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COLLEGE
NEW ZEALAND**



DEPARTMENT OF HORTICULTURE

BULLETIN 12

**The Production, Management
& Marketing of Berryfruit**

Editor : G. F. Thiele

Seminar on

THE PRODUCTION, MANAGEMENT and MARKETING
of BERRYFRUIT

AUGUST 1971

Edited by Mr G.F. Thiele

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Lincoln College
University College of Agriculture
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in conjunction with
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PREFACE

The papers presented in this bulletin were delivered during a two day marketing course for berryfruit growers preceding the annual conference of the Berryfruit Growers' Federation and at a production and management field day at the Horticultural Research Area, Lincoln College, the following day.

Berryfruits, in New Zealand terminology, are blackcurrants, raspberries, brambles (boysen and logan) strawberries, gooseberries and others such as blueberry, red and white currants and cranberry which are not grown extensively commercially.

The increased interest in berryfruit production in the last three or four years in New Zealand has resulted mainly from individuals or firms developing their own export markets and others following suit in the hope of gaining a slice of, what appeared to be, 'rich cake'. Increasing costs, changing patterns of production in both New Zealand and the importing countries and fierce competition in a situation where production decisions had no relationship to marketing, have all contributed to a position where profitability in many instances is marginal. This is not to imply that well managed berryfruit properties are unprofitable. What it does imply is that a fluctuating market demand, coupled with high risk of crop fluctuation and high production and overhead costs, can suddenly lead to a severe loss situation.

New production techniques and the hint of mechanical harvesting have added to the interest of those who think New Zealand can be a large scale, efficient producer of berryfruits for processing. The demand from farmers for crops which will allow diversification and intensification has added to the marketing problems.

This is the background on which the series of lectures and discussions was built in an endeavour to bring together research, production, processing and marketing interests. The marketing course had three broad sections dealing with consumer demand, market development and marketing costs. The production and management section of the programme provided a resumé of recent developments rather than full cultural details of berryfruit production.

Mr A.D. Dick, M.P., Parliamentary Under Secretary to the Minister of Agriculture, in opening the N.Z. Berryfruit Growers' Conference, said 'I would like to congratulate you on the progress you have made toward unifying your industry and on the steps you have taken to explore and establish new markets for your produce'. This publication provides ample evidence to support Mr Dick's statement. It is to be hoped the industry can use the information to promote further improvement in efficiency of production and marketing. If it can, New Zealand could well develop gradually into a major berryfruit competitor on world markets. It is evident also that the New Zealand market, representing nearly 90% of total production, is extremely important in providing a firm economical basis for the industry.

If we have assisted in any way to promote unity and co-operation within the industry for the ultimate good of its members then we have succeeded. As Mr P.J. Hawley, Dominion President, said in closing the course; 'the questions have been posed; we will try to find the answers for next year!'

G.F. Thiele
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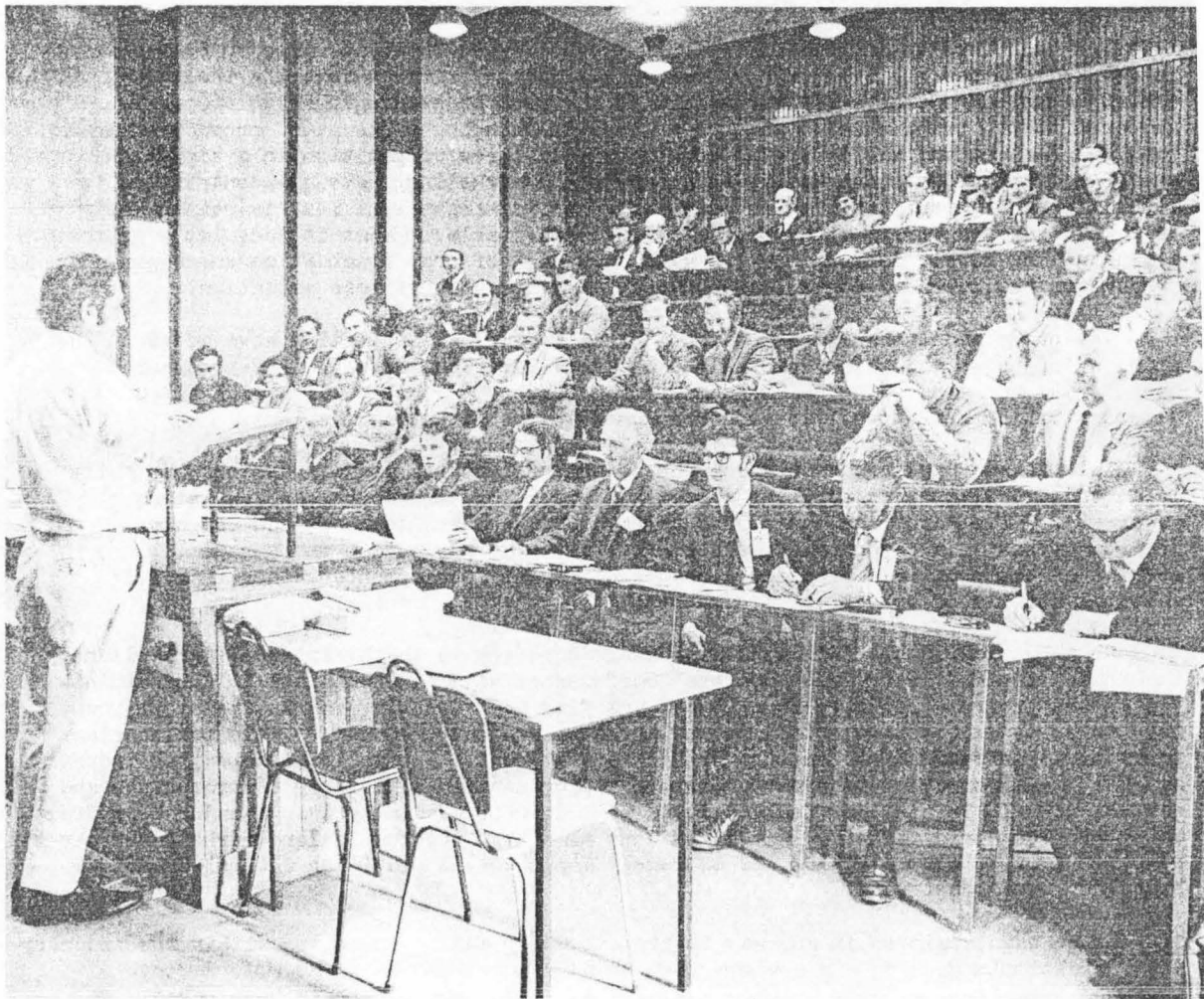
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Professor McCarthy addressing the Marketing Seminar
in the Hilgendorf Wing, Lincoln College

Section 1

TRENDS IN CONSUMER

DEMAND

FOR BERRYFRUIT

Professor B.J. Ross : leader

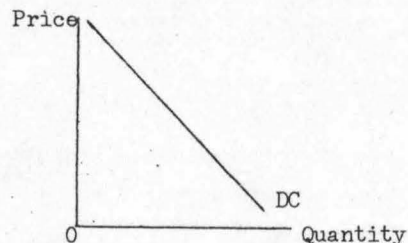
TRENDS IN CONSUMER BUYING HABITS AND TASTES IN
NEW ZEALAND AND OVERSEAS AND THE PLACE OF
BERRYFRUIT AND PRODUCTS IN THIS PICTURE

Professor B.J. Ross
Department of Agricultural Economics
and Marketing
Lincoln College

With my rather limited knowledge of the berryfruit industry, a detailed and expert discussion of the topic laid down for me this afternoon is a bit beyond me, but in wondering how I should cope with the situation I was heartened by the recent performance of two of our leading politicians. Last month the Christchurch Branch of the Economic Society invited Mr Pickering and Mr Rowling to address a meeting on the topic "Alternatives to Present Fiscal Policies", and one after the other they got up, said they didn't think much of the topic, and proceeded to address us on a vaguely related topic of their own choice. I hope I come closer to the advertised subject than Messrs Pickering and Rowling, but be warned, I shall probably not be covering all the fields you might have expected from the title.

Some smart anti-economist once said, "You can even make a parrot into a learned political economist - all you must learn are the two words "Supply" and "Demand". Whilst I should hate you to believe anything as crude as that, it is true that we can learn a great deal about consumption trends for any product by studying changes in the supply and demand conditions affecting the chosen product. Accordingly, I intend to outline the effects different factors have on supply and demand conditions in general, and I shall then try to relate the general conclusions to the particular case of berryfruit.

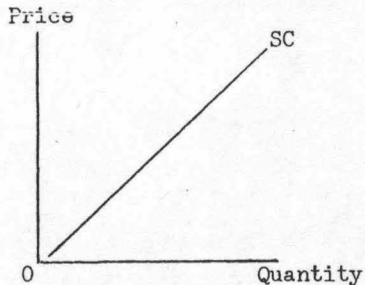
If we draw a graph of all the different combinations of prices and quantities purchased for a particular commodity we get what is known as a demand curve, and if we



measure prices on the vertical scale, and quantities on the horizontal, the demand curve is normally found to slope downwards to the right. This simply illustrates the commonsense conclusion that people tend to buy more of a commodity as it becomes cheaper, all other things, including the prices of other goods, being held constant. This commonsense relationship between price and quantity purchased has been measured many times for all sorts of products.

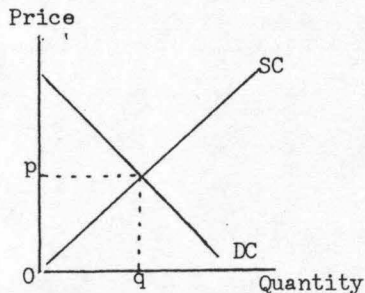
relationship between price and quantity purchased has been measured many times for all sorts of products.

We can also graph the relationship between prices and quantities supplied. Commonsense indicates, and research confirms, that a supply curve will normally slope upwards to the right.



There are two main reasons for this upward slope: many costs rise sharply as output is increased, and the extra output is therefore worthwhile only when prices are high, and secondly, in a fully employed economy, extra resources will only be attracted to the production of this commodity from the production of some other if the returns are worthwhile.

The actual out-turn in the market with regard to prices and quantities purchased and sold will be determined by the intersection of the supply and demand curves.

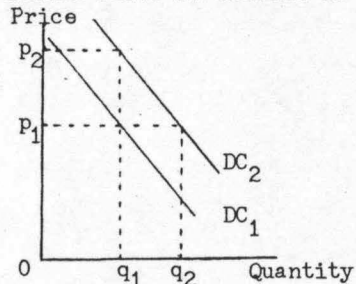


The price which corresponds with the point of intersection is the only one at which the quantity people want to purchase is exactly the same as the quantity producers are willing to supply. As producers of perishable commodities, you scarcely need to be told that the prices sometimes received are far below the level at which you would be happy to go on selling in the long run, but that does not upset the validity of what I have said, if applied to

periods, such as a season, or several seasons, long enough to allow producers to change from one commodity to another.

Having seen that it is the intersection of supply and demand which determines prices and quantities, it is clear that anything which causes the supply or demand curves to shift will change the equilibrium price and quantity, and it is shifts of this sort that I propose to examine now.

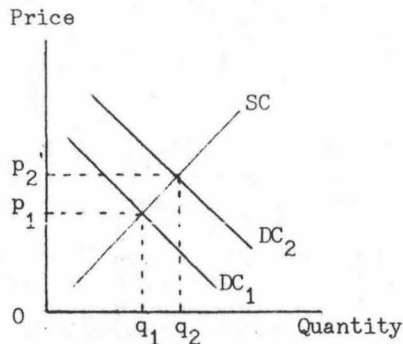
If the demand curve is shifted to the right it indicates that, compared with the old



demand curve, a given quantity can now be sold at a higher price (q , now sells for p_2 instead of p_1)

or what amounts to the same thing, a greater quantity can now be sold at a given price (q_2 now sold at p_1 instead of q_1).

Thus you can see that anything which tends to shift the demand curve to the right is to the advantage of producers; with the supply curve unchanged they will be able to sell greater quantities at a higher price.



Conversely, anything which shifts the demand curve to the left is to the disadvantage of the producers.

The most obvious factor shifting demand curves to the right all over the world, is an increase in population. If more people, with the same tastes and incomes as the existing population, are added to the population, it is obvious that more of each commodity will be wanted at each price level. Thus, with other things being held constant, increasing population means increasing demand.

Other things rarely do remain constant, however, and a change in the tastes of the population could mean a reduction in total demand even when population was increasing. The decline of the ostrich feather industry is perhaps a prime example of this. Changes in tastes are often hard to foresee, but we can get some clues if we know where to look. For example, an American study which I am going to quote several times, shows that the average weekly expenditure on fruit is twice as high for non-farm households as for farm households, a result that has obvious significance in a situation where there is a continuing drift of population away from farms.

Advertising is nothing more nor less than an attempt to shift the demand curve for a particular product to the right by changing people's tastes.

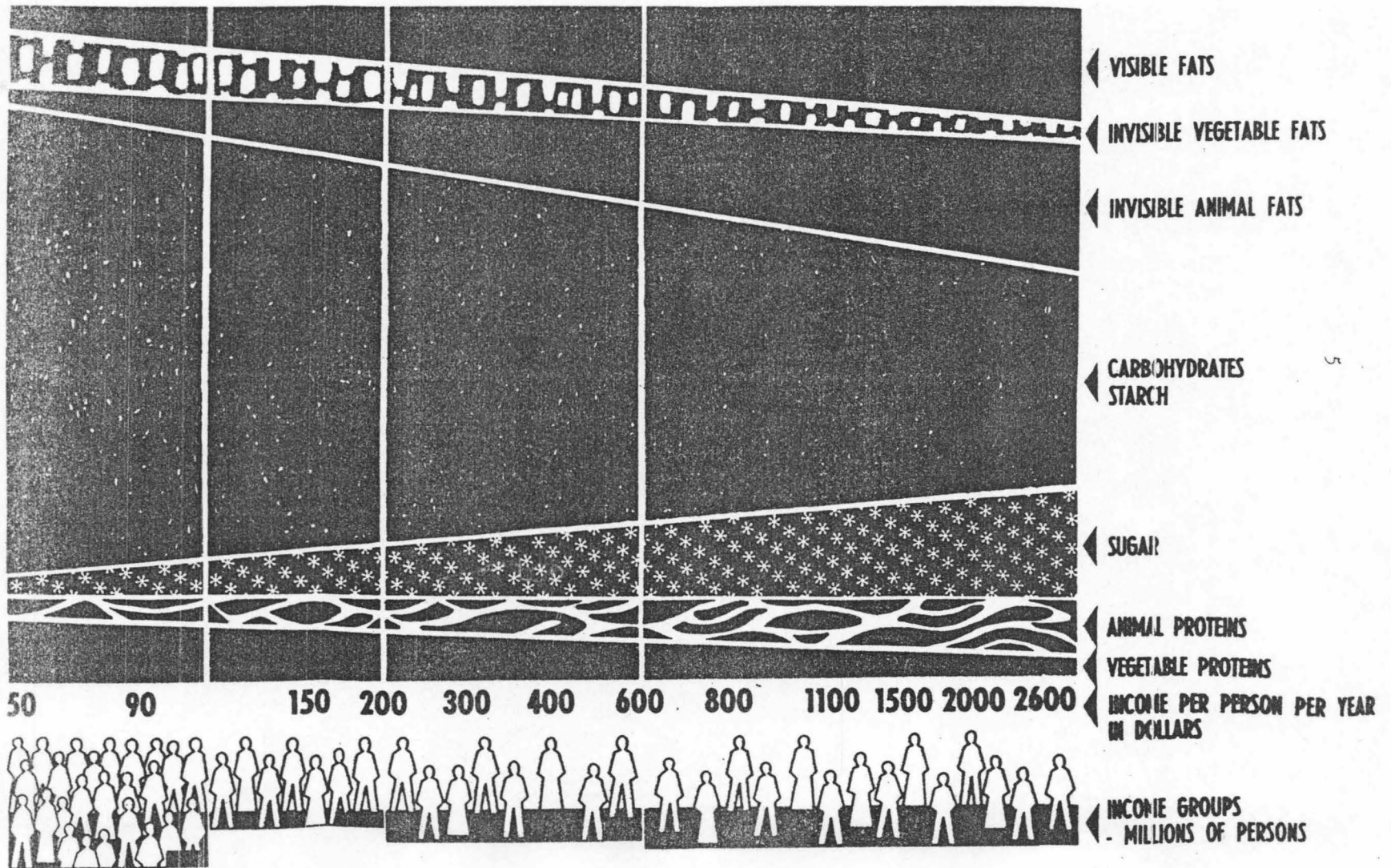
Another important factor affecting the demand curve is the level of people's incomes. Other things being equal we would expect higher incomes to lead to greater consumption, but whilst this is generally true it does not apply equally to all goods. Thus the American study shows that expenditure on citrus fruit per household goes up by two and a half times between the lowest and the highest income groups; expenditure on fruit other than citrus goes up a little under two times, but within this group expenditure on strawberries is trebled, whilst expenditure on other berries scarcely changes. Changes in income can affect the composition of expenditure and diet (see Fig.I, p.5).

