consequent upon higher average quality) than at a lower.

What is such a policy? It is easier to say what the policy for the *industry* should be than for growers individually, and this part of the question will be answered first. A first requirement is for the industry—growers collectively—to extract from consumers as a whole as much money as they will willingly pay for culinary apples. In this way they will ensure that the revenue filtering back to the farm from the market is the largest possible sum. Thereafter growers could aim to reduce their costs of supplying consumers as far as they can whilst still keeping consumers' spending at a maximum. In pursuance of a policy of maximising earnings in the market, growers can influence consumers and increase their willingness to buy, or to pay a remunerative price, through (a) the quantity, (b) the quality and (c) the timing of supplies. As regards quantity of supplies, growers will quickly answer that they cannot control quantity, and this is partly true: it would be more correct to say that they *do not*—there is very little human interference with volume of supplies each year, in spite of the fundamental fact that the amount of fruit available is determined by natural (i.e. non-economic) forces and bears no necessary or close relation to demand, which is much more largely conditioned by economic forces.

The benefits of improved *timing* of supplies have been well taken care of by cold and gas storage: there is no question about growers having control of the situation in this respect. In "quality", too, they have the capacity for control, and they would apply it more largely if the market were to reward them for making a stronger and more widespread effort to do so.

One unsettling factor in the supply situation is the big difference in the size of the culinary apple crop from one year to the next. It is no good the industry having the *minimum* acreage i.e. just sufficient trees to meet the demand in a good-crop year, because for possibly three years out of five in such circumstances the market would be short, and, as a result (from what is known at present about the elasticity of demand) some revenue from consumers would be sacrificed. The *optimum*, or most desirable average, would need to be in excess of a normal year's requirements in order to provide adequate supplies when the crop is short. Demand is much more elastic in short-crop conditions than in a time of glut, and there is consequently more to gain by having more apples available when they would otherwise be scarce. In the past, the above-average crop including 150,000 to 175,000 tons of Bramley's Seedling has been more profitable (in the sense that revenue has been higher than usual, and costs per bushel less) than either the glut crop or the short crop.

Ideally then, the crop of culinary apples should be, for four years out of five (i.e. allowing one short-crop year in five) somewhat in excess of requirements, and cut down to optimum size by

restraints on marketing. It is believed that there is sufficient common interest among all fruit-growers, whether wholesalers or not, for such action to be realisable once it is understood that the chronic excess capacity in the industry has been removed. The number of effective single suppliers of packed and graded culinary apples to central markets cannot be very large: and the suppliers of tree-run consignments would not be concerned.

Would it help growers to be told that the apples which, in a year of glut, they cannot sell, in effect cost nothing to produce? Would it alter their attitude to occasional surpluses if they realised that they need not lose money on the unsold fruit? A grower makes his production plans in the expectation of a normal crop. When he is presented with far more apples than he expected to get, the extra yield is in the nature of a gift, and he incurs extra costs only by picking and handling the larger crop. He does this at his own risk; the market does not ask for them.

The Desirable Level of Supply

At the end of Chapter I the grower was left wanting a minimum average price of 11s. 3d. a bushel at wholesale, and the markets were presumed to require the produce of some 40,000 acres of culinary apple trees. Are these two desiderata reconcilable?

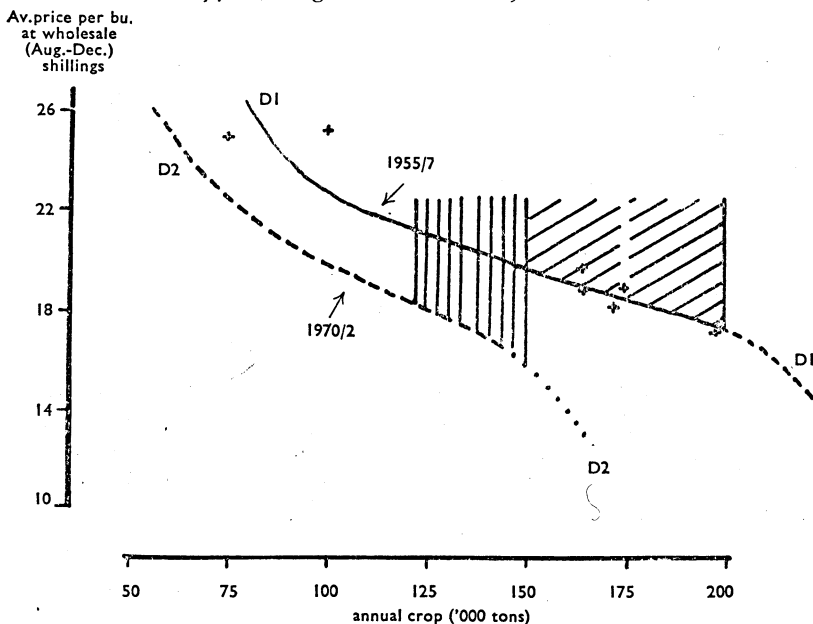
Further study shows that during the period 1952-57, before the slump, a grower who was marketing 75 per cent of his crop as fresh fruit, half of first quality, half of second quality, would have received an average price in the market of about 12s. 8d. a bushel. So if the 1952-57 situation can be restored, the required 11s. 3d. (for the good grower) should be realisable by a grower during the early and barn-store period, with *pro rata* increases for longer-stored fruit.

In the light of existing knowledge, Figure VI has been prepared in order to show the 1952-57 (relatively favourable) situation and the projected situation for 1970-72—15 years later. For greater definition, this analysis covers only Bramley's Seedling, but the principle holds good for all varieties.