Potatoes are traditionally thought of as being little affected by the level of income - even the poor can afford to buy as many potatoes as they want - and while the American statistics confirm this, they go into sufficient detail to show some other interesting facts as well. Only the relatively well-to-do make any significant purchases of frozen, canned or dehydrated potatoes, and in the field of potato chips the purchases by the two wealthiest groups are about seven times those of the lowest income groups. Thus processing can change the appeal a product has for the higher income groups.

If we assume that in the markets of greatest interest (in your case probably New Zealand, Australia and Japan) incomes are going to go on rising, then the expenditure patterns of the well-off section of the population can give us some clue as to how the majority will be spending their money tomorrow. This sort of projection into the future must not be taken too far, as consumption patterns are determined as much by the level of income in relation to others (keeping up with the Jones's) as by the actual level of income, but we probably can get quite a good idea of what people will want to consume tomorrow.

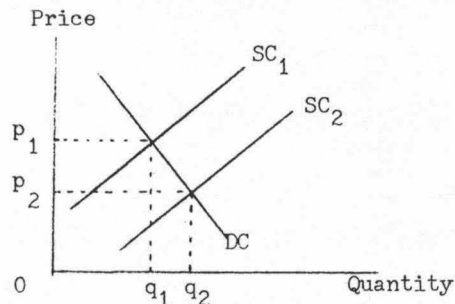
FIGURE I

COMPOSITION OF DIETS REFLECTS RISING NATIONAL INCOMES



The last factor influencing demand which I want to mention is the price of competing goods. The more similar two goods are, the more the price of one will affect the price of the other. Thus in a year when there is a bumper crop of strawberries, and the prices are consequently very low, the prices of raspberries will be relatively low too. Putting it another way, a given crop of raspberries will sell at a higher price when strawberries are in short supply, or a lower price when there is a glut of strawberries. To some extent, all types of fruit can be looked upon as competing products from which the consumer can make a choice, and price will play an important role in determining the choice which is made.

Now, just as the demand curve can be shifted by changes in such things as population, tastes, incomes and the prices of competing products, the supply curve can also be shifted by such things as changes in technology, changes in costs and changes in the prices of other products, or putting them together, changes in the relative profitability of different products. A shift of the supply curve to the right implies that producers will be prepared to supply a greater quantity at a lower price than before. (e.g. with SC_2 , supply q_2 at price p_2 , compared with original situation of q_1 at p_1).



Without any detailed knowledge of the industry, it is my impression that the supply curves for berryfruits in general have been shifting to the right rather more slowly than the curves for some of the competing products. The relatively high input of labour, which is a high cost input, has meant that costs of berryfruit production have not enjoyed the same relative reduction that has been experienced with other products. Consequently, berryfruit prices have become relatively expensive in relation to other products, and the big increases in consumption have gone to those products which have become relatively cheaper.

As I mentioned earlier, the American statistics show that expenditure per family on strawberries trebles between the lowest and highest income groups. There is a similar, but not quite so pronounced, trend for grapefruit, with expenditure going up about $2\frac{1}{2}$ times between the extremes of incomes. Thus the effect of income changes seems to be about the same for strawberries and grapefruit, with strawberries having a slight advantage. But over a period when grapefruit consumption has shown a major increase, strawberries have been losing ground. Thus from 1909 to 1966, consumption of grapefruit per head in the United States rose ninefold from 0.9 lb to 8.1 lb. Over the same period, consumption of strawberries per head fell from 3.7 lb to 1.2 lb, that is, a reduction to one third of the earlier level. Information on relative prices was not available back to 1909 from my sources, but I would suggest that the difference in the trends in the consumption of grapefruit and strawberries is probably attributable to roughly equal shifts in the demand curves, as a result of higher incomes, coupled with differential shifts in the supply curves, the grapefruit curve being shifted more rapidly to the right.

One final point, which will hardly be news to you, but which is important nevertheless, is the fact that the proportion of berryfruit consumed which is purchased, rather than grown at home, tends to rise with higher incomes. Thus the United States statistics show the high income families buying nearly all their strawberries, whilst the lower income groups tend to produce about half their own requirements. Continuing trends towards higher incomes probably associated with greater urbanization and higher density housing, therefore mean greater sales for commercially produced berryfruit even without any change in total consumption.

The remarks I have made about fresh berryfruits also apply to berryfruit products, in terms of the factors affecting consumption. Some products have particularly good prospects for growth. For example, the amount of canned baby food consumed, per child under the age of three in the United States, grew from 2.0 lb in 1936, to 60.3 lb in 1956. To maximize the future demand for your products you must ensure that you get a stake in the rapidly growing products such as the baby food.

Conclusion

To sum up, of the factors likely to affect the demand curve for berryfruit, changes in population, tastes and incomes all seem to be working in your favour, with very little effort on your part, though advertising can affect the rate of change in tastes. A continuing swing from home production to the purchase of commercially produced fruit also adds to the prospects for commercial production.

The prices of competing products seem to have had adverse effects on the demand for berryfruits, and over the longest period for which statistics are readily available, consumption of berryfruit per head has declined whilst other fruits have gained. The answer here seems to lie in the conditions of supply. Berryfruit production costs have probably risen considerably in comparison with many other types of fruit, over the years, and a profitable large side expansion of berryfruit production would seem to be dependent on the further development and successful exploitation of such potential cost saving techniques as mechanical harvesting. If this can be done, the future for berryfruit production looks very bright, as people obviously want fresh berryfruit, and their products, if they can be obtained at competitive prices. But a word of warning; if new techniques make berryfruit production profitable at lower prices than at present, those growers who do not, or cannot, adopt the new techniques, will find themselves caught in a cost-price squeeze of greater severity than ever before. If new techniques are developed which are profitable only to the large scale producers, we may see a marked change in the structure of the industry.

I have spoken in rather general, and perhaps elementary, terms, but I think there is merit in going back to first principles, and I hope I have given you some idea of the market forces influencing the consumption of berryfruit. The exploitation of overseas markets, by the industry as a whole, requires knowledge of the factors I have discussed in order to ensure that promotion is used in the areas where it will have greatest impact. Finally, you didn't need me to tell you that costs of production are crucial, but I hope I have shown you how they have affected the whole trend of berryfruit production over the years.

PRODUCT, USAGE AND DIVERSIFICATION

Mr G. Strachan
Fruit Research Division
D.S.I.R.
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I consider berryfruits to be strawberries, raspberries, boysenberries, blackberries, currants, blueberries, cranberries and a miscellaneous group of fruits not commonly grown in this country such as bellberries, snowberries, etc.

Products manufactured from these fruits vary widely ranging from jams, preserves, canned fruit, frozen fruit, dried fruit, juices, flavourants, even wines and vinegars.

Very few berry crops in New Zealand are grown specifically for processing and are generally only an adjunct to the fresh fruit market. Hence some of the varieties grown are not necessarily the best for preservation, which tends to limit the processor to a somewhat lower grade product than could be attained if some effort were made to supply ideal varieties. A quick look at some of the requirements for good processing warranted.

Strawberries

High yield of firm, well coloured fruit is important and here the colour must be internal as well as external. Firmness is most important for jam or preserves where whole berries are required. For freezing, good slicing properties are essential. Flavour must be high as well as stable. Naturally freedom from blemish, disease (especially moulds) and insect pests are essential. To reduce costs, mechanical harvestability is also important.

Raspberries

This fruit must be mechanically harvestable. It should have firm non-shattering fruit which are readily removed from the receptacles. Good, stable, red colour is essential. Flavour should be mild to strong depending on the final use. Freezing demands mild flavour, jam, preserves and flavour compounds require stronger flavours. Fruits which retain original shape are preferred for freezing and canning. They must be free of moulds and other debris.

Boysenberries

There are no true varieties of this fruit but certain strains have fewer cane spines and resistance to disease. A more firm fruit would be preferred especially with a tender receptacle.

Blackberries

Commercial varieties are mainly used for jam and flavour extraction which is not very demanding on quality. However, such problems as disease and insect damage can be serious.

Blackcurrants

Berry size and stability, high colour, high Vitamin C and mechanically harvestable are all important.

Blueberries

These are not extensively grown in New Zealand which is unfortunate. When available, well coloured, large-fruited types are preferred for freezing as a fruit dessert but size is not as important for pie fills. Blemished fruit and disease must be considered as well as yield.

Other berries

Cranberry - one variety, McFarlan, is outstanding having large well coloured berries and is relatively resistant to disease and many insect pests. Other berries such as billberry and black raspberries are not commercially practical depending on cheap labour for harvesting.

Processing methods

Strawberries

Currently strawberries are canned in small volumes in syrup. There are no particular problems in canning except that every effort must be made to retain shape and natural colour. In New Zealand the product may be artificially coloured. However, if the product is to be exported to North America this process cannot be used and therefore it is necessary to have highly coloured fruit in well lacquered containers. Local products are mainly criticised as being too soft and low in flavour. As most local products are made from excess commercial varieties this is to be expected. Some strawberries are also made into a jam mix for local markets. Some of this is reasonably good but colour is generally poor. Commercial strawberry jam is made in some volume. Methods for making this vary from simple pot boiling to vacuum kettles. To my knowledge no-one in New Zealand has continuous jam making equipment. Again variety reduces quality, colour is generally poor, flavour reasonable and texture only fair. Whole berry jam preferred by most consumers is limited by availability of suitable varieties.

Frozen berries especially the free flow type, are becoming popular with the New Zealand consumer especially in areas where the fresh strawberry season is limited. This product is not as demanding on berry quality as is the sliced syrup product commonly sold in American markets. Colour variation is not as noticeable nor is berry firmness. An improved product would result with full red berries and varieties less subject to collapse after thawing, e.g. Northwest.

A technique of freezing common on the West Coast of the United States and to some extent in the United Kingdom is cryogenic freezing. The berries are subject to rapid freezing by immersion in or spraying with liquid nitrogen, nitrous oxide, carbon dioxide or trichlorofluoroethane. The latter is preferred as recovery costs are better, fracturing of the fruit is lower and equipment is less expensive.

Some work has been done in New Zealand, mainly by Mr Morris, on the drum drying of berryfruits. He has previously reported on this technique. The product may be incorporated with farina and milk product to enhance the flavour. Elsewhere, concentrated strawberry juice is encapsulated in sorbitol, glycerin or gelatin for incorporation into breakfast cereals.

The extraction of flavour constituents from fresh berries has become important due to legislation in American and European countries restricting artificial flavours and colours. Flavour can be removed from good quality high flavour berries as esters by relatively simple steam distillation. These gross extraction products are further concentrated and fractionated by liquid-liquid extraction or fractional distillation in molecular stills. The esters wanted are stabilized by incorporation in various sugars and sugar-alcohols. Some similar products are currently produced in a crude form in New Zealand.

Strawberry wines and juices are dealt with under raspberries.

Raspberries

Relatively few raspberries are canned in New Zealand. They are, however, fairly popular overseas. For canning, a relatively firm berry of good colour that will not fragment is essential. Colour loss in poorly enamelled cans is a serious problem due to the relatively high acidity and high anthocyanin content of the fruit. Dyeing of this fruit is not permitted. The majority of processing of this fruit is in the frozen state. Free-flow freezing depends on a non-fragmenting berry again, good but not too strong flavour is required and colour requirements are critical. A better flavoured product results from syrup packs but filling equipment and special packaging is the limiting factor in this country. Raspberry jam is widely produced, some processors making good quality products. Practically any well coloured and flavoured variety is satisfactory but they must be free of insects and mould to eliminate excessive hand sorting. Health regulations set limits on mould and insect counts.

Cryogenic freezing is also used overseas for freezing whole raspberries.

Some berries are used alone or mixed with other fruits in pie mixes. This is a very important item overseas where pie eating is more popular.

Raspberries were also used by Mr Morris in his experiments on drum drying. This product is of excellent flavour and colour and can be incorporated in milk farina and cereal products as a flavourant.

Raspberry esters are also made for flavouring other products.

Juice of these fruits is not widely known in New Zealand but in America and Europe many tons of juices from strawberry, raspberry, loganberry, cranberry, etc., are used alone or incorporated into soft drinks. This product is simply a heat or chemically preserved juice of the fruit which is adjusted to a standard sugar acid ratio.

Considerable quantities of wine are also made from strawberry, raspberry, blackberry and loganberry. The latter has an especially high production in Western America. Wines made from these fruits have a delicate, interesting character but their shelf life is limited to 12-15 months.

Some special vinegars are made from all berryfruits but sales are very limited.

Boysenberries and Loganberries

The popularity of this fruit has led to higher fresh fruit production and processing. With a very high pigment content canning is relatively simple.

The naturally high acidity aids in preservation but colour changes from red to purple can occur if poorly made containers are used (that is inferior enamel and excess friction or solder). This fruit is frozen in large quantities in California mainly in syrup. It is not as popular as raspberry mainly due to tartness.

Boysenberry jam is made in some areas but cannot compete with raspberry in the same market. It is, however, widely used as is loganberry in pie fills especially when mixed with apple.

At present flavour extraction is not important from this fruit. As mentioned before, loganberries are preferred for wine making.

Blueberries

This fruit is mainly used as a fresh fruit and may be frozen either with or without syrup. Hand picked berries can be frozen in the free-flow form but rake harvested fruit is too severely bruised tending to stick together. For best quality the fruit should be fully ripened at harvest. Stems and loose leaves cause some problems but when production is high, equipment is available for destemming, winnowing and washing.

The majority of this fruit is used in pie mixes as blueberry pie is second only to apple in popularity in North America.

Cranberry

This fruit, originally harvested in the wild state, has become a popular cultivated crop in North America and Europe. The fruit is mainly used as a preserve and used as a supplement to poultry dishes. Cranberries, because of their natural high benzoic acid content, keep well for a long period fresh in cool storage (0°C). They can be frozen, canned or simply made into sauce and preserved with their own benzoic acid. A cranberry-apple juice mix is popular in America and Scandinavia.

Blackcurrants

These may or may not be a berry but they offer increasing possibilities as a processing fruit.

Storage of berryfruits

The extension of exporting berryfruit has caused Plant Diseases Division to investigate methods of preventing losses from fungus in transit. A wide range of fungicides has been tested both in the field and as a post-harvest treatment. It would appear that pre-harvest treatment gives the best results.

TRENDS IN JAPANESE BUYING HABITS

Mr G.W. Kitson
 Agricultural Economics Research Unit
 Lincoln College

Introduction

Initially I'd like to explain that, having been in Japan for a limited period on my first-hand experience will also be limited. However, I hope that this limited experience may be of some help.

My paper has three main sections:

- (a) A review of broad changes in Japanese consumption patterns and some of the major influences on these patterns.
- (b) The changes in consumption patterns for food and for products of general interest to New Zealand producers.
- (c) A specific look at berryfruit consumption in Japan and the significant features of this market.

Broad Changes in Japanese Consumption

Many experienced observers have suggested that one of the most important single factors contributing to economic growth in Japan since the war has been the development of the local market. Previously market outlets for the products of Japanese economic effort had been dominated by the military and overseas outlets.

The two major factors responsible for changing consumption patterns in Japan have been

- (i) exposure to Western cultures and consumption patterns since the war. Major exposure of course has been to American influence and this is apparent in everyday living, nowhere more so than in clothing and in leisure. For example, baseball is the number one sport in Japan. It would be very wrong to suggest, however, that Japan is, or will become, a mirror image of America, for there are many American influences that have not taken on in Japan. Japan is a country whose history goes back several thousand years. This has led to a culture and customs which are very deeply entrenched. The result is that foreign influences in Japan, before they are adopted by the Japanese, must first pass the test of being compatible with Japanese culture and custom. Even after passing this test these influences are characteristically adapted to become Japanese in nature.
- (ii) the major influence on Japanese consumption of the growth of Japanese income. Japan is a country of very gross and very rapid income change. It is therefore very exciting. Economic growth rates in Japan are twice as great as other countries. For example the annual rate in Japan between 1960-65 was 9.6% (G.N.P). The next highest was West Germany at 4.8%. Moreover economic planners in Japan expect these rates to be sustained. A recent publication of an analysis done by the Economic Planning Agency in Japan shows an annual rate between 1980-85 of 11.4%. By 1985 the per capita income of Japan will be, on this basis, \$US 5280

(N.Z. currently about \$US 1700). This means that between 1985-1990 Japan will become the richest country in the world if measured in per capita income.

This great rate of economic growth of course leads to gross changes in consumer spending. In 1968 consumer spending grew at 11.3% with notable individual rates as follows:

- (a) Food grew 7.8%
- (b) Housing grew 22.8%
- (c) Motor cars grew 50.0%

The figure for housing is interesting because it is in this field Japan lags behind the rest of the world. This is mirrored by flat rentals. A three bedroom, western style flat in central Tokyo, according to the Australian Financial Review, has been estimated to cost about \$US 1200/month in rent. As a result Japanese housing tends to be frugal and much housing is provided by the company.

The 1971-76 Social and Economic Development Plan emphasises expenditure on housing.

However, while housing tends to be frugal, Japanese ownership of consumer durables is amongst the highest in the world and here I would like to present Table I which shows the percentages of households in Japan owning consumer durables.

TABLE I
PERCENTAGE OWNERSHIP BY JAPANESE HOUSEHOLDS
OF CONSUMER DURABLES (1969)

Black and White Television	94.7%
Washing Machines	88.3%
Sewing Machines	84.6%
Refrigerators	84.6%
Electric Fans	80.1%
Cameras	62.7%
Vacuum Cleaners	62.6%
Knitting Machines	37.2%

Individual Consumption Patterns

In this section of the paper I intend to review consumption patterns in general terms initially, then review food consumption patterns, and finally look at consumption of some items of interest to New Zealand.

Before 1950, life in Japan revolved around traditional customs and habits. The national diet was rice and starchy substitutes such as potatoes, fresh or preserved vegetables, fish and other kinds of food from the sea. Houses were designed, decorated and used in such a way that they were complete without any of the so-called modern conveniences and with very little, if any, furniture in the Western sense. Most of the families needs were made either in the home itself, that is many different items of clothing, and pickled foods, etc., or by local neighbourhood craftsmen. Among the few mass-produced durable goods common in Japan at this time were sewing machines, radios, electric irons and bicycles. Each local neighbourhood had a collection of shops and craftsmen catering for the basic needs, the pattern of which was extended to the cities where it still persists to a considerable extent today. There were several large department stores in the most important cities and a few like such as patent medicines, ceramic tableware, textiles and rice wine were distributed more or less nationally, but for the most part the market was composed of over one million tiny retailers, wholesalers and other distributors who served only their own areas with locally and regionally produced merchandise. In many product lines it has long since reached the point where there are as many as seven wholesalers between maker and retailer. This fantastic proliferation of interlocking wholesalers and tiny retailers who often operate more under personal and family obligations than on basis of business considerations, was in itself a tremendous barrier to the growth of the mass consumption society.

Until recently the typical Japanese diet was described as shushoku, meaning 'main food' which was rice, and fukushoku - which is all other food items which were eaten as supplements, and in small quantities. These side dishes tended to be strong tasting dishes and included a considerable number of condiments.

This type of diet was stable over centuries and the Japanese people developed a strong psychological dependence on it.

Westernisation of the Japanese diet has not meant that the Japanese have substituted western foods for their traditional diet. The major motive for adopting western foods has been a desire for better nutrition, Western foods therefore tend to be used as side dishes. It should also be remembered that food is still very low in the Japanese consumption priorities, for example, they still tend to cut down on food consumption to enjoy luxury goods - usually leisure or clothing.

91% of all Japanese still eat a rice miso, which is a type of soup, fish and vegetable diet, and only 3-4% base their diet on bread, meat, milk and vegetables.

The typical Japanese calorie intake is 2,200 per day. Compare this with other major countries:

For example:

	Calories per Day
U.K.	3,270
Australia	3,251
U.S.A.	3,150
India	1,880

This diet is typically vitamin deficient, and the Japanese consume enormous quantities of vitamin pills and pep potions to make up this deficiency.

Japanese protein consumption, which is regarded as a yardstick of a nation's dietary well-being, is also very low. In 1967 the average Japanese protein intake was 75.7 gms/head/day. This had grown from 67 gms/head/day in 1958. Compare this with other international figures.

	Gms/head/day
For example in 1958 the New Zealand figure was.	106
U.S.A.	95.6
France	100.7
U.K.	87.5
Australia	90.5
India	45.4

In addition, a low proportion of Japanese protein was of animal origin.

Beer, spirits, soft drinks and sweets have become more important in Japanese consumption. The proportion of household food expenditure spent on meat, milk and eggs has grown from 10% in 1955 to about 20% in 1967. 10% of household expenditure goes on fish which is much higher than in other countries, 8% on vegetables and 6% on fruit.

The typical daily fare for a Japanese family would be as follows:

Breakfast commonly consists of two or more bowls of rice, a bowl of soya bean paste soup, which is miso soup as I mentioned before, with a few vegetables and bean curd in it, a small piece of fish or other seafood, perhaps an egg and green tea.

Lunch, the type eaten at home or prepared at home and taken to work, would likely be cold rice, a small piece of boiled or roasted fish and several tiny pieces of pickled vegetables. Occasionally there would also be a small piece of souffléd egg.

The evening meal would include rice (up to three or four bowls per person), clear soup with bean curd or Japanese leaks in it, or soya bean paste soup with edible mussels in it, a small piece of fish or meat, grated radish, pickles and green tea, followed by whatever fruit is in season.

Now it is difficult to know to what extent Japanese food consumption is due to traditional frugality or to what extent it is due to very high prices. Many observers consider the latter to be very important and suggest that in future considerable consumption increases will be evident for nutritionally important foods as agricultural imports are liberalised. All I can do at this stage is look at consumption pattern changes for products of significance. These are shown in Table II.

This table is interesting especially for meat and dairy products. No parallel data is available at this stage for individual fruits. Beef is regarded in Japan as a premium meat, for despite its very high price and high rate of price increase, its rate of increase of consumption has been very high at 13.1% per household per annum. Greatest increases were recorded for chicken and pork. These meats recorded only moderate price increases and are currently the cheapest meats on the Japanese market, not that any meat is cheap on the Japanese market. Sausage is regarded as an inferior meat in Japan. This is mirrored

TABLE II
 CONSUMPTION GROWTH RATES BY JAPANESE HOUSEHOLDS
 FOR SELECTED PRODUCTS

(Annual Average Percentages 1965-68)

Commodity	Consumption Growth (%)	Annual Average Price Increase (%)
Bread	3.0	0.09
Shrimp and Crab	3.2	1.15
Beef	13.1	16.55
Pork	18.5	3.72
Chicken	18.4	2.15
Sausage	4.6	3.72
Milk	7.2	3.77
Powdered Milk	12.5	2.29
Butter	-0.7	0.27
Margarine	12.4	2.77
Cheese	36.0	-0.30
Eggs	15.0	22.45
Beer	3.7	2.67
Whisky	50.4	1.75
Coffee	14.6	-2.23

in its slow rate of consumption increase. The implications for New Zealand mutton, most of which is used for this purpose, are obvious.

The rate of consumption growth for powdered milk has been somewhat faster than for whole milk. One suspects that availability of fresh milk was important here.

The figure for butter is very interesting. Consumption fell between 1965-68 at 0.7%/household/annum. The most obvious reason for this is that margarine has been a very good substitute. Its consumption, as is shown in the table, has increased at 12.4% per annum. The rate of growth of cheese consumption has been remarkable at 35%/household/annum. This was associated with a slight price drop. Cheese prices are still very high by New Zealand standards.

The growth of egg consumption has been remarkable, for a 15% growth rate in consumption was achieved despite a price rise of 22.45%/annum. Whisky is the most notable of the other products listed with an annual rate of consumption increase of over 50%. One suspects that this may be maintained as a result of the recent

liberalisation of whisky imports into Japan.

In concluding this section of the paper I'd like to make the point that the data used is not up to date and that realistic interpretation of it requires a fuller knowledge of basic market conditions than is yet possible.

Berryfruit Consumption and the Market

I'm sure that the main interest of most of you in Japanese consumption patterns will be in consumption patterns for berryfruit. You'll also be interested in information about the berryfruit market other than consumption patterns. For this reason I intend to stray slightly from the subject.

The first point is that the only berryfruit to appear in Japanese statistics are strawberries, known to the Japanese as Ichigo. Almost all other berryfruit which are familiar to us are unheard of in Japan. I'm not going to make any judgements at this stage on prospects for new fruits in Japan other than repeating a comment I heard recently that one of the supermarket chains in Tokyo is interested in trying new types of fruit. This may lead to an opening for other sorts of berryfruit in Japan. I hope to be able to give more information on this topic at the end of my stay here.

Strawberries account in Japan for 2.16% of total fruit produced. From the limited statistics available at this stage (these are summarised in Table III) it is apparent that strawberries are becoming increasingly popular. Consumption per head has grown from 0.77 kg in 1965 to 1.14 kg in 1968. This represents an increase of 16.1% per annum. This also means that strawberry consumption is growing at a rate greater than increases in income.

Imports to Japan have been minimal. Hong Kong and Guam in 1966 and 1967, and New Zealand in 1968 and 1969, have been the only sources over recent years.

Retail prices from Table III at first appear staggering, averaging about 80c/lb but also staggering is the margin between wholesale and retail. This was over 200% in three of the four years considered. This is percentage mark-up, or the margin as a percentage of the wholesale price. The equivalent figure for Christchurch in 1969 for strawberries was 41.5%. These high margins in Japan are reflections of the inefficiency of distribution. Distribution in Japan is complex and I don't intend to get involved in discussing it at this stage. This is probably a paper in itself. If a New Zealand exporter was to receive only the Japanese producers' price and on top of that pay the cost of air transport to Japan, the prospects here are not nearly so bright.

However, with this in mind, I would like to make a few further points.

The first is that the supermarket growth rate in Japan is now very high and is likely to become greater with the Japanese Government's liberalisation of capital imports for foreign supermarket investment in Japan. Further, strawberries belong to an import category known as automatic approval. This means that supermarket chains are in a position to import directly, and this could mean a considerable saving in marketing cost. In addition there is currently no tariff for fresh strawberries.

TABLE III

JAPANESE STRAWBERRY PRODUCTION, IMPORTS, CONSUMPTION AND PRICES

Year	Production (1000 kilograms)	Imports (1) (1000 kilograms)	Consumption Per Head (2) (kilograms)	Average (3) Retail Price cents/lb	Average Retail Price yen/100 gms	Average Growers' Price yen/100 gms	Percentage Margin Grower to Retail (4)
1965	75,500	-	0.77	83.2	72.2	38.9	85.6
1966	96,800	1.380	0.98	74.7	66.5	20.0	232.5
1967	102,900	1,282	1.02	78.3	69.2	23.0	200.9
1968	115,600	4,409	1.14	87.5	77.8	25.1	209.9

(1) Imports - Fresh Strawberries only

- 1966 and 1967 Hong Kong and Guam were the sole sources

- 1968 and 1969 (not shown) New Zealand was the sole source - main months were
November and December

(2) Annual average increase in consumption per head over this period has been 16.1%

(3) The current official Exchange Rate of Y403 per \$ was used for conversion

(4) Percentage of wholesale price (markup)

The second point is that there is a considerable price variation throughout the year as would be expected. This price variation meshes in pretty well with New Zealand production patterns. This is evident from Table IV which shows that from October to March, and especially before Christmas, producer prices were very high, averaging over \$1 per pound.

TABLE IV
JAPAN'S WITHIN-SEASON STRAWBERRY PRODUCER
PRICE VARIATION

(Averages from 10 producing areas 1969)

Month	Average Price (Yen per 100 gms)	Price Range Between Growing Areas (Yen per 100 gms)	Number of Producing Areas Represented
January	49.7	25.9 - 77.3	5
February	53.0	36.8 - 69.8	5
March	45.2	42.2 - 59.7	7
April	28.5	21.2 - 31.9	8
May	18.9	12.2 - 34.5	9
June	13.8	7.3 - 24.1	10
July	17.1	11.0 - 30.0	6
August	21.4	11.0 - 31.8	2
September	32.9	-	1
October	90.0	-	1
November	95.0	-	1
December	97.0	-	1

Preliminary indications for a strawberry market in Japan appear bright, although a fuller statistical series would be desirable.