At 1956, the demand and supply situation led to a "normal" crop of 167,000 tons of this variety, and four years out of five the annual crop will be between 150,000 and 200,000 tons. (see the diagonally hatched area in the diagram). By 1971, the "normal" projected crop is 135,000 tons, and four years out of five it is to be expected that the annual crop will be between 120,000 and 150,000 tons. (This area is vertically hatched in the diagram.) So, during the lapse of the ten years, the average crop would have tended to be sold at increasing prices, (i.e. at a point further to the left along the original demand line D.1), because there were progressively fewer apples available. In the same period, however, it is to be expected that the demand will have fallen by more than one quarter, to an estimated position represented by the broken line (D.2). In

practice, therefore, the average crop will not sell at the higher prices. The predictions are that the average price for the period September to December will be fractionally less than it was in and about 1956 (in relation to the then current general level of prices). In other words, the price of culinary apples is likely to recover somewhat from its recent low levels, but not to attain its pre-1959 level unless the acreage is reduced below 40,000. (The predicted prices of 18s. 8d. for 1956 and 16s. 10d. for 1971 are 1959-equivalent and at best can only be considered as guides). The answer to the opening question, then, was this: if a grower experienced an average price for market fruit at wholesale of 12s. 8d. a bushel in 1955-57, he can expect about 11s. 3d. a bushel in 1971, but only on 75 per cent of his previous acreage.

Figure VI. Predicted change in the demand for Bramley's Seedling apples, England and Wales, 1956-1971.



Is this purposeful curtailment of acreage good economics? It will be if the net returns from culinary apple growing are higher than they would be if acreage were maintained. It is, of course, incumbent on growers to reduce costs in proportion to the reduction in acreage (much of part III of this report is given up to a discussion of this very matter). If they can, the gain resulting from a large-scale withdrawal of *commercial* orchards (not derelict or semi-derelict orchards, the removal of which will have no effect

on market supplies), assuming that 55 per cent of the crop is marketed before December 31st each year, may be assessed as follows for Bramley's Seedling :

SITUATION A (50,000 <i>acres culinary varieties</i>)	SITUATION B (40,000 <i>acres culinary varieties</i>)
<i>Returns</i>	<i>Returns</i>
92,500 tons @ 12s.	75,000 tons @ 12s.
6d. a bushel	6d. a bushel
wholesale (£24	wholesale (£35
10s. a ton net	a ton net home) £2,625,000
home) ... £2,266,250	<i>Costs</i>
<i>Costs</i>	22,000 acres @ £75 £1,650,000
27,000 acres @ £70 £1,890,000	
MARGIN + £376,250	MARGIN + £975,000

That is, the smaller area will be worked at a lower aggregate cost, the net returns home will be higher than if the original area was maintained, and the growers' margin will be larger.

III. ADJUSTMENT ON THE FARM

Having attempted previously to outline how the changing situation in culinary-apple growing appears *off* the farms, the present chapter is concerned with adjustment *on* the farm. The question is: "Can the grower afford not to grow so many culinary apples?" and it is answered in three ways. First, by considering the effect of either a partial or an entire withdrawal of the orchards on a farm: secondly, by examining the prospects for changing to other crops following the withdrawal of the trees: thirdly, by commenting on the mode of improvement of net returns on farms which are not vulnerable in either yield or quality of crop.

Policy for the grower

On the farm, the individual grower can adopt the same policy as was outlined for the industry, although his problem is more intricate because he has to consider marketing costs and how costs of growing the crops are affected from season to season. Here again, the fact is often overlooked that under the prevailing system of commission selling, the grower needs a higher break-even price in the market than the salesman. The salesman can cover his average costs per box handled at a price, of, say, 10s. a bushel: if, say, 7s. of that 10s. finds its way back to the farm, the grower may not be covering *his* average costs per bushel produced. What has been said on page 31 about production of "free" apples does not apply to marketing in anything like the same degree. The apples that cost nothing to grow cost just as much as the others to market.

When demand is inelastic, as it is for quantities of culinary apples exceeding 200,000 tons a year *additional* sales induced by a falling price are not likely to be profitable to the grower when high fixed charges for marketing have to be paid first out of the money received. The grower, however, habitually puts himself in a weak position by *handling* too many worthless (in the sense that the *net returns* from selling them in the fresh market will be inadequate) apples. It often has happened, too, that small apples abound in an "on" year, which is not to the grower's advantage. An attempt is made on pages 48 and 49 to evaluate the small apple; at given prices, it definitely does not pay to pick, carry and put through a grading room apples of a certain diameter.

So the approach through marketing leads to the same conclusion as the approach through production. A grower can only succeed by *growing* (not by grading-out) a good sample. The hard facts of the situation are that many growers of culinary apples do not succeed in producing heavy, clean and good-sized crops. In what follows, it is assumed that their best chance of a profit is in

supplying the central wholesale markets. This is not always the case: local sales or a private bargain with a dealer are often more advantageous to the grower than sending to a big market—and local sales are certainly the way out for very small and dispersed growers.

It behoves each grower to make the best assessment he can of the related costs and benefit (or losses and savings) of alternative actions. When estimating the future advantages of improving quality on one block of trees he will have to weigh the probable costs of his programme against the extra revenue the improved crop will earn. The remainder of this section of the report is an attempt to trace the break-even points of alternative actions on orchards or farms for the guidance of growers.

Uneconomic Orchards

There are some farms which, judging by their results, should not be attempting to produce fresh culinary fruit for the main wholesale markets. For a variety of reasons, these farms' yields average less than 300 marketed bushels a tree acre, possibly because the trees are old and widely spaced, or otherwise the average price does not exceed 5s. a bushel net home, due to many of the varieties grown not being much wanted on the market.

At yields of 300 bushels or less of clean fruit to the acre, the direct costs of production of any variety of fruit destined for the fresh fruit market will be about £70 an acre at the farm gate. The average direct cost per bushel in these circumstances, will be at least 4s. 4d. for each bushel handled—that is, an *average* return of 4s. 4d. will make no contribution to the fixed charges or to profit, and many growers would like to allow 50 per cent. of direct costs (i.e. £35 an acre or 2s. 2d. a bushel) for these fixed costs. A 300 bushel crop which graded out 100 per cent. Fancy or better, might just pay its way, but on farms of the type in question, 67 per cent. pack-out would be good, which means that if all the 33 per cent. of fruit not of market quality went for processing, the market fruit would have to return 5s. a bushel to cover direct costs, and, more important, would have to return about 9s. a bushel to give the same anticipated profit as a cereal crop (say £20 an acre margin over direct costs). In other words, this type of grower requires a *market* price of 15s.-16s. a bushel for first grade consignments in the season, in order to make the same profit as he could in alternative crops.

Low prices have an effect similar to low yields. To be confined to a net return on the farm of 5s. a bushel from market sales puts the low-price grower in very much the same position as the low-yield grower. For his margin of £20 an acre, assuming

67 per cent. market sales, and no waste at all, a minimum average yield of 410 bushels an acre is essential. (This is equivalent to 450 bushels a tree acre in the Wye College Yield Census data : and the ten-year results show that two growers out of every five had average yields of less than 450 bushels a tree acre.)

A first conclusion then, is that growers who have been faithfully carrying out the normal operations on the trees, but whose recent average marketed yield of the more popular varieties has been less than 300 bushels an acre, or less than 400 bushels an acre of the less popular varieties in cases where orchards on the farm are much alike, would be better off within a few years if they took out the trees and used the land for other purposes. These are the truly uneconomic orchards.

As a general rule, "the weakest" blocks of trees on large fruit farms having varied types of fruit, could survive longer at the same rate of yield or price than on small farms. In fact, however, the trees grubbed by large growers are likely to be more productive than those taken out by small growers, because there is more general shortage of labour (time can be useful spent on the remaining trees) and because the large grower has higher income per acre standards than the small grower. It is on large farms that the quickest outright reduction of acreage will be looked for.

Whether single orchards or the entire orchard acreage is uneconomic, as judged by the two offered criteria of price and yield, a culinary apple grower will rarely face complete abandonment of his life-line. On each farm there will always be the questions of (a) how much of the acreage is uneconomic, and (b) how much can the grower afford to dispose of? The answers to the two questions are by no means the same. In all too many cases, the peculiar combination of land, labour and capital existing at present will have to be upset, with consequences that may not readily be foreseen. For instance, if the task of pruning the present acreage is nicely balanced to the labour available, to reduce the task without reducing the labour will lead to an unbalance: if there has been a steady cash income even if only £50-£60 an acre, on a family holding, if one acre be taken out, there will be £50-£60 less revenue than usual and expenses will be virtually as before, leaving the grower worse off than previously.

The only circumstances in which partial withdrawal could be guaranteed to improve results are (a) where the net return from an orchard is customarily less than what is spent on manures, sprays, packing materials and casual labour ; and (b) where the existing acreage has been too large to manage adequately with the staff available.

Elsewhere, although the national situation might demand, say, a 30 per cent withdrawal of trees, many growers acting singly might not be able to improve their financial position by grubbing 30 per cent. out of their acreage. If growers corporately cut acreage by 30 per cent., presumably the reduced supplies would produce a rise in price, but growers singly cannot be sure that the national effort would be large enough. An incentive rate of subsidy might generate withdrawal on the scale required, but then consumers will have been taxed in order to raise culinary prices. This is one of the many dilemmas in policy matters.

To repeat, a small reduction of acreage may not be worthwhile, and the reason therefore can be demonstrated as follows.

A grower who is equipped in men and machines to work 20 acres of orchards, decides to remove two uneconomic acres and tests out on paper what the effect on his profit will be. He will find that his costs per acre on the 18 acres will be slightly higher than on the 20 acres, and that so long as he has his present equipment, all he saves by *not* having the 2 acres is about £10 in fertilisers, £25 in spray materials, £20 in packing materials, and £15 in casual labour—some £70 in cash, and about 200 man hours' labour, whereas his net returns from fruit sales from the two acres have averaged £110 a year, so he is £40 worse off. In this case, the grower concerned would be advised either to take out at least five uneconomic acres and have a significant amount of labour freed, or not to take out any at all on purely economic grounds, unless he had other land available and could plough up five acres and crop it with cereals, which could be expected just to use up the labour and cash previously spent on the two acres.

As the farm under consideration becomes larger, the effect of a partial or "marginal" withdrawal will have progressively less weight, until in the extreme case a grower could contemplate taking out, say, 30 acres, releasing two men, and budgeting for a definitely higher market price.

It would hardly seem to be worthwhile for the uneconomic small grower to hold on in the expectation of other growers' actions effectively raising market prices, unless he intends to retire shortly, because prices are unlikely to rise to a really profitable (for him) level. His trees are ageing all the time, and he will in any case be faced with a bleak time when he *has* to replace the orchards at their normal retiring age. Some equity between growers could be realized if the large growers grubbed relatively more of their acreage of uneconomic orchards than the smaller growers.

The cost of grubbing

The net expenses of grubbing may be very small indeed where the area affected is three acres or more. If a nominal cost of con-

tractor's work of £40 an acre be assumed, an area of less than $2\frac{1}{2}$ acres will not be eligible for grant under the terms of the Horticultural Improvement Scheme (unless it is combined with other agreed work on the holding), because the cost of the projected improvement does not exceed £100.

For schemes exceeding £100 in cost, orchard grubbing qualifies for a one-third grant under the Horticultural Improvement Scheme if the fruit from the orchard is of a kind "likely to depress the market"—a reasonably all-inclusive term! The grant itself covers only grubbing and clearing and does not include the cost of the subsequent ploughing. If, however, an orchard has been under grass for the last seven years, a ploughing grant of £7 an acre will usually be payable too. Log wood will be a third source of revenue. The value *on the site* of fruit wood is a matter requiring careful and expert assessment. For any trees, whether large or small, which are physically decayed, it will be nil. On the other hand, standard trees in good condition having a clear trunk of up to 4ft. in height, could be worth about 13s. each. At 40 trees to the acre, the net revenue from fruit timber could be about £25 an acre, exclusive of the lighter branches. Provided that the trees are taken out in time, therefore, a grower could expect to get financial help toward grubbing amounting to some £47 an acre for an operation costing perhaps £50 an acre (for grubbing, clearing and ploughing). Even if these expectations are not realized in all cases, it should be common experience for grubbing to absorb no more than half the first year's profit on an arable crop.