The only other point to make on the subject is that of Japanese quarantine restrictions. New Zealand is fortunate indeed not to have Mediterranean Fruit Fly, for not only is New Zealand able to send strawberries and a wide range of other fruit to Japan, but also a good deal of New Zealand potential competition on the Japanese market is eliminated through these quarantine regulations and this includes Australia. While the inclusion of Australia may be an advantage in many ways, it is a disadvantage in others for the Japanese authorities are also very particular about countries of transit also, and they have objected to fruit passing through Australia. Fiji and Hong Kong would be regarded as acceptable transit ports while the Hawaiian Islands would not. Use of existing routings may therefore present problems.

A GROWER'S VIEW ON CONSUMER DEMAND

Mr R.K. de Castro
Horticulturist
Blenheim

Introduction

I looked for a definition of the term consumer demand and couldn't find one. I see it as the buyer's response to an offered product or simply what the housewife wants.

I propose to divide berryfruit production into two broad categories:
(a) that which is sold fresh, and (b) processed or semi-processed products.

Fresh Market Products

The average producer in the past, marketing fresh fruit through the auction system for either dessert or jam has very rarely concerned himself with consumer demand. This method of marketing has provided in effect a clearing house, at which point too many growers think that their responsibility ceases. Theoretically, price reflects demand, quantity, quality and packaging. Too high or too low a price can create consumer resistance.

In my address to the Market Growers' Conference in June, I attempted to analyse the fresh vegetable industry as I saw it today and much of what was said in that address is equally valid for the berryfruit industry. I am concerned about the image of fresh berryfruit in the eyes of the consumer, in the eyes of the housewife. If she is a satisfied customer she will become a regular customer, and as a result we have created a demand. Professor Ross brought this out very well in his demand curve concept. If the demand curve can be moved to the right you can sell more of your products. If the demand curve moves to the left you will sell less of your products. I suggest that one of the factors influencing the demand curve is the degree of consumer satisfaction from a berryfruit purchase.

The quality of our product is in our own hands and will inevitably reflect on the whole industry and its prosperity level. One unscrupulous packer, one careless packer of fresh fruit does untold damage on the market not only to his own name but to the industry image. If a housewife buys a punnet of strawberries or a tin of raspberries it proves to be an inferior product, she doesn't repeat the same mistake next week or next day, and some people have very long memories.

As an industry we must be sure that every customer is a satisfied one. To this I see no alternative to the acceptance by the industry of certain disciplines and the first of these must be grading standards. We must eliminate misrepresentation. At the same time the co-operation of all concerned in the distribution and retailing of berry must be sought to ensure that our product reaches the consumer fresh, well graded, attractively packaged and well displayed. In large measure, the first responsibility is the producer's. No one can make a silk purse out of a sow's ear. No amount of fancy packaging, promotion, or retailer effort can turn unattractive produce into an attractive article.

I sometimes wonder whether the situation we know as oversupply with the consequent depressed prices, isn't in fact under-consumption resulting from consumer resistance to an inferior product or one in a non-preferred form.

Processed and Semi-processed Products

The processing industry provides a vital outlet for berryfruit, we hope in expanding volume. As producers for processing however, we can have little effect on consumer demand for the end product. Promotion on a considerable scale is undertaken by the processors and distributors themselves and the quality control of the product is entirely in their hands.

In the semi-processed field I believe individual producers will have a considerable influence on consumer demand in the future. This may be to the industry's advantage and it may not? I leave that question mark there very deliberately. The result will be determined by how it is handled.

The products I classify as semi-processed are those fruits which can be turned into a static commodity by the producer himself or a group of producers collectively, packaged and marketed for direct consumption; in other words it requires no further processing. The best example I have experience with is frozen berryfruit, particularly raspberries, strawberries and boysenberries, either block frozen in 1 lb, 3 lb or 4 lb consumer packs and latterly dessert grade frozen free-flow products.

In our brief experience with boysenberries particularly, we have observed an extremely interesting trend in consumer demand. Initially most of our fruit was purchased fresh for jam making. Then the value of boysenberries as a preserved fruit for dessert use was realised, and we were able to promote this very simply by the inclusion of recipe sheets in the packages.

More recently, and largely I think through the advent of the home freezer, demand has turned to a frozen product. I find this quite fascinating and wondered whether there was a similar pattern to be found in vegetable consumption. The office in Wellington found out some interesting facts. The number of home freezers in New Zealand homes and the growth according to statistics proved quite remarkable. As I recall 25% of all New Zealand homes had home freezers and something like 60% of farm homes had home freezers. The next lot of statistics from the annual census will be most interesting, because I think this indicates a very distinct trend in consumer demand. Even the housewife who still makes her own jam prefers to do this in the winter, rather than in the summer heat. Our experience again is that home jam-making is diminishing rapidly. The majority of women today purchasing fruit for jam are in the 45-50 plus age group. I think we have to understand and take note of changing habits and tastes. For instance, we have noticed a distinct trend to the more savoury types of spreads, which are promoted extensively. The affluent society has also had a very marked effect. The prepared product is for sale on every supermarket shelf and the do-it-yourself housewife is fast disappearing. However, there are those who still have a taste for home-made jam. Now I believe home-made jam production could in fact be promoted and represent an increase in consumption of raw berryfruit, because fresh jam, and I mean fresh jam, can be produced from frozen fruit in every month of the year. When raspberry jam or strawberry jam came out of the pot, the consumption rate was very high by all members of the family for the first few weeks and maybe the first few months, but when it becomes a stale product 3-4 months old in the top cupboard in August and September it usually remains there and is never consumed.

Dessert Free-flow Berries

The product offering the greatest potential for many berryfruits with the exception of strawberries, is the dessert grade free-flow product. It satisfies all the consumer demands of today. Ease of use with no work involved; it is very time-saving - a housewife can take free-flow fruit out of the freezer, about a quarter of an hour before a meal, even five minutes, and if she knows how to thaw it, she can have fruit any day of the year. It is also the most suitable garnish to go with ice-cream which is now eaten all the year round. It is not very many years ago that you couldn't buy ice-cream in the middle of winter. In other words, this product, in our judgement, is a high-class convenience food, and the market is orientated to convenience foods. These changes in consumer demand have become apparent to us during the past 7-8 years. Unfortunately this is not a long period of time when one is considering production, the establishment of vines, and so on. What must concern us is what the next 7-8 years might bring in the way of consumer demand.

With the free-flow product however, and this applies again to all the frozen products, much the same point applies as for fresh; the end result, the thing that the consumer buys, must be a consistently high grade dessert quality; it must be well-packaged and well-presented. The fruit itself, particularly for freezing, must be picked at full maturity for best appearance, and flavour and carefully handled and frozen to prevent fragmentation. The producer's job will not stop at the point of harvest. He must be fully aware of present and future consumer requirements and be prepared to meet them. Where and how do we get this information? When I studied the proposals for this course, I was delighted to see one section allocated to market research because this is vital if the industry is to progress and expand.

Cost Escalation

Cost escalation will be a major factor in the future. I do not see a great deal of scope for mechanisation of the very high quality dessert type products in which I believe New Zealand has a real future. This cost escalation is definitely going to preclude people from following wild hunches, resorting to highly speculative ventures and relying on trial and error. We must have facts, and on these facts endeavour to equate supply and demand. The equilibrium point that Professor Ross brought out in his graph has got to be an economic price.

Market Research and Promotion

Market research is only of real commercial value if the communication chain is there, so that the information is transferred to the producers. In the past, it has been the auction price that has virtually been your communication, but in future, with less speculative growers and less speculative outlets, we have got to have this communication and the knowledge that it gives before we consider investing in any type of production. Do you in fact know what the per capita consumption of berryfruit in New Zealand is at the moment? If the per capita consumption of berryfruit per household in New Zealand is say, only 5 lb, it is not very difficult for a family of five people to eat 2 lb of berryfruit per week, which puts the per capita consumption at about 100 lb per household per annum. To do it, of course, it is necessary to have promotion, but I think properly managed it could be done. Again it emphasises the fact that we've got to have market research.

Finally, what about the implementation of this sort of programme? I suggest that nothing will be accomplished without a high degree of co-operation. I am not very confident, if everybody retains a highly individualistic outlook. The prosperity of the individual and the industry in the future will be governed by consumer demand. Consumer demand will be governed by the image of our berryfruit products, and that image is our responsibility. We are the only people who can really influence it.

SECTION 1 - PANEL DISCUSSION

TRENDS IN CONSUMER DEMAND

Mr R.K. de Castro (chairman)
Professor B.J. Ross
Mr G. Strachan

Question

'Mr Strachan mentioned Freon freezing. Could he elaborate on this and give details on costs?'

Strachan

'This is difficult, but I will do my best. At the moment in New Zealand I don't think it is economically feasible. The material required for this type of freezing, which if we used the trade name 'Freon', is too costly to use for this purpose. Liquid nitrogen would be an alternate material which is very acceptable, unfortunately this is also too costly at the present time. The price in the United States where it is used extensively, is somewhere in the order of 1c per lb. The New Zealand price at present is 9c per lb. This price is coming down, because I understand from the company that the Iron and Steel works outside of Auckland will be using liquid oxygen in one of their processes; liquid nitrogen in this case would be a by-product and a lot of it will be wasted unless they can find some other use for it. Therefore, prices may come down, but I haven't seen any details yet.'

Question

'It is important that Freon also be consistent with health regulations isn't it? There are grades of Freon that simply cannot be used as refrigerants.'

Strachan

'That is true, and so far none of them have been passed in New Zealand. There are Freon grades which have passed the U.S. Public Health Regulations and I think if anybody wanted to go into manufacturing there would be little difficulty getting this changed for New Zealand.'

Question

'Could Mr Strachan explain the 'continuous jam' technique and its advantages?'

Strachan

'There is such a process in existence. There are four plants operating in the United States, I think three in Britain, and some in the Continent, where they use the product that Mr de Castro was talking about - frozen berries. Manufacturers buy berries with the sugar added in a 3 berries to 1 sugar ratio. The mixture is placed in a continuous vacuum cooker which is operated under low pressure. A certain amount

of water and pectin are added and if it is heated sufficiently, it comes out at the end as jam. The process is more complicated than that, but that is the general principle. The plant can run 24 hours per day.'

Question

'Mr Strachan, you mentioned in your address that packaging for export of frozen raspberries was not suitable. What did you mean by this?'

Strachan

'I don't think I said 'packaging for export', but rather 'packaging for berry products is difficult'. Modern plastics are a help in this regard. There are semi-rigid plastics suitable for forming into containers which can be heat sealed. The problem has been to get a container which will not leak when the housewife inadvertently turns it upside down in her freezer. In the United States they solved this problem many years ago by making a paper board carton which is essentially the same construction as a tin except it has a rectangular cross-section and sealed ends. This container can be stacked anywhere, but it is expensive and losing favour in the United States because of cost.'

Question

'Professor Ross, you mentioned advertising as a cause for moving the demand curve on your graph to the right. Have you any knowledge on the type of advertising required to do this and how much effect it would be likely to have?'

Ross

'The easy way out is to say that would vary from product to product, from place to place and from time to time. But one of the important things is that you have got to know who you are trying to reach. You have got to know, for example, that a certain income group might be a prime target for frozen strawberries, so that you buy advertising space in the sort of woman's weekly that women in that income group are buying. You do not waste your time by buying television time, where you are paying a lot of money reaching the whole country with a shot-gun type approach - you are hitting everybody. Of all the people you are reaching, only 5% are the ones you are really interested in. The main point is that you have got to have knowledge of who the people are you are trying to reach, to get maximum benefit from the amount of advertising money you are going to spend.'

Question

'I have noticed in the case of those products that are nationally advertised, and where advertising appears to be so successful, that the body doing the advertising has control over the supply and cost of the product until it reaches the consumer. Is this an essential pre-requisite of successful advertising? Is advertising any use where the cost of production cannot be used to determine the cost to the consumer?'

Ross

'This is right. Basically perfect competition occurs when there are a lot of individual producers producing a similar product; it doesn't pay any one of them to advertise. Promotion of the Woolmark by the International Wool Secretariat was an advertising campaign which was very successful in getting a symbol well known. Whether it has actually sold more wool or not, might be a different matter. In this particular case the Woolmark was

put out by the International Wool Secretariat, but they only allowed certain producers to use the Mark once they had proven to the Secretariat that they use 100% pure virgin wool. Promoting a product produced by many different people needs some sort of standardisation and all have to agree that those approved by a central organisation will use a certain mark on their products. This overcomes the problem that one grower can spoil the image of a particular line. If the one grower is somebody who has not got the mark on his product, then the housewife will look for the can of strawberries that has the mark signifying 'I am an approved strawberry grower'.'

Question

'Professor Ross, where do we draw the line between advertising that is necessary and high-pressure advertising?'

Ross

'It is in the advertisers' interests to draw their own line, not too far towards the really high pressure advertising. I do not think I can take it any further than that, it is a personal sort of thing. Either you dislike high pressure advertising, or you just grin and bear it.'

Question

'Do you think the big advertising people are going to draw the line themselves? It is big business, lets face it!'

Ross

'They do, every now and then, attempt to develop a code of ethics which they try to keep but I think it is up to the people who are hiring the advertising people you are talking about to really put their foot down and say 'well, that's as far as we will go with our product'.'

Question

'Do you agree that advertising adds to the mountain of unproductive labour in this country at the moment?'

Ross

'Well, this is difficult. If you as berryfruit growers sell a lot more berryfruit in Japan through advertising activities, can you say it is unproductive? If you shift your demand curve in New Zealand to the right and you are selling more, is it unproductive? I do not think you could say it is strictly unproductive, but I think you can say that there does come a stage where we can say the consumer is being 'got at', but it is a productive activity in many senses of the word. But where you have got two brands of detergent, one against the other, this is pretty unproductive from the nation's point of view, though it can be highly productive from the point of view of one firm.'

Harland (Industries and Commerce Department)

'There is legislation now, the Consumer Information Act, which deals more strongly with misleading advertising. I think where advertising is stepping over the line there is now something that can be done about it.'

de Castro

'I think the question is directed at advertising, and I think that one must be careful in considering this field, and note the difference between advertising as such and promotion. There is a distinct difference between the two. With promotion, I regard and define this more as a teaching process, whereby somebody who has not had any experience with the use of a product can be educated in its use. A committee of the Vegetable Federation has spent three or four years studying the whole subject. The basic problem with vegetables (and this has been proven with our personal experience with berryfruit) is the lack of imagination of the average New Zealand housewife. It is virtually necessary to spell out 'promotion' in words of one syllable and I think this is the essential job that an industry can do.'

Comment

'On the other hand, remember Professor Ross mentioned the Wool Board and the promotion of the Woolmark. Look what has happened to the price of wool!'

Ross

'They might be able to turn around and say 'Well where would you have been if we hadn't been doing that? Think how much worse it would be!''

Question

'Mr Strachan stated that boysenberries in California seem to can and freeze much better than the varieties here in New Zealand. Is this right?'

Strachan

'I only use the terminology to make a point. I don't think this is quite true because I would think most of the boysenberries here are very similar to the types grown in California, and that boysenberries processed here are quite satisfactory. There are some new types (I don't think you could call them varieties of boysenberries, because they are too easy to confuse) which are superior to the ones that we are currently growing, in that they hold together better and have much softer cores. They are worth investigating at the Levin Horticultural Research Station.'

Hunter

'I just want to mention a problem regarding free-flow fruit that I encountered during some market research in Australia and I wondered if you could tell us something about the American point of view. This was a question of the ice-cream manufacturers who are going for full strawberries in their ice-cream (that is not chopped up) but they have run into a very serious problem in that the freezing point of strawberries is much lower than ice-cream. In other words, the manufacturers make the mixture and put it in the supermarkets. Then when the consumer takes it home it thaws out a bit on the way. She puts it into the fridge and freezes it but when she takes it out to use, the ice-cream thaws out all right but the strawberries are still like marbles. Now the argument they put forward was that they wanted strawberries with sugar added which has the effect of raising the freezing point. Is this the experience in America?'

Strachan

'This is a well known problem in ice-cream products generally - the processor must try to match the freezing point of the added fruit to the freezing point of the ice-cream itself. This can be accomplished by adding sugar to the fruit so that the freezing point is adjusted to the point where the fruit will still be soft in the ice-cream. This is also a problem in such things as yoghurt (which incidentally I did not mention) which is becoming an increasing user of berryfruits. The product usually used in yoghurt is a preserve. It is not a jam. It has not as much sugar in it as jam. Therefore one has to get a product that is not as firm as jam, in order that it doesn't cause the consumer to bite it. This can be accomplished by judiciously using the right pectin and sugar combination. It is possible to make products that are soft; there is quite a lot of juggling one can do in food processing to fit product to product and make them compatible.'

Question

'Mr Strachan - I think I should mention that there are strawberries available which will not collapse after freezing. Do you mean in New Zealand or overseas?'

Strachan

'As far as I know these varieties are not being grown in New Zealand as yet. There are some new types coming out of Oregon and Pullup, Washington, that look very interesting, in that they maintain their shape, especially after cryogenic freezing.'

Comment

'We have tried varieties from Europe which were claimed to stay whole after thawing, but under New Zealand conditions they prove unsatisfactory.'

Strachan

'I know there are a lot of difficulties when you bring varieties from some areas to a different environment. Apples that are grown in Europe for cider purposes when grown in New Zealand are quite different in character in that they lack tannin and have a low level of flavour constituent. We have European apple varieties growing in Hawkes Bay which taste quite different from the same variety when grown in Europe.'

'This is true of most fruits in that you have to develop them for your own environment.'

Question

'Professor Ross made a statement that berryfruit consumption per head in America had fallen from 3.6 to 1.2 lb or something similar. Would that not have been influenced by a rise in something else? I think the remark referred to strawberries; was there a compensating rise perhaps in cranberries or raspberries?'

Ross

'Other berries were fairly constant over the period. It was the citrus fruits that had the greatest increase. The one that surprised me was that total fruit was slightly down over the period. But the strawberries really slipped after the Second World War.'

Strachan

'Can I make a comment on that? I had the opportunity to discuss strawberry growing with a grower from Oregon a week ago. This young chap's father normally grows 100 acres of berryfruit, about one-half of them are strawberries. This year they ploughed the whole lot up and planted it in barley, mainly because they haven't the labour force to harvest it at a cost that is economic. He was talking about prices of \$2.75 per hour for harvesting strawberries. You know yourselves as growers that you cannot afford to pay this, and I think this has quite a lot of influence on the production and consumption as well.'

Question

'Professor Ross, you have been talking about advertising. I wonder if you could give us a guide here on the various types of advertising and promotion available. Bearing in mind our type of industry, which type of promotion in your opinion would be best - (a) a promotion based on radio advertising urging people to buy, or (b) a type of promotion based on a redeemable voucher presented to your fruiterer giving 3c off a punnet of strawberries?'

Ross

'I am not really a marketing man, Dr Schroder may have a comment, or Professor McCarthy tomorrow. As Mr de Castro indicated, if people are going to buy from you anyway, you can put in a slip telling them things they can do with this fruit. Also when there is a real glut of strawberries on the market, that is the time to put a couple of advertisements on the radio and say 'strawberries are the cheapest they have been this season' and try and build up a bit of consumer buying pressure right at the time when there is a glut. This is the situation where you use a radio spot fairly smartly and get results. Dr Schroder might like to add something.'

Schroder

'I would say that redeemable vouchers are used primarily for the introduction of new products. If you have a new process food or product which you want consumers to try, then you might use redeemable vouchers.'

Question

'Would Mr Strachan like to comment on the possibility that the sale of New Zealand strawberries in particular would be jeopardised by the uninteresting flavour of our main variety as compared with some varieties in America?'

Strachan

'I would think that is not a fair comment. The varieties of strawberries grown for the fresh fruit market in New Zealand are, I would say, acceptable anywhere. The main problem is to get them to the consumer in their best condition. Sometimes it is difficult and if they are going a long distance they have to be harvested slightly immature, otherwise they will be nothing but strawberry juice by the time they reach the consumer. At the time when we are sending strawberries to North American or European markets there are no other comparisons available, except maybe some strawberries from Chile or from Mexico until they found some insect that they wanted to keep out. His comparisons are made with what the consumer thinks strawberries tasted like in the peak of the California season. Anything that tastes like a strawberry is competitive. The most important factor is good appearance with reasonably good taste. Does it look like a strawberry?'

Is it the same colour? Is it in good condition? I don't think the flavour is a major factor.'

Question

'Perhaps Mr Strachan could help us with this one and to a degree Professor Ross. We have seen in the last five or six years in New Zealand an industry, which has been very much a localised farm industry, start to develop with the backing of some real marketing expertise. This is the wine industry which started in little vineyards spread through the country. I wonder whether in the next five or ten years it would be possible for small processing outlets to produce specialised berryfruit products (not necessarily wine, but some of the things you have mentioned) and for this to develop to the stage where some marketing expertise can be brought in behind it and develop it in much the same way as the wine industry has in New Zealand.'

Ross

'I think the wine industry is getting to the stage that advertising is building up to quite a large extent with the different brands, and these are in fact big enterprises now. Some of them only started as small vineyards but they have built up into fairly big enterprises now and it takes a big enterprise to sustain the advertising campaigns we now see. I would guess the processing of some berryfruit products will take a minimum size plant to get started, which means it could be several growers together or it could be a processor who is buying from the growers. Advertising could pay for enterprises of this size.'

Strachan

'This is broadly true. There are good practical reasons why a fair sized berryfruit grower though can be a reasonably good processor. First of all, he has quite a lot of capital tied up in his own plant. If he is a decent grower at all he should have some fruit storage facilities on his place and these can be upgraded fairly readily to freezing equipment. Then he would have to consider whether he is going to process further. When it comes to manufacturing such things as pie-fillings for example, I think it is best left to the large canning institutions already in the country. It would be better for growers to co-operate and sell the central processor good quality fruit, because he usually handles this type of product outside his normal processing range. This makes it economical for the processor and it should be better for the grower.

As regards wine, this is one place where a small producer can do well in that it takes a minimum amount of equipment, the health regulations are not hard to adhere to. However, I do warn people who are thinking of making berry wine that it is perishable and only has a life of 15 months at a maximum. Berryfruit juices are a possibility for a small manufacturer. There are small manufacturers of other juices in the country who seem to be doing very well, but a lot of it depends on supply and local demand.'

Question

'Would not berryfruit wine producers be subject to all sorts of Government regulations?'

Strachan

'Berry wines are not normally fortified and therefore they are not under the jurisdiction of the Excise Department. There are a lot of very small vineyards still, in New Zealand, producing their own wine. They do not have a great deal of trouble with the law, and a lot of them manufacture fortified wine. There are no stringent regulations on wine making; it has to be up to the Health Department standards naturally, but the regulations are not severe on fruit wines.'

Harland (Industries and Commerce Department)

'I am rather interested in this subject because, as you may know, my Department for many years has been assisting promotion of New Zealand grape wine, through the annual Wine Tasting Exhibition. Just recently, I have been exploring fruit wine production and investigating who is interested in organising the development of fruit wine. Just recently the local Manufacturers' Association as an agent for the Manufacturers' Federation have been circularising growers in the South Island, to find out what their interests may be in forming an association to promote fruit wines, with a view to having an exhibition and displaying their product at the Canterbury Industrial Fair, for instance. It is very interesting to hear this discussion. I think a typical example of possibilities in this field is something that you are going to sample today, Mr Barker's elderberry wine. He has only a small production unit of a few thousand gallons and he certainly has had to go through the forms and regulations. But these things are not impossible, and I would certainly be very interested to hear of anybody who is thinking of taking up berryfruit wine production. If I can assist in any way with information, I will be pleased to do so.'

Question

'Does Mr de Castro think that a printed recipe sheet would help the promotion of berryfruit sales for home jam making? A lot of housewives don't know how to make jam.'

de Castro

'Unquestionably. With fresh or frozen, it is astounding how you can stimulate consumption by the use of these recipe sheets. Do not think you can produce one recipe sheet and rest on your laurels for the next five years however because your customers want something new next year. We managed to increase our sale of boysenberries by something like 1000% over five years through recipe sheet type promotion.'

Comment

'Fresh fruit seems to be quite simple to dispose of but the difficulty in advertising fresh market fruit daily is similar to studying a racebook prior to race day; you can tell them your product and what they can expect of it, but you can't tell them the price it is going to be until the market is open. As growers we are apt to sit on the side of the fence and hope somebody can come up with a good advertising scheme so that we can hop on the bandwagon. I am not prepared to put in the paper on Monday 'Eat Walker's strawberries next Friday in Dunedin' because I am not sure whether the strawberries are going to get there or not. This is a fact; you cannot advertise fresh fruit until it is on the market floor and by that time it is too late. You have got to do the groundwork first by advertising what a great thing strawberries are for eating, jam-making, fruit-making, and then hope you can satisfy the demand.'

Schroder

'Can I comment on this? Advertising by and large is most successful when it is directed at specific groups so that the use of a slogan 'eat more strawberries' is an approach which is not likely to be successful. On the other hand if you relate your promotion to a particular outlet at a particular time and a particular price, the chances are it will be more successful. We have some general rules about promotion and I think this is one of them.'

Comment

'Mr de Castro referred in his address to meeting the needs of the consumer. I feel that you overlooked one point, and perhaps the whole industry may be overlooking it, and that is that your buyer or your consumer in relation to processed goods is initially the processor. I have repeatedly heard mentioned today that we are not producing the fruit suitable for processing. Would you like to comment?'

de Castro

'Frankly I avoided this whole subject of producing fruit for processors. My remarks were directed at fruit that I process myself into various products. In my own experience of processing with boysenberries and raspberries we have had no great problems with the varieties we have in New Zealand, certainly not boysenberries. I think much of the criticism of boysenberries is not a question of the varieties we have in New Zealand, but the stage at which they are picked. This is where the hard core causes trouble and perhaps this is a 'thing' with me which I have never expressed at a berryfruit conference. Frankly I am fearful of the outlet for boysenberries if many producers do not begin marketing high quality fruit. Perhaps I will just continue on this; the message might get around the country. I was warned of this by Stuart Richardson ex Department of Agriculture berryfruit specialist, many years ago (when I was in the Department of Agriculture doing experimental work on boysenberries in Nelson) that someone in Canterbury way back in 1946 tried to 'get on to' boysenberries. He produced very successfully and marketed some very red berries. It was something like 20 years before Christchurch would accept boysenberries again. People fail to appreciate the fact that the boysenberry is one fruit that just does not mature or develop once it is off the vine. It is not like the strawberry which continues to develop its red colour, the boysenberry does not; if you pick it green, it will stay green.'

Comment

'The discussion on boysenberry marketing leads me to emphasise the importance of mould control in boysenberries at harvesting time. This often stems from poor husbandry and I think we could inquire more from the Department of Agriculture as to the best spray programme for mould control. The year before last I had a certain amount of mould, but this was entirely my own fault due to my spraying programme. This year I had an excellent crop and excellent fruit simply because I had an entirely different spray programme and carried it out very thoroughly. I think this is probably one of the most vital things in growing berryfruit.'

Comment

'I think weather conditions have a lot to play, along with the spraying programme, as boysenberries ripen. One year you can get away with virtually no sprays and get a crop perfectly free of mould and another year when there is a lot of rain and hot humid weather at harvest time, mould occurs even with spraying.'

Section 2

BERRYFRUIT

MARKET DEVELOPMENT

Dr W.R. Schroder : leader

MARKET RESEARCH AND PRODUCER ORGANISATION

W.R. Schroder
Reader in Marketing
Massey University

In 1968, when the National Development Conference was setting its targets, prospects for the berryfruit industry looked good. The industry's optimism was reflected in the export targets set for berryfruits and fresh vegetables; a 100 percent increase from 1968 to 1972-73 and a further 100 percent increase from 1972-73 to 1978-79 - altogether a four-fold increase over the decade. While the 1969 berryfruit exports were well ahead of target, there was a considerable drop in 1970 and it appears that the 1971 exports will be very little higher than the 1968 base year figures. It would seem that the industry's progress towards being a major export income earner has been, to put it mildly, somewhat erratic.

On the home front, the prices received by berryfruit producers have, in general, increased at a considerably smaller rate than their costs - and, in the case of strawberries, are actually lower than five years ago. Despite this, the Department of Agriculture's Horticultural Statistics report increases of nearly 40 percent in berryfruit acreages, 15 percent in the number of growers and nearly 50 percent in the tonnage of fruit produced over the same period.

Your Federation regards the present position as being extremely serious - or, at least, this is what I read from the 'Report on Berryfruit Production and Marketing' brought out earlier this year.

It is common for agricultural and horticultural producers, in times of real or imagined crisis, to seek a panacea for their problems in 'the marketing system'. This, I suppose, is the main motivation for a course such as this. If we seek improvements in markets and in the marketing system, the first thing we need to do is to obtain information. This is the role of marketing research. A reasonable procedure would be for me to now discuss the types of research that might be carried out. However, at the risk of appearing heretical, I would like to begin by suggesting that the solutions to the major problems of the berryfruit industry (and horticultural producers in general) do not lie in research. It seems to me that there are quite basic structural and organisational problems to be overcome before the real benefits of research can be obtained by the industry as a whole.

When one looks at your industry the impression one obtains is:

1. There are relatively few producers. This means that a small number of new growers entering the industry can have a significant effect on the total supply.
2. Entry into the industry is relatively easy in terms of capital requirements and know-how.
3. The supply of berryfruit on the market is insensitive to the price received. In the short term this arises mainly from the perishable nature of the product.

One can be less certain of the factors involved in the longer term, but certainly, strawberry production (for example) has been expanding in the face of declining prices at a rate which is not readily explained by obvious technological changes such as increase in production per acre or production per man.