The alternatives to culinary apples

The arguments used in this section assume that the grower whose present culinary apple trees are unprofitable will not want to re-plant that fruit, that he cannot afford the loss of revenue whilst waiting for apple, pear, plum or cherry trees to come into bearing; or that, if replanted, the present acreage will be too small for efficient production. These considerations will be important on holdings where orchards are an important enterprise. Where they are a sideline different criteria will apply.

It would be tedious to deal in detail with all the possible combinations of circumstances in which growers find themselves: but it is possible to give an outline of the probable best alternatives in four cases. What the grower who is giving up a relatively high-value crop like culinary apples for a lower-value crop has to watch is (a) that his profit is maintained as well as possible, and (b) that the paid labour necessarily kept on the holding is utilized as fully as possible. There will be holdings on which the revenue might be adequate if there were not heavy fixed charges for labour

to be met: other things being equal, an alternative cropping programme will have to be either more intensive or larger-scale where labour-use is as important a consideration as profit. Four possibilities must be allowed for:

- (a) the small farm on which both net income and employment have to be considered;
- (b) the small farm on which net income only has to be considered;
- (c) the larger farm as in (a).
- (d) the larger farm as in (b).

It is further assumed that the small farm is a mixed farm and does not produce solely fruit. There is no knowledge of the number and size-distribution of uneconomic orchards, but for the purposes of definition the smaller farm is assumed to have an annual turnover of £3,000 and the larger farm a turnover exceeding £10,000.

(a) On the smaller farm

On the smaller farm, the policy must be one of maintaining, and if possible improving, net income by keeping up revenue. A *re-distribution* of existing levels of expenditure could be profitably made in some circumstances. Where there is already some arable cropping on the smaller farms concerned (i.e. if the grower already owns some cultivating machinery and a drill) the costs of an additional field of say, five acres of wheat or barley would be £10-£12 an acre. Returns, without storage, should certainly exceed £30 an acre, leaving a margin of £18-£20 for two years out of three (assuming a break of a one-year ley). This would cancel out any residual cost of grubbing remaining after receipt of the grants therefore in the first year. And if winter grubbing were followed by spring sowing, the wait for revenue would be no longer than the grower is already used to. A further outlay on a small livestock enterprise (pigs or poultry) may also be necessary to utilize any labour freed by the change-over in cropping, and although the livestock enterprise may not show an actual profit, it will, with normal efficiency, be a more productive use of labour than in uneconomic culinary orchards. It is argued shortly that in most circumstances to grub enough of the orchards to make a reasonable—original or additional—alternative enterprise is the best policy. A policy of “letting the trees go” has little in its favour except as a last resort, where, for any reason, arable cropping is not recommended. Cereal cropping, with livestock added to take up some of the time released from the orchards, would serve the small grower who has only himself to maintain.

A more intensive organization will be desirable when sons or paid labour have to be given employment as well as the grower himself. In theory, any soft fruit crop and many vegetable crops will return a higher net income per acre than culinary fruit as

present, for a given labour requirement per acre. The table below shows the terms on which several of these crops could be exchanged for culinary fruit, the revenue per acre for culinary fruit being assumed to be £85, and the labour requirement 220 hours an acre to get the crop to the orchard gate.

<i>Alternative crop</i>	<i>Acres required to produce the same revenue as 5 acres culinary apples on u n e c o n o m i c orchards.</i>	<i>Acres required to give the same employment of regular staff as 5 acres apples.</i>
Soft fruit :		
Blackcurrants	$1\frac{2}{3}$	$6\frac{2}{3}$
Strawberries	$1\frac{2}{3}$	6
Raspberries	$1\frac{1}{4}$	6
Gooseberries	2	7
Vegetables :		
Brussels Sprouts	4	7
Broccoli	4	10
Cauliflower	5	10
Runner beans	$1\frac{1}{4}$	$2\frac{1}{2}$
Lettuce	$1\frac{3}{4}$	$3\frac{1}{3}$
Cabbage (one crop)	5	11
Vining peas	$7\frac{1}{2}$	50
Peas picked green	4	15
Carrots	4	10
Parsnips	3	11
Rhubarb	3	10

The above catalogue shows how unique orchard crops are: they cannot easily be replaced by any other crop. Alternative crops tend to be less labour-intensive, to have shorter-duration and more "peaked" regular labour requirements. Accordingly, growers who do change over entirely to cash cropping will be faced with a considerable re-organization of the farm: but these growers will be a minority. The majority will be faced with a change on only part of the farm.

Looking again at the alternative crops, it appears that on the small farm, and considering production aspects only, to replace five acres of orchard with two acres or less of soft fruit would maintain revenue and save labour, whilst to replace the five acres of orchard on a full scale would give about 85 per cent. of the regular employment on the orchard. Crops of short duration, like lettuce and runner beans, of course, are not true alternatives, and (lettuce especially) could be considered as catch crops in suitable circumstances.

(b) On the larger farm

The same theoretical arguments apply to larger farms as on smaller. Partial replacement with soft fruit will maintain revenue: full replacement will increase revenue and give satisfactory utilization of labour, possibly with beneficial release of marginal labour for additional work, such as thinning, on the remaining orchards. Full replacement with vegetable crops—more to be recommended on the larger farms than on the smaller—would add to revenue but leave some labour unemployed: fully to employ the labour released from the orchards would entail extending the cash cropping on to a larger area than freed by grubbing, with a consequent major change in the farm organization.

Whenever possible, the policy on smaller farms should be to maintain or increase intensity of production. On the larger uneconomic farms, a policy of scaling-down may be the correct one. It is to be expected that the larger farms at present heavily committed to culinary apple production will not maintain present acreages. Such farms could reduce their uneconomic orchard acreage without deleterious financial effects if one regular man were released for each 12-15 acres grubbed, with conversion to cereals.

Any policy for switching into new crops, of course, is subject to alteration to circumstances. Some conditioning influences are outlined below.

Practical limitation. Only an annual crop, such as Brussels sprouts or carrots, will give the grower a fully-compensating income in the year of grubbing. If it is essential that the grower have the income, soft fruit crops will be ruled out, unless he *anticipates* grubbing by planting the replacement crop two or three years before he wants the income. Three years' wait should be allowed for blackcurrants and gooseberries, two years for raspberries, and one year (actually 10-11 months) for strawberries. The waiting period rules out of consideration the other orchard crops—dessert apples or pears, plums or cherries. Of these four crops, plums may well be the best choice in many circumstances.