4. There is considerable potential for further dramatic increases in production.
5. On the demand side, there seems to be a relatively fixed requirement for fresh fruit on the domestic market and recent experience with our only significant berry export market indicates an upper limit on the amount of fresh fruit that can be exported.
6. The potential demand for processed berries seems to me to have been very poorly exploited. I cannot claim to be fully informed on all the developments in this area but, as a consumer, one is struck by the limited availability of processed berry products in New Zealand supermarkets - as compared with the U.S.A., for example.
7. The marketing activities of the industry as a whole are extremely un-coordinated. There is little evidence of grower co-operation and it would seem that the aggressive competition between exporters for overseas orders has certainly not been to the benefit of the industry as a whole.

These are impressions - based on what published information I have been able to find. I would suggest that the first priority for research is to answer some quite basic questions on your industry. For example, the 'Report on Berryfruit Production and Marketing' states that '.... we have seen a dramatic increase in all fruit and vegetable gate sales direct to consumer.' However, I was unable to find any figures to support this statement. You need to know where you are before you can think about making changes.

Nevertheless, I think you will agree that the impressions are broadly correct. The most important point that distinguishes your industry from any manufacturing industry is related to your inability to control supply. This characteristic, of course, also applies to other agricultural and horticultural industries. However, this inability to control supply has more dramatic effects in the case of berryfruit production because relatively small changes in the number of growers or the acreage can have quite a large proportional effect on the total supply. This, coupled with a relatively inelastic demand for berryfruits, means wide movements in prices.

This is the basic economic problem - a problem with which agricultural economists are very familiar. However, the inability to control supply poses marketing problems lying beyond the realm of basic economics. Planned marketing requires a known and controllable product mix - something which the berryfruit industry does not produce. The product mix forms part of a 'marketing mix' of brand, packaging, advertising, distribution channels, price, etc. This idea of a marketing mix forms the basis of many textbooks on marketing management. It makes good sense when we consider the operations of firms like Unilever or U.E.B. It makes very little sense when we consider the berryfruit industry collectively. The basic problem is coordinating the activities of the mix. If you asked the marketing manager of U.E.B. to organise a promotional programme without control over supply or price, he would probably go into a state of shock. Yet, this would be exactly the situation that would occur if the Berryfruit Growers' Federation chose to organise a promotional campaign.

It will now, I hope, be becoming clearer what I meant when I said earlier that market research is unlikely to offer solutions to your major problems. You might, for example, employ the services of Mr Ian Brown and find that there is a strong consumer

preference for 'Tioga' over 'Red Gauntlet'. This information would be valuable but its impact on the price received by the grower could very easily be completely dominated by an oversupply of both varieties.

The question now is - what can be done about the problems of over-supply and the absence of a coordinated marketing system? There are a number of avenues that have been taken by horticultural producers overseas. At the risk of encroaching a little on the subject matter of Mr Hubert Brown's talk, I would like to discuss one of these - the marketing order system that is used for horticultural products in the United States.

A marketing order is a statutory means of giving producers control over how the total production is to be marketed. An order can only be issued with the approval of a specified majority of producers. However, once issued, it is binding on all producers and handlers in the industry. Marketing orders do not control directly the amount any grower may produce. However, they regulate the supply on to the market over time and, in terms of end uses and geographic distribution.

In 1964-65 there were about 90 marketing orders for horticultural products in operation in the United States, six of which were for berryfruit.(1)

The types of activities carried out under a marketing order are: grading regulations, packing regulations, promotion, market research and quantity regulation. The last of these is potentially the most powerful economic weapon but, in fact, is only included in the legislation for about a quarter of the existing orders for horticultural products and is infrequently invoked in these. The control of market supplies without control of production is usually achieved through the grading system. An obvious requirement for a successful marketing order is a limited number of distribution channels so that effective control is possible.

The marketing order approach is only one of a range of degrees of grower organisation and control. At one end of the range there are organisations like the Berryfruit Growers' Federation - a means by which growers can get together. At the other extreme, there are production quotas and a monopoly marketing agency. If you, as berryfruit producers, chose to organise yourselves to a greater degree than at present, it seems to me that the following questions would be important:

1. Is there the necessary degree of grower co-operation existing in the industry? Co-operation will, of course, arise from a community of interest, but the factors involved are subtle. Why, for example, does the dairy industry operate so effectively as a co-operatively organised industry, while the wool producers have been unable to agree on anything important since the time that they set up the Wool Commission?
2. Will you be able to persuade the Government to provide the necessary legislation? For any significant degree of control to be successful, legislation will, I believe, be necessary. The recent efforts of the Vegetable Producers' Federation do not give grounds for optimism in this respect. One probably important factor is that a high proportion of your produce is sold fresh on the domestic market. Efforts to raise the price of this produce would have a direct, and highly public, effect on the consumer price index.

(1) 'Organisation and Competition in the Fruit and Vegetable Industry', Technical Study No. 4, National Commission on Food Marketing, 1966.

3. If we accept that the most effective weapon available to growers is the control of supplies on to the domestic market, can this control be exercised in the absence of direct production control? This is one of the major problems in the operation of a marketing order and the problems would be no less acute in the New Zealand situation.

I do not have good answers to these questions and I have not formulated in detail alternative marketing schemes for your consideration. I would suggest however that a useful research exercise would be a detailed investigation of the various forms of horticultural producer marketing organisations in other countries. If you believe, as I do, that a greater degree of organisation than that presently existing is desirable, such an investigation would be a necessary first step towards implementing any reforms.

I will now leave any further discussion of marketing reform to Mr Hubert Brown and return to the question of marketing research.

In very simple terms, we can look at the marketing system for berryfruit as:

	Retail return
Minus	Marketing Margin
Equals	'Farm Gate' Return

This framework identifies two broad classes of research:

1. Research on markets and market opportunities; that is, research with the objective of increasing the 'retail return'. (This is the major topic covered by Mr Ian Brown.)
2. Research with the objective of decreasing the marketing margin. (This is the topic of Professor McCarthy's paper this afternoon.)

Having already partly violated Mr Hubert Brown, I will now proceed to encroach on Mr Ian Brown and Professor McCarthy. I apologise for these encroachments, but they seem to be unavoidable in a symposium of this type.

Research on Market Opportunities

1. New product research

My colleagues in the Food Technology Department at Massey tell me that it is technically possible to make virtually anything from strawberries. While the development of new products is not, in itself, market research, it is important that market research proceed concurrently with product development and the costing of new processes. It is highly desirable to avoid going 'too far' with a product that is not going to make it in the market place.

2. Potential Overseas Markets

Your Federation is to be complimented on working with the Trade Commissioner service in making a preliminary survey of world berryfruit markets. However, it is not the job of the service to carry out serious market research. They simply do not have the resources.

The systematic investigation of overseas markets should proceed; first through a thorough study of published statistics; then a preliminary survey through the agency of the Trade Commissioner service covering such points as distribution methods, and the nature of the competition; and finally, a detailed analysis of consumer usage of this type of product and how consumers regard your product. This last activity requires the services of a professional market researcher. Again, I would emphasise that it is not worth employing such services unless you are reasonably sure, on the basis of your preliminary investigation, that a profitable market opportunity exists.

Research on Reducing Marketing Costs

Cost of Processing/Plant Location Research

One of the major problems facing the processor of berryfruit in New Zealand is the relatively small quantity available for processing into various end uses. Given this problem, priority should be given in the development of new products to those which can use existing facilities. In considering new processes, careful costings should be made and evaluated in relation to the 'systems problems' of balancing processing and distribution costs. In the United States this type of work is carried out by the Universities and the U.S.D.A.(2) Professor McCarthy has had some experience with this sort of work and, I am sure, will be discussing it in more detail in his address.

I would like to conclude by reiterating the point I made at some length earlier. What is the best organisational structure to make your research work for you? I would suggest that the payoff to the grower from (say) research on processing may not be very high when the growers do not have control over the processing operation. It seems to me that the priorities are first to put your house in order and then to proceed with a marketing plan - of which market research must be an integral part.

(2) For example see: Goble, William E., 'Cost of Processing Strawberries for Freezing in Tennessee', Bulletin 378, University of Tennessee Agr.Expt.Sta., August 1964.

MARKET INFORMATION AND ANALYSIS

Mr I. Brown*
New Zealand Data Ltd
Wellington

1. Expert is a man in his best suit, a plane ride away from home.
2. I'm really only an expert in market research, not in marketing.
3. I'm certainly not an expert in the berryfruit field. I didn't even know until the other day the pertinent facts. As I see them the basic facts are probably somewhat as follows:

(1) Production: Up from about 4,047 tons in 1965
to about 6,848 tons in 1970

or an increase of 69%

(2) Number of growers:

Up from something like 572 in 1965
to about 696 in 1970

or an increase of 22%

(3) When we talk about berryfruits we are talking about six main items -

strawberries
raspberries
boysenberries
loganberries
blackcurrants
gooseberries

My guess is that we are talking about family puddings, housewives making jam, and food processors as the end uses.

(4) A situation in which end price to consumers does not reflect market returns to producers, thus postulating the entrance, stage right, of a possibly villainous 'middle-man'.

In addition if we believe all we are told it seems that retail prices don't bear much relation to wholesale prices.

(5) Coupled with above we have the classic position of stable or falling prices, and escalating cost structures.

* Now a director of Haylen Centre of Marketing, Social and Opinion Research Ltd, P.O. Box 9625, Wellington.

- (6) This means income squeeze, and possibly a shift of growers away from the industry. The indications are that this took place in 1969 anyway when the number of growers fell from 604 the previous year to 554 (a drop of 8%).
- (7) It is postulated that more and more growers are selling at the gate. But volume we don't know.
- (8) Given the two/three year lag in many cases from planting to selling, plus the fluctuating demand emphasised by export and processing requirements, we seem to have anything but orderly marketing. However, I want to leave that, because regardless what the other members of the panel might think, I think that's their topic!
- (9) It would seem that all the industry wants is a fair reward for labour and management skills compared with the rest of the community, and 5½% on capital investment (which seems low to me by the way).

Since that's what we all want it seems reasonable to start admitting that there is a problem or two around.

4. How can market research at the practical level help?

A couple of tenets of faith first so we don't have misconceptions:

- (a) Most problems are caused by lack of hard data. The more data you have, the more chance of defining the problem. The better the definition of the problem, the easier the solution.
- (b) A market researcher is not a man with all the data at his finger tips. He is, however, an expert at collecting data. (In some cases he can even help you apply the data he collects to helping solve your problem.)
- (c) If you lean on a problem hard enough, and long enough, it will yield. Hard data just gives you more leverage.
- (d) Objective - that's what you pay for - sensitive toes.

- 5. You may very well feel that you and your federation know your own industry. With the greatest respect, this is something I don't feel able to take for granted. My reason for this attitude stems not from lack of respect for the acumen of the people concerned, but rather from long experience in handling inquiries of a somewhat similar nature where so often it has been found that the picture held by the most skilful governing body, is not a complete reflection of the conditions in the industry as a whole.
- 6. If it were my money on the block I'd be thinking about collecting data.
- 7. Any successful investigation of a situation where existing hard data is limited depends on the systematic compilation of that data in the right sequence.
- 8. I think that in these circumstances I'd probably start off by asking for all the information that I could get that was available. I'd then sort it into two big piles. One called hard, substantial data. The other called soft data; opinion, hunch, guesswork. This latter pile would be bigger than the former, almost for sure.

9. Having done that I'd start to sort out some of the things I really wanted to know; know in the sense of hard, factual, incontrovertible data. To achieve this I'd almost certainly involve myself in some market research. I'd want a descriptive survey of the whole industry, which covered all the who does what, with which, and to whom aspects.
10. Market research, big name, is simply the use of imaginative thought and scientific methods, applied to the solution of market problems.
11. The technique I'd want to use in this instance would be the survey. Simply this consists of asking a cross-section of people (the sample) a set of questions (a questionnaire). The collective opinion obtained in this way would provide a reliable indication of just what is happening in the industry.
12. Here is a brief guided tour of the ten steps of a typical survey.

(1) Defining the problem -

Often the most difficult part of a survey is to clearly define the real problem, and to set specific research objectives. Frankly, I doubt if it could be done in this case. We have disorderly marketing, cost problems, price problems, who sells what and to whom, and so on. This is why an exploratory survey to describe the industry as it is seems to be the starting point.

It seems pertinent to observe, however, that much of the problem revolves around the following key conundrums:

- * What is produced?
- * Under precisely what conditions?
- * With what resources of capital and labour?
- * What are the marketing channels?
- * What is the revenue position?
- * How much does the grower retain?
- * What are the real grower problems?

(Everybody borrows problems instead of defining their own.)

(2) Designing the questionnaire -

It is easy to ask a question, but one of the most difficult tasks in a survey is to ask the right questions, in the right sequence, to yield the right kind of information. Careful phrasing of questions is essential as misinterpretation on the part of the respondent will introduce unreliable data.

Loosely constructed questionnaires can be a major source of error.

In the case of such an investigation as this I'd guess that some, or all, of the following questions would be asked - and maybe a lot more.

- Q. About how many years would you say you have been growing berryfruit?
- Q. Is growing berryfruit your main occupation?
- Q. (If not) what is your main occupation?
- Q. What were you growing five years ago?
- Q. What are you growing now?
- Q. (If changed) why the change?
- Q. (Now, about the crops you grew.) Did you send the total production of all of these crops to market?
- Q. (If no) what were the crops concerned?
 About what proportion of the crops were sent to market?
 What about last year?
 What was the reason for not sending all the crop to market?
- Q. Through whom do you market your output?
- Q. How else do you market -
 Your road side stall?
 Somebody else's road side stall?
 Direct to retailer?
 etc?
- Q. What do you sell this way?
- Q. How much do you sell this way?
- Q. How do you fix the prices of the stuff you sell direct?
- Q. Please indicate top and bottom price achieved.
 Dates of those prices?
 Average price?
 Average price satisfactory/not satisfactory?
- Q. Does your work load vary?
 Busiest month?
 Slackest month?
- Q. Days worked in season?
 Hours worked per day?
 Do family members work?
- Q. (If yes) How many? What days? What hours? Do they get paid?
- Q. Casual labour employed?
 (If yes) How many weeks of the year?
 Average weekly wage bill?

- Q. Area of property?
Productive area?
- Q. Government valuation?
leasehold
freehold
mortgaged (amount still owing)
- Q. Mechanical implements?
Number?
Value?
Age?
Owned/not owned?
- Q. When you need finance, where do you get it?
Frequency?
Amount?
Rate of interest?
- Q. Do you regard your net profit before taxation from vegetable growing to be a satisfactory return on your labour and capital?
- Q. Value of total sale for last year?
- Q. What was the net profit last year?
- Q. What are the main problems in the running of your business?
- Q. Do you think the federation could help you further in any way?

Classification Data

- A. Partnership/non partnership
- B. Age of respondent
- C. General educational level
- D. Dependability rating of interview
- E. Area
- F. Location

You may think an individualistic bunch like growers would not answer such questions. You might - but after rephrasing they would - and did.

(3) The Sample -

The persons interviewed, the areas covered, and the sampling method adopted all depend upon the marketing problems being solved. I could carry on about sampling using mathematical theories of probability, confidence limits, and so on, but I won't.