Soil requirements. A big distinction will be necessary here between the single culinary orchard on a mixed farm and the several orchards which might exist on a fruit farm in such a relatively specialized area as the low Weald of Kent. The choice of alternatives will be much wider on the general-purpose land: in fact, the removal of orchards in such circumstances may be useful on other than economic grounds. On the low Weald farms the high winter water-table, and the liability to spring frosts make both over-wintered vegetable and soft fruit crops hazardous in some situations. Least risks could be expected with crops like runner beans and green peas. Where neither labour nor equipment is available for arable cropping preference would seem to lie towards livestock, and of the alternatives in livestock, sheep make the least demands for new capital expenditure in relation to the value of

what they produce. If there was no previous provision for arable crops on a farm—if the farm were large enough (say 40-50 acres) and if the removed orchard were large enough (say 5-10 acres)—a cereal crop would involve expenditure amounting to £35 an acre. Annual costs would be at least £20 an acre, which, over a three-year rotation, is consistent with an annual margin of only £10 in a year: Kent sheep will do as well as this at lower capital outlay. The question of introducing sheep keeping is dealt with more fully in the later section on “spending less”.

Marketing. Any new development into horticultural cash crop production in new and hitherto untried parts of the country is bound to be speculative. A grower should not plant blindly or even hopefully. The three most likely types of outlet are (a) growing on contract, (b) growing for local sale, or (c) growing for consignment to a London market. On the whole, it would be unwise to grow small areas of cash crops for chance consignment to central markets. A local co-operative organization may be able to help growers to find new markets and to give advice about the type of crops there is the best chance of selling. Contract possibilities are perhaps greatest for blackcurrants and some of the vegetable crops. As regards local markets, there seems to be the best possibilities in the townships on the southern fringe of London. Any development in this direction, of course, could hardly be engineered by a novitiate of growers; it would necessitate association with a wholesaler and may be dependent upon some feature like quality of product or relatively high yield per acre, and, as far as is known, neither of these can be expected in the circumstances.

Size of team. Some horticultural crops may be ruled out on some farms—particularly the smaller ones—by lack of adequate labour to meet the peak demands of the crop. Casual labour may be available only in the non-harvesting season, being drawn off elsewhere at the busy seasons. Harvesting horticultural crops is always labour-intensive: even if there is not a lot of hand work as with raspberries, a good output for the day can be realized only with team work, as with vining peas or cauliflowers. Raspberries, strawberries, runner beans, and peas may be ruled out on some farms for reasons of inadequate peak labour.

To sum up, the difficulties of converting from culinary apples to other crops on a large scale are formidable. So much so that many growers will not think conversion worthwhile. It remains, therefore, to explore what can be done with the orchards if they are to remain on the farm. Can they be managed more economically? Is there any satisfactory alternative to the fresh-apple market?

The demand for apples for processing

The only other outlet available is the process market. On paper a favourable balance can be struck on selling mainly process fruit if the orchards are left alone (or only used to take up "free" labour) so that costs are at an absolute minimum. Assuming that grazing takes the place of manuring, a theoretical margin (output—variable expenses) per acre of £17 10s. is obtainable from an uneconomic culinary apple orchard, as under.

<i>Expenditure</i>		<i>Revenue</i>	
Picking-up fruit (only)		Sales of process fruit :	
5 tons an acre @		5 tons an acre @	
£4 a ton	£20	£7.10 a ton	£37.10
Margin per acre ...	£17.10		
	£37.10		£37.10

In practice, however, it is doubtful whether either a large or a small grower could rely on selling all his fruit each year by this method. Were he to sell half, and keep sheep in the orchard at the stocking rate of three per acre, the prospective margin would be something like £28 an acre.

It is not to be expected that the process market will become more buoyant and demanding. Normally, there is no shortage, and even if sources of culinary culls dry up, sources of dessert culls will increase pro rata. In any case, to sustain the process market in one short-crop year by four years' unprofitable cultivation is not a good policy for either the grower or the nation. It would be much better from the national point of view to accumulate stocks of processed products (apple sauce, juice concentrate and so on) in the years of plenty and hold them over until they are wanted. Abandonment of trees that cannot compete in the fresh market is the only sound economic policy. Reliance on the process market would, however, tend to reduce actual financial losses on non-economic orchards, if only because the fruit will not cost anything (be picked-up) until a buyer for it has been found.

Economic orchards

Withdrawal of orchards on the scale implied on page 32 can hardly be contemplated, and many growers, even if they grub some trees, will be unwilling to grub them all, and will try to make the best use of those remaining. Possibly 25 per cent. of the *Bramley* and *Derby* acreage is uneconomic, plus 75 per cent. of the area of less wanted varieties: on this basis, some 7,200 acres of culinary orchards in Kent—30-33 per cent. of the 1957 area—could with ultimate advantage be grubbed. Growers having farms whose orchards are not wholly uneconomic and growers whose yields and prices are barely economic also have a problem of adjusting to lower prices: they can be considered together. These

growers are faced with the task of increasing the margin between revenue and expenditure, which means undertaking additional expenditure if it will be lucrative, or forgoing expenditure if it does not recreate its own value in output.

Growers may get certain leads in this direction from a study of costs and returns broken down into their elements. The situation on three barely-economic culinary apple enterprises is reported in the table on page 45. Costs are shown for the labour, for materials, and for the services of mechanical equipment used in the routine operations in the orchards. Returns are shown for the different qualities of apple produced. All the farms have standard or half-standard trees still carrying their top branches, and not heavily cut about.

The costs cannot in all circumstances be taken at their face value. Take pruning: this is winter work, and it may well be that there is no equally valuable alternative work to pruning for two or three months of the year. In such cases, when assessing the real costs of pruning, it is correct to take the value of *the best alternative work*: only in this way can a grower find out the extent of the advantage in giving up pruning.

If there were no alternative work (and activity on farms is generally at a lower ebb in winter than in summer) the real cost of pruning is next to nothing. More work is required per acre on orchards for pruning than for any other operation except harvesting, and it is to be expected that the considerations governing a decision about pruning will be different on the small family farm and on the larger farm which has a considerable staff of regular employees. In the first case, the pruning will be valuable as providing work of *some* value during the winter months: in the second, pruning may be instrumental in keeping on the farm more regular men than are necessary to carry out the spring and summer operations. In the latter case, the grower will be involved in trying to make a decision about the reduction in net returns that would follow alternate-year pruning compared with the costs that would be saved if he released half his pruning staff. Alternate-year pruning was recommended for standard trees by American agronomists at the time of economic depression in the 1930's and is also practised on some Kentish farms nowadays.

In the examples given, all labour has been charged at its full rate, on the assumption that if the staff were not engaged on fruit work they would be doing work equal in value to it, but growers can improve upon these figures for their own use by altering them along the lines suggested above. Costs of materials are more easily evaluated than labour because if they are foregone the grower saves all their cost, although there is very little information available to him about the likely effect on both his crop and his returns if he were to do so.

The economy of (a) cost-saving and (b) revenue-raising is now considered separately, bearing in mind that the grower's first aim should be to produce a sample of fruit suitable for the fresh market.

Table 3.—Analysed Direct Costs and Returns on three Culinary Apple Enterprises, 1958 crop year.

<i>Orchard Size Group</i>	<i>Farm X</i>	<i>Farm Y</i>	<i>Farm Z</i>
	10-20 <i>acres</i>	20-25 <i>acres</i>	50-75 <i>acres</i>
Costs (£ an acre)			
Pruning (and picking up)	10.8	9.95	14.25
Labour	10.4	8.85	14.05
Services	0.4	1.10	0.20
Manuring	6.4	5.4	8.95
Labour	1.05	0.95	0.55
Materials	4.80	3.55	7.90
Services	0.55	0.90	0.50
Cultivations (mowing) ...	6.2	1.75	3.65
Labour	2.0	0.85	1.80
Services	4.2	0.90	1.85
Spraying	14.95	15.6	5.75
Labour	1.45	3.5	0.80
Materials	8.65	7.4	3.20
Services	4.85	4.7	1.75
Other cultural operations	4.05	2.0	3.65
Labour	3.80	1.05	3.20
Materials	—	0.50	0.05
Services	0.25	0.45	0.40
Picking	22.85	23.45	16.95
Labour	21.10	18.50	14.65
Services	1.75	4.95	2.30
<i>Total :</i>	65.25	58.15	53.20
NET RETURNS (£ an acre)	£65	£128	£83
Average marketed yield per acre	319 bu.	343 bu.	214 bu.
Composed of :			
extra large (over 3½in.)	22%	9%	—
large (3in.-3½in.) ...	31%	23%	24%
medium (2¾in.-3in.) ...	16%	38%	60%
small (below 2¾in.) ...	31%	30%	16%
Average price per bu. on the farm	4s. 1d.	7s. 6d.	7s. 9d.

As has been suggested in an earlier page, the grower who would be interested in adjusting his expenditure per acre for the sake of getting a relative improvement in his revenue, is one whose yield exceeds 300 bushels in a year, or one whose average price

exceeds 5s. a bushel on the farm. In the latter category, too, come the growers whose price on the farm is about 5s. a bushel because a satisfactory market price is seriously diminished by high marketing costs.

When wishing to cut down on expenditure, a grower can only do so by omitting or cheapening some or all of his normal operations. Hence, the first requirement is to make an appraisal of the value of each operation in turn, considering in what circumstances it could profitably be dispensed with, or cost less.

When to spend less

Pruning. Pruning, in some form, is the last operation that growers would dispense with: they would not abandon pruning without giving up other cultural operations as well. Judicious saw-cuts, however, can increasingly take the place of knife-cuts in the later years, and up to £5 per acre could be saved in this way, with possibly little effect on the crop.

Nowadays, to judge by the table of costs, alternate-year pruning saves some £5 an acre in direct expenditure over all the orchard area if the labour not required as a result of the change is actually released—and more than this indirectly if the spring and summer work were to be accomplished by the reduced staff. So far as is known, second-year pruning is very little more expensive than first-year pruning. Non-pruning could perhaps be offset by fruit thinning, regular labour being replaced by casual labour for this purpose. The writer has nothing to offer upon the economics of this exchange but it may be worth consideration experimentally.

Manuring. The three growers whose costs are given are evidently agreed that it is a mistake to cut out manuring, and have maintained annual dressings of 4-6 cwts. an acre, mainly nitrogenous inorganics: but because in all cases their yields are low, they need to consider whether there is not some other factor limiting the fertilizer's effect.

No doubt the tree could be adjusted by altering the pruning, to a lower-nitrogen economy, but this is not a proven way of saving money. The only scope for spending less on manuring would be in cases where neither vigour nor yield would suffer if it were reduced.

Cultivations. Competition for water and nutrients between the trees and the grass in uncut orchards can be severe in some seasons and would be generally deleterious to crop size on trees already declining in vigour on account of their age. Blade mowers, however, are much more expensive to operate than knife mowers, and knife mowers which could perhaps be borrowed before and after the hay-cutting season would be worth a trial on smaller acreages, if the prospect of saving £3 an acre or so in this way appeals to the grower.

There is no way out for the grower in reverting to arable (clean) cultivation. Apart from making access to the trees more difficult and costly, cultivation costs per acre on grassed and arable orchards are very similar, and if, in place of grass mowings, organic manures have to be bought in, the cost is likely to be higher by about £8 an acre. There is thus no saving in the long run in reverting to clean cultivation.

Spraying. So long as the grower has hopes of sales of fresh apples, spraying cannot be dispensed with. The "variable cost" element in spraying is about £8 an acre, or 6½d. a bushel at average yields, whereas the variable return expressed as the difference in net returns from the fresh market and the process market is likely to be at least 2s. 6d. a bushel. So not to spray, and not to do anything else instead, cannot be recommended as a policy. Whilst apples marked with scab or surface blemishes might find a market as fresh fruit; apples showing insect damage as well would be less acceptable. The clean sample is now the market standard. As the average grower is committed to an expenditure of £8-£10 an acre if he does any spraying at all, to do the minimum full programme is, again, an insurance: what he can do, in the last resort, is to cut the later solely anti-scab sprayings.