Suffice to say that a well constructed sample can give a clear indication of the total picture. Deciding the final sample size is always a matter of experience, knowledge of the theory, and the amount of money in the kitty.

(4) The Fieldwork -

The questions must be asked in the right way (and the same way) on all interviewers. The field operation requires careful planning. Every interviewer must be instructed, and trained to the necessary level of tact, persistence and skill.

Supervision must be maintained, problems must be classified in a consistent way, and check calls carried out to ensure integrity.

(5) Checking/Editing/Coding Questionnaires -

After fieldwork all questionnaires must be checked to ensure consistencies and accuracy of recording. They must then be coded for subsequent data reduction.

(6) Data Reduction -

Final preparation of data for computer - usually. The data at this stage is prepared for the final tabulation as it will appear in the final research report. Much data will be analysed in great depth.

(7) Interpretation -

Analysis and interpretation - the search for what all the data really means.

(8) The Report -

The final report may be a thin volume of ten pages, or a weighty tome of up to five hundred pages. Whatever form the report takes it will explain and comment on all the data brought to light by the survey.

(9) Recommendation -

Whenever it has been part of the assignment, recommendations are included.

(10) Decisions -

This is the client part of the survey.

13. With some, or all, of this data available I'd think we would have a good description of the industry as it is, from the production point of view.

14. At this stage any deliberative and thorough investigations would have to change course and concentrate on the marketing channels, from production to end user.

There would seem to be two very different channels here.

There is the internal market, and the export market.

15. The Export Market -

Without setting up in some form a commercial intelligence network about international supply and demand, and the key international markets, attempting to market as a minnow among the sharks seems to be offering oneself up as somebody else's breakfast. This can be done, the data can be collected, and it's not necessarily as complicated or as expensive as it seems to be.

16. The Internal Market -

Here again the market would seem to be a three way split -

- * The industrial market
- * The domestic market
- * The retail sector

- (1) The industrial market, meaning I suppose food processors, would not seem to be difficult to pin into place.
- (2) A thorough check of the retail sector - markups, etc.
- (3) The domestic market might repay some attention -

Who uses?
 For what purposes?
 What does it compete with?
 What is the changing nature of consumer demand?
 What are the preferences? taste/colour/packaging/etc.
 Frequency of purchase?
 Awareness?
 Faithfulness - loyalty?
 Attitudes to products?

I suspect at this stage berryfruits compete with each other as well as other fresh and processed foods - e.g., peaches and ice-cream.

The vehicle for such attention would simply be the survey again, and this time we'll be talking to housewives as the end users.

PLANNED PRODUCTION TO MEET MARKET DEMAND

H.H. Brown
Horticulturist
Levin

As a producer I feel a little out of my depth, particularly in a Marketing Seminar led by so many who have distinguished themselves as authorities on the subject.

Yet I make no apology for being here since marketing is the reason I till my soil and tend my crops; and no matter how high the quality of my produce or presentation or the efficiency of my production, my ultimate income will depend on the marketing of my crop. As I believe is the case with all producers whether primary or secondary, the reason I produce my crops is to provide an income and in New Zealand today it must be a steadily rising income; and this is true despite all the guff one hears about the advantages of our way of life.

Well now, what about Production and Market Demand?

First, it's time we producers realised we are involved in running a business - yes, business - not a way of life - and that the rules of success which apply to the industrial giants apply to us. Yes, we may have differing problems and methods but basically we both produce an article or component which we aim to sell at a fair and reasonable profit.

Let us then look at the picture (Fig.1, page 49) - it's like a giant television set which we plug in but before we can get a clear picture we must tune all the controls in balance.

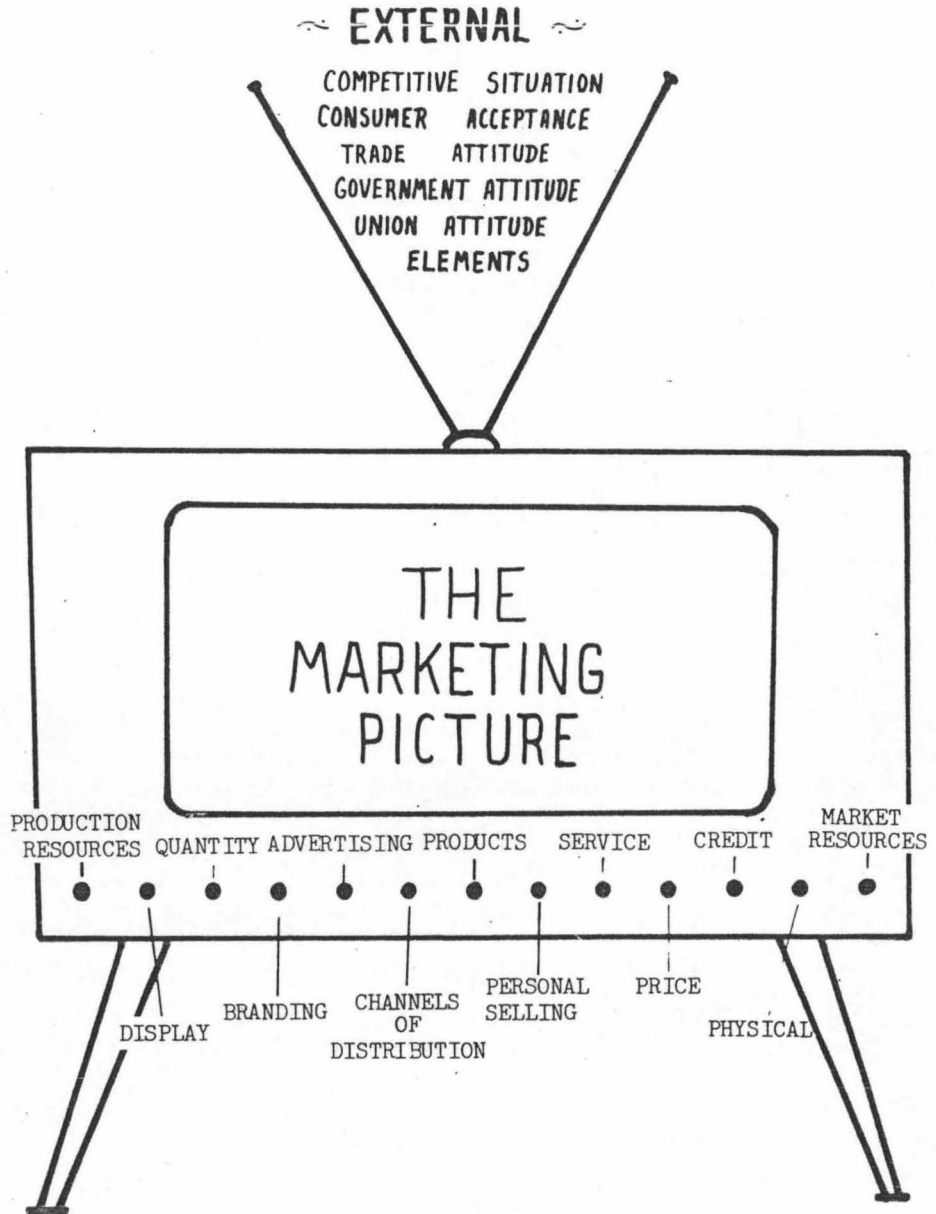
- | | |
|-----------------------------|---------------------|
| 1. Production Resources | 2. Market Resources |
| 3. Display | 4. Quality |
| 5. Branding | 6. Advertising |
| 7. Channels of Distribution | 8. Products |
| 9. Sales Effort | 10. Service |
| 11. Price | 12. Credit |

Even then there are external factors which can prevent our receiving a good clear picture despite the fact our set is perfectly tuned.

- | | |
|--------------------------|------------------------|
| 1. Competitive Situation | 2. Consumer Acceptance |
| 3. Trade Attitude | 4. Government Attitude |
| 5. Union Attitude | 6. Elements |

How, then, can we be assured of good reception on our set? The answer is we cannot but we can make sure that all factors under our direct control are in balance and by our own industry efficiency we can influence some of the external factors which will at least increase our chances of good reception.

FIGURE 1



It is true nothing succeeds like success and many of the external influences we have spoken of will respect a successful industry but are likely to ignore a floundering one.

Where do we fit in?

Mr X (Fig.2, page 51) has invented the world's most efficient balloon-making machine. It produces flawless balloons at lightening speed day and night non-stop and the cost of production is only half that of his competitors. It would seem Mr X is all set to make his fortune. However, there are two serious flaws. Mr X hasn't put a regulator on his machine to control production nor has he done any market research to establish the total demand for his product and he can't stop the machine producing. Result - Bankruptcy! A bit exaggerated, yes, but isn't it rather like the berryfruit industry today?

We don't know what the total market requirements are or where they are, we don't really know the strength of our opposition and we produce what we feel like growing, when we feel like growing it. We are told the law of supply and demand will take care of us but it is also a fact that a fluctuation of as little as 2% can have a serious effect on market stability.

I may sound like a pessimist. However, I hope I am being a realist.

What then, is the answer?

Let me first say there is no easy answer. This does not mean that an answer cannot be found.

Let us look at the pyramid of marketing (Fig.3, page 53).

1. The purpose of our efforts

Consumer - world-wide. Is he or she getting what she wants in the way she wants it when she wants it or what she can be persuaded to want? Notice I have not said anything about price as I believe there is ample evidence today to prove that provided the other factors mentioned are right, price is not of critical importance.

2. Servicing the consumer is

The wholesaler and the Processor. Are these agencies providing

- (a) the consumer with the service she requires?
- (b) the producer with the information he needs to accurately predict and supply consumer demand?

3. Information

- (a) Market research - who wants what when.
- (b) Product research and development - are we offering our produce in the best form? Would demand world-wide be increased? Can we increase the volume of our new products?
- (c) These facts must be co-ordinated under production planning.

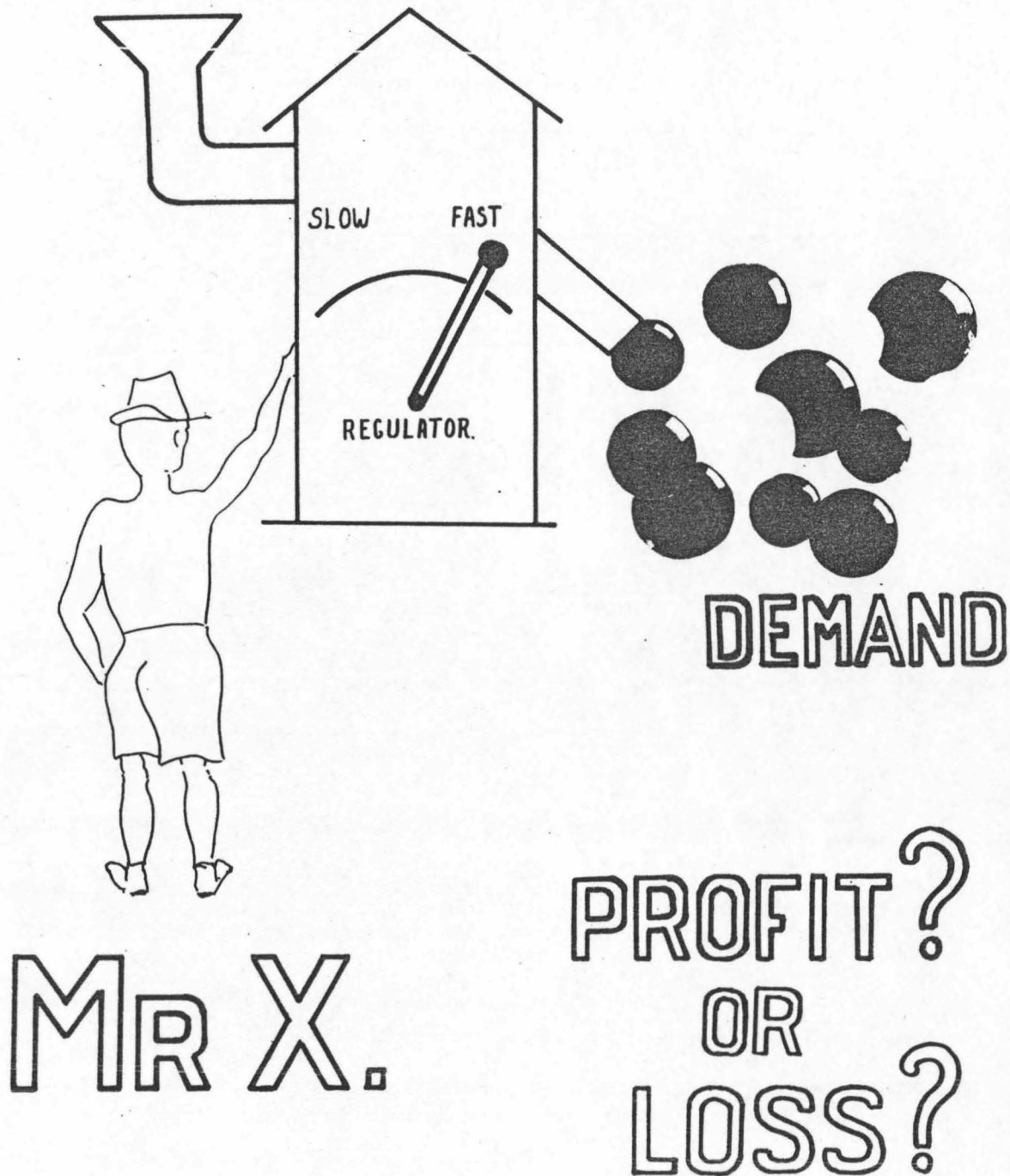


FIGURE 2

4. Communications

Does everyone know what's going on and what our aims and objectives are?

- (a) With staff - both selling and producing.
- (b) With customers, wholesalers, retailers, processors.
- (c) With public at large. What is our public image? Have we ever thought about it?

5. Rules and Policy

- (a) To what standards do we produce - NONE.
- (b) To what timetable do we aim our production?
- (c) What guidelines have we for producers or their agents to follow?

6. Resources

The five M's -

Money
Manpower
Materials
Machines
Methods

All vital parts of the whole structure.

7. Foundation

The foundation of the whole structure is the grower but it is important to note that our structure has a very broad base but a single objective at the top - 'The Consumer' - and unless all our efforts are channelled correctly and each part of the structure carrying its proper share of the load the structure is in danger of collapsing.

I have tried to draw you a picture of what is involved in Planned Production to Meet Market - or I would prefer Consumer - Demand. I firmly believe our industry structure is failing to provide producers with the basic information required to enable them to provide soundly based production. To continue in this way can only mean chaos and the responsibility for reorganisation to enable growers to obtain the market intelligence required in order to better programme production and increased demand fairly belongs to the industry itself and its appointed agents. Granted, we may need legislative authority to enable this to be done. To achieve a rationalised approach to production we will need discipline and finance and at Conference tomorrow delegates will have the opportunity of deciding whether our industry is prepared to pay the price.

The alternative in a competitive world? Well this, I think, can best be illustrated by what I call the 'Growers' Wheel of Fortune' (Fig.4, page 55).