Non-spraying plus sheep, however, if the fruit *can* be sold for processing at say, an average of £35 an acre, will lift the returns from an orchard of ten acres or more to the equivalent of an average net return of 3s. a bushel from a 300-bushel crop. If non-spraying is associated with non-picking (on the trees), in an effort to concentrate on the process market, the savings would be more dramatic and sheep would contribute to the farm profit. Thus to deflate an orchard enterprise, however, may not be the solution for the small grower: it would depend upon how high his fixed costs were.

A "budget" for introducing sheep to the farm would be as follows. It should also be borne in mind that in ceasing to buy pest control materials and to pay the wages of hired fruit pickers, in favour of buying-in tegs and ewes the grower would not be increasing his cash expenditure. The investment in sheep would entail about £25 an acre, and a grower would be spending at least £30 an acre, in cash, on mowing, spraying, box paper and picking. (Fertilizers, of course, are common to both uses of the land.)

There would be a *prima facie* case for introducing sheep into orchards then, where manuring, spraying and picking the crop (not to mention grading, which is assumed to be just worth its cost) do not increase the revenue from fruit sold by more than £42 10s. an acre (the cost of these operations plus the profit from the sheep) or more simply, where total revenue from fruit sold fresh is less than £42 10s. an acre over and above its process value.

Sheep as a balancing enterprise on uneconomic orchards

Gains from having sheep			Losses from having sheep		
£ an acre			£ an acre		
Expenditure saved : on mowing 4.0 on spraying 10.5 on picking 18.0 <hr style="width: 10%; margin-left: auto; margin-right: 0;"/> 32.5 Net output from sheep : wool and animals ... 13.5 <hr style="width: 10%; margin-left: auto; margin-right: 0;"/> 46.0 <hr style="width: 10%; margin-left: auto; margin-right: 0;"/>		Revenue sacrificed : say 240 bu. an acre formerly sold fresh, now sold for process- ing at a net 3s. a bushel less—240 x 3s. 36.0 Balance gain from sheep 10.0 <hr style="width: 10%; margin-left: auto; margin-right: 0;"/> 46.0 <hr style="width: 10%; margin-left: auto; margin-right: 0;"/>			

Other cultural operations consist of grafting, brushing round boles, cutting-out water shoots and the like. Some, but not all, would be dispensed with if it were the grower's policy to cut his losses.

Picking is a good one-third of the costs of all operations and, possibly, has not been given enough of growers' thoughts. Sums of £15-£30 an acre are at stake here : and this is a considerable sum and is mostly paid away from the farm. Not to pick can only be conceived of in relation to selling fruit for processing, and is thus ruled out. The grower's best policy is to see that he is getting value for the money he is paying for picking.

By the time the crop is ready to pick, every apple on the tree has cost as much as every other : the large apple and the small apple, for example, have grown up together. On the cost-basis of valuation, assuming (for the less successful farms) a yield of six bushels a tree, an average count of 150 a bushel, and total costs excluding picking, of 32s. a tree, each dozen apples carries an investment of 5d. when ready for picking. To pick and load each dozen costs about 1½d., making the picked apples worth 6½d. a dozen. A bushel of 150 apples, therefore, can cost about 7s. at the packhouse door. After grading, the investment will have risen to 9s. a bushel or nearly ¾d. per apple. This is already more than the expected average net return per bushel for the whole crop. Admittedly, *once he has produced a crop for sale in the fresh market*, a grower need only count his picking and grading as variable expenses, and not to pick (certainly) and to grade (perhaps) would be worse than doing so as a general rule. In deciding whether to pick and grade in these circumstances the grower has put aside thoughts of his total costs in relation to total returns, which may be unfavourable, and has to weigh up instead whether he can cover his variable costs, and by how much.

Size of apple. Adequate revenue depends very largely upon having large apples—large enough, that is, to qualify for a good price in the market. The small apple costs as much to grow, as much to pick, more to grade and more to handle than the large apple and is worth considerably less. Hence, there is a great deal for a grower to learn about the economics of apple size. Whether the small apples can profitably be picked or not must depend on (a) the number of larger apples available as alternatives (if a grower has entirely small apples, his sanction to pick them is stronger than if he has only a small proportion), and (b) the average level of supply. Item (b) will enable him to put a price on them, item (a) to decide whether it is worth while for him to pick. The circumstances in which it pays to pick and handle small apples, once they are grown, cannot yet be clearly defined: (this in itself is an indication of how little management has yet ramified into growing and marketing culinary apples) but the boundaries of application of this principle can be set by considering two extreme positions.

It would certainly be uneconomic to pay casual workers to pick 10 per cent. 2½ in. diameter apples to bulk with the rest in a normal or good crop year. Such apples may be worth a net 2s. a bushel. If there is no shortage of Bramley's (i.e. a national crop of 150,000 tons or more) only fruit that will return 4s. a bushel on the farm is worth picking if casual workers are concerned in the picking and grading.

On the other hand the large apple will be worth picking in most circumstances. If there were, say, 20 per cent. of 3 in. (or more) diameter apples in a 300-bushel crop of predominantly small apples, the costs per bushel of handling 60 bushels an acre would be high, and the only policy giving a prospect of profit from market sales would be to pick straight into the box, weigh in the orchard and market a loose pack. If such deliveries returned 9s. a bushel at the farm, the grower would have a margin over any conceivable cost of picking, would "net" £27 an acre from the fresh market and, say, £25 an acre from the process market, making £52 in all. This would not cover *all* his costs (in the circumstances it would be impossible to do so), but his loss would be less than if he were to pick and grade the whole crop. Where there is the prospect that 120-150 bushels an acre of 3 in. apples could be marketed in this way, a grower could expect his total returns from fresh and process sales to be about equal to *all* his expenses on the crop.

To sum up, the opportunities for spending less will be found largely in the way manual labour is used; first, by reducing either the direct or indirect costs of pruning; secondly, by greater discrimination in picking.

When to spend more

On farms where average yields have exceeded 300 bushels an acre of all varieties, or the average price on the farm has exceeded 5s. a bushel, but there is no regular (small) average profit on the crop, a grower's best policy may be to grade-up his quality. As in other cases, it seems to be a good policy to try first with the most likely block of trees, and then extend the practice if it is proved worthwhile. The whole aim would be to grow fewer apples per acre. Even without storage, there appears to be a good prospect that fewer larger apples exchanged for more but smaller apples, *without an overall increase* in yield, would raise revenue sufficiently to allow of quite a lot more attention to the trees. For example, if a grower were to replace 1,500 apples (100 bu.) an acre of 2.7in. acreage diameter apples with 1,000 apples (100 bu.) of 3.3in. average diameter, he would raise his margin by some 4s. 6d. a bushel or £25 an acre, and this would pay for quite a lot of thinning or extra work. If thinning were to make the difference between an average net return of, say 4s. a bushel and 7s. a bushel over a marketable crop of 400-bushel an acre, it is "worth" £60 an acre and should not cost anything like this. Growers insure (or over-insure) against blemished fruit by spraying. Why do they not more frequently insure against small size by thinning? It is quite a workable practice to plot the rate of growth (increase in diameter) of a crop during the season, and to get, in the space of a few years, a knowledge of a normal rate of development: and then to proceed from this basis to a routine removal of all apples that cannot be expected to make the minimum size by the time of harvesting. The graph of size is useful in this connection because over a period of three or four weeks' thinning, allowance can be made week by week for the growth of the whole crop.

The cost of improvement

Renovation (of the trees) is certainly one of the topics that should be considered under the heading of "spending more", because the loss of revenue after de-horning cannot be overlooked and adds to the cost of doing the work. One grower has attempted a programme of renovation on standard trees less than 40 years old and is satisfied (no more!) with the results. Costs worked out at almost £40 an acre, with no marked subsequent savings, for the first year's growth required as much pruning as on a normal tree. The additional cost, therefore, is some £25 an acre, being the difference between what normal pruning would have cost, and the cost of the de-horning. There was no crop of apples in the first year after de-horning and a half-crop in the second year: so the "cost" in revenue forgone is $1\frac{1}{2}$ crops less the cost of picking, which might average out at £150. The total cost thus becomes £175 an acre. This is a comparatively large sum. Is it worthwhile? Much would depend upon how long the improvement

in quality were maintained. The entire *cost* (without profit) could be recouped in three years if, for example, one-third of an average crop of 400 bushels an acre were enlarged from 2½ in. to 3 in. and over. It remains to see whether this scale of improvement will materialize.

It would seem that this technique, which will have to be repetitive, could be "taken round the farm" and used to grade-up slowly the entire crop. However, it would seem also that the operation should be carried out in good time: for many growers it is already too late—their trees are too old. Some varieties stand severe treatment better than others: *Newton* succumbed in the case already referred to, whilst *Bramley* recovered.

Growers who have read through this chapter to this point may well think it over-elaborate and inconclusive. The justification for giving it such lengthy treatment is first, that growers' individual circumstances are such that a general recommendation to "grub uneconomic trees" avoids the larger question of how this is to be done to the grower's best advantage, and secondly, that if they can foresee a rational course of action—such as might be opened to them by reading this section—they are more likely to take action, and thereby contribute to their own progress, than if they cannot foresee the future so clearly.

SUMMING-UP

The implications of this examination of the costs of different processes in growing and marketing culinary apples are self-evident. First, in view of the fact that prices of culinary apples are unlikely to be higher in the near future than in the recent past, the most uneconomic trees and orchards should be grubbed: such a move would help the growers who withdraw and those who remain.

For those who remain, but still have yields or prices almost down to the minimum (300 bu. an acre; 5s. a bu. back at the farm) a half-hearted effort at improving their financial results by spending less on the trees is not likely to prove a good policy. (It must be made clear here that the point at issue is not better, more skilled work for the same or less money, but an implied withholding of skill for the sake of "saving" money. There may well be on many farms opportunities for employing the skills in pruning, manuring, pest control and so on at a lower cost.) Rather than to cut down on operations, it would probably pay these growers better to spend very little on the trees, selling the crop for cider and using the grass in the orchard.

Where the trees are not too old, have adequate vigour, and, on past performance, have shown a *capacity* to crop, a better policy is to aim to produce a higher quality crop, even though it costs more per acre to do so. Obviously, the least successful growers should only attempt improvement in part of their orchards at first.

To be fully informed about marketing the grower needs to know :

- (i) which size and quality of apples have paid only for picking and marketing ;
- (ii) which apples have paid only the variable expenses of production ; and
- (iii) which apples have paid all production costs, including orchard depreciation and interest on capital :

As a general guide to the average case, the following figures have been prepared on the basis of a price of 12s. a bushel in the market for a 3in. apple, graded and in a returnable box. At the break-even points quoted, the 3in. apples will pay the expenses of the entire crop, relegating the smaller apples to the role of a by-product, which, if saleable, will be a source of direct profit. This approach to accounting the crop will not suit all readers, but it is a rational way of examining the position.

Situation 1. To pay for picking, and all subsequent expenses :

	<i>at 75% 3in. apples</i>	<i>at 50% 3in. apples</i>
Break-even price ...	6s. 11d. a bushel	7s. 5d. a bushel

Situation 2. To pay for the season's expenses :

	<i>at 75% 3in. apples</i>	<i>at 50% 3in. apples</i>
Break-even yield ...	270 bu. an acre	440 bu. an acre

Situation 3. To pay for *all* production (and marketing) costs :

	<i>at 75% 3in. apples</i>	<i>at 50% 3in. apples</i>
Break-even yield ...	375 bu. an acre	610 bu. an acre

In theory, only growers who qualify in Situation 3 can afford to continue in business on their present scale, and only they can confidently be re-planting with culinary varieties.