PYRAMID of MARKETING

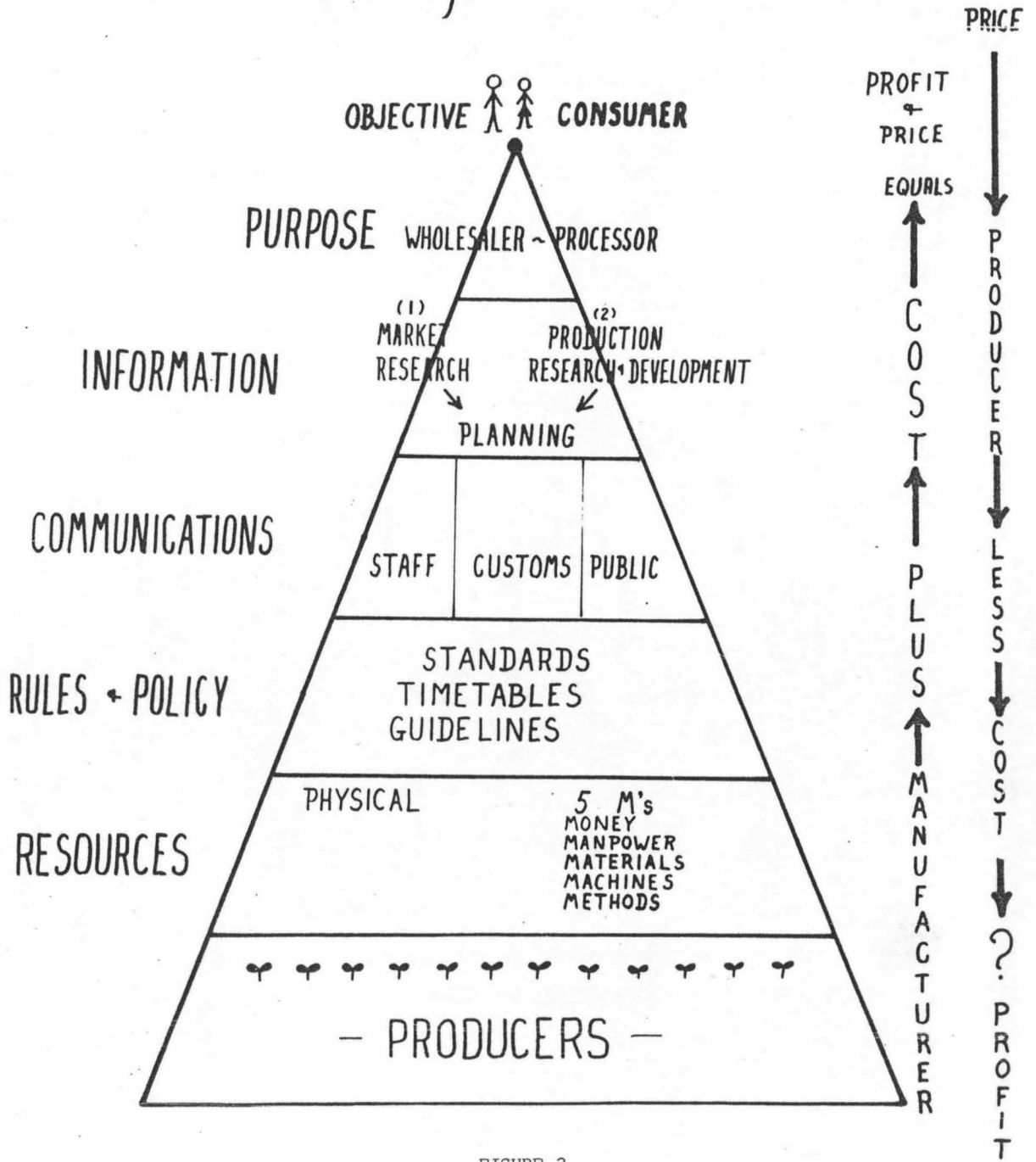


FIGURE 3

One climbs on at the bottom and as one's efficiency improves, one slowly climbs to the top of the wheel. However, there are always more climbing on below and as the wheel turns, so others catch up and slowly but surely one starts on the downward journey until, at the bottom, one by one growers fall off. Sure, a few may manage to ride the wheel longer than others but in the end almost inevitably the 'SYSTEM' catches up and off they fall.

This need not happen but only by the introduction of more efficient marketing (in its widest meaning) can it be avoided.

Without being militant, none but the blind or stupid can fail to observe the lessons on the 'strength of unity' demonstrated so clearly in the New Zealand industrial scene over the last few weeks.

We, after all, grow and own the produce - the answer surely is ours!

THE CROWERS WHEEL OF FORTUNE



FIGURE 4

SECTION 2 - PANEL DISCUSSION

BERRYFRUIT MARKET DEVELOPMENT

Mr H.H. Brown (chairman)
Dr W.R. Schroder
Mr I. Brown

Professor Morrison (Lincoln College)

'I think you are kidding when you suggest that manufacturers in fact assess their costs of production and therefore arrive at a price. This is an ideal situation which I doubt very much ever occurs. If you watch critically the introduction of a new product which may compete with an existing one, you will find that if there are some special attributes to it, as for instance transistors replacing valve radios, there is a novelty value and you will find that the product is priced just above that of the product it is meant to replace. The product it replaces gradually drops and the transistor comes down following it. This is unrelated to cost of production and I suggest that both producers and manufacturers in fact use the same system, and that is, 'what will the market pay?' When you get to a point where your costs are greater than your returns, then obviously you are in a loss position and in a year or so this will become obvious to you, in which case you are out of business. It is as simple as that. I don't think berryfruit growers are so far different from the manufacturers.'

H. Brown

'I accept your statement, Professor Morrison, although I think that whilst during original costing, market research is conducted on what the consumer may be prepared to pay, nevertheless in subsequent cost adjustments, production cost increases are undoubtedly taken into account. The frequent price rises we are afflicted with prove conclusively that industry recognises that once a product is established and serving the consumer well, the consumer is normally prepared to pay any increases in cost which the firm sees fit to impose in order to keep the production of that line profitable.'

I. Brown

'I am sorry, but I disagree with you and an increasing number of manufacturers in New Zealand these days would also disagree with you. In the last two weeks on this question of transistor radios alone, I have been given a transistor radio which has been marketed in Japan and which can be made under licence in New Zealand and I have been asked a question - 'Is there a market for this; what are the demographic characteristics of the market and will they be prepared to pay XYZ dollars for it, because if they won't I am not going to make it?' This particular company knows what it is going to cost to put it on the market, and they are not going to put it on the market unless they have consumer acceptance, and I think if you look at motorcars, refrigerators, washing machines, or carpets, you will find all of these people analysing their costs of production before they end up at a retail price. They also have a mutual point in that having established a retail price based on costs of production, there might be some added plusage for

innovation, novelty value. I think what Mr H. Brown meant was that there is disaster ahead if you do not analyse the difference between your manufacturing costs and your end price. You want the difference, but you want it your way, not the other way.'

Question

'I take it that the manufacturer does his market research and finds out precisely what the consumer is prepared to pay in many cases and then looks at the profit margin and quite often it may be considerably more than he could ever hope for.'

I. Brown

'Sometimes this is true. I had better put what I have just said in absolute historical perspective. The reason this particular producer of transistors has been in my office recently is that he came in about two months ago with an XYZ brand of product and said 'This thing's a dog, it's on the market at about \$50.00 and I am not selling any; why not?', so we did some work and found out in fact, that all consumers were prepared to pay for this was \$25.00. In fact an electrical shop in the north of Auckland was broken into by a bundle of thieves who 'flogged' every transistor radio in sight except this one. The result of that piece of market research, plus a profit and loss account of that particular produce, caused him to say 'I am never ever going to launch a product on the New Zealand market where I know what I am going to have to sell it for, until I know at what price it is liable to be bought at'. So if you are talking about profiteering, there may be some instances, but you can't blame it on market research.'

Comment

'Market research may not in fact be 100% accurate; you might make more and you might make less. The important point is that the producer of the transistors should not go on producing the transistors when he knows the return on the production of this sort of transistor is less than he could get if he put his money into something else. This is the big difference between an agricultural-horticultural type of industry and the manufacturing industry.'

Question

'Would it not seem then that if berryfruit (or whatever you are producing) doesn't pay, it is time to get out of it and do something else? A manufacturer can't keep manufacturing something that doesn't pay; neither can a berryfruit grower do it for very long. I think the problem is now to cost it accurately; I can do it - but how many other growers can? One problem arising in the berryfruit industry is the part-time grower. How does this type of grower determine his cost of production accurately?'

Schroder

'This is undoubtedly a very important problem. I asked Mr Hubert Brown earlier what proportion of growers depend on berryfruit as their sole source of income. His estimated proportion was very small. In the situation where berryfruit production represents only one enterprise amongst a number of activities, the problems of costing - in particular, the allocation of fixed costs - becomes considerable.'

Question

'Should growers have full control of produce to the consumer?'

I. Brown

'Speaking from experience, I can think of very very few producers who do. I can think of very very few manufacturers who do. Between the manufacturing bit and the buying bit there is usually a retail channel of some kind through which the product or produce is bought or sold and goes through three or four price changes. Can you Dr Schroder - I cannot think of very many instances where it is over to them?'

Schroder

'No, I cannot think of any cases where a manufacturer has complete control over the marketing of his product through to retail. However, franchising and other arrangements do allow a significant degree of control.'

Comment

'I would say that in most of the successful ventures, like production and marketing of motor cars and a lot of the more popular consumer goods, the producer does have a large measure of control.

In motor manufacturing the producer largely controls his wholesale distribution and he has control over his retailers. The only thing he hasn't got control over is his competitors, but by adjusting his own price he has a large measure of control, right from the time it is produced, until it is sold. The only problem which can arise is when market research is incomplete and the market becomes under or oversupplied. This large measure of control over the distribution of products right through is something which berryfruit growers lose after the produce leaves the gate.'

I. Brown

'I don't want to take issue with this, but I simply just don't believe that, and I begin to wonder just how you people think you can compare with say Mr Wattie or Mr Unilever - the big giants - or some of the smaller firms. Have you any idea of just how difficult it is to get a grocery shelf line into retail outlets; into grocery shops? If you are launching a new product it is quite common to launch it at the rate of 14 or 15 to the dozen, which means in fact that the man is paying for 12 and getting 14 or 15 - that is, 2 or 3 extra free - plus the normal trading discounts that he would get - and if in fact you haven't promised him a \$20,000 or \$40,000 advertising appropriation to get it off his shelf once he has bought it, he won't even stock it for you in the first place. On top of that he may want credit from you while he is stocking it. But it is incredibly difficult even for the giants like Watties or Unilever to launch new products and the competition tends to be the fight for shelf space, which the retailer - the individual grocer - himself controls and the fight for promotional space or time in things like press or television. It is sold from the factory gate to a wholesaler or a retailer and it is only stocked by the retailer if you promise to shift it off his shelves at your cost by creating consumer demand. There is no manipulation or control of the market placing even by the giants. Even in the case of the motorcar boys, it is sold admittedly to a franchise, but it is sold to a motor retailer and you don't sell the second car until the motor retailer has got rid of the first one. This is true regardless of the quantity involved. Don't feel that you have it hard and the giants have it easy because the giants fight with the giants and marketing isn't easy at any level. I am sorry - that was too long - but I think that you people feel hard done by - in many respects you are - but it isn't necessarily in the distribution channels.'

H. Brown

'I would just like to add something here. I think that the difference between Watties and Unilever and ourselves is that the lines of communication on the one hand are open; the lines of communication on our side seem to be closed. I think this is the important difference. In the case of the processors it is a team effort - where everybody is helping everybody else so that the product finishes up with the consumer. In our instance, everybody stops at their own particular gate and doesn't worry about what happens from then on. This is wrong, I am sure, in the total enterprise.'

Comment

'I would like to make a reply to Mr Brown with regard to franchise holders of motor vehicles. If they don't shift their quota, and this happens consistently, then the franchise will be taken away from them and given to somebody else. Now that is a measure of discipline that we don't have at the moment but which we might well introduce into our own industry; some method of control of our retail outlets.'

I. Brown

'I think that now you are beginning to agree with Dr Schroder. You are now talking about more orderly marketing and if that is what you are after that's fine, but owning the produce to the end, or trying to control it to the end, usually is really trying to get all the benefits of the monopoly and you are not in that position.'

Question

'Is it feasible if the Federation wanted to find out just what demand is in a particular place like Auckland or Wellington at a given time?'

H. Brown

'Yes, I think it is perfectly feasible to find out what the pattern of demand is and it is probably also feasible (Mr I. Brown could answer this better than I) to find out how the pattern of demand might be influenced. This is a matter of co-operation of all the channels involved working for the one objective of getting more products into the consumer hands.'

Question

'What would be the cost of determining demand?'

I. Brown

'Measuring demand I am not sure about. If we are talking about measuring housewife demand and measuring factors that might affect that, then something could be done by area. I do not think it is within the resources of the single grower, but it ought to be an industry problem rather than an individual grower problem. If we are talking about the demand by processors, I think this could be done, depending upon the degree of co-operation that exists, or that might be brought into existence, between your Federation and the major processors. The third area of this would be measuring the export demand which is the most difficult of the lot. All of these things can be done. When I was coming down on the plane last night I was trying to think if somebody asked me how much money had to be found for an industry investigation of your problems, and the collection and measurement and interpretation of some cold, hard, factual data, what the budget should be. I think

in fact such an investigation would have to last over about three years, and my guess is that if every grower comes to the financial party, it could cost every grower about \$20.00 spread over three years, i.e. about \$10,000. \$10,000 sounds like an awful lot, but \$20.00 per head over three years doesn't sound like very much at all. Now that isn't a panacea, it isn't paradise, it won't solve all of your problems, but it will go a long way to solving some of them, isolating some which do not need solving and isolating in considerable detail some that do.'

Question

'Has Mr H. Brown ever thought of looking at his 'pyramid of marketing' upside down? You could get quite a different picture if you put the producer at the top where the two consumers are and put the two consumers at the bottom where the producers were. What picture would you get then?'

H. Brown

'Yes, I think the basic answer is the same quite frankly. You would still have a very broad base top or bottom aiming at a very narrow target. Unless your aim and information are good and your channels of communication open, very few of you are going to hit the mark. In other words, you can be trying to put too much produce there, you can be trying to put too little, and you may be missing the mark altogether.'

Question

'Can I ask Dr Schroder to elaborate a little further on his comment that it was relatively easy to enter the berryfruit industry?'

Schroder

'What I meant by 'relative' was mainly in terms of the capital requirements to enter berryfruit production as compared with other agricultural/horticultural activities. However, I do not have good figures on this question; it is just an impression I have. Perhaps Mr Brown might like to comment?'

H. Brown

'I think it is relatively easy for people to start off in berryfruit but to what degree of course is a different matter. Most berryfruit producers start off in a small way, and either get to like the taste of strawberries or raspberries or something else gradually expand, but certainly compared to pastoral types of farming and to various types of arable farming, the berryfruit industry is relatively easy to enter. There is nothing to stop anyone who can acquire half an acre of land for relatively little cost, establishing in any type of berryfruit. One would imagine if they are going to grow strawberries they are going to do it properly, but of course strawberries can be grown just by rotary hoeing the ground and planting them. There are still people growing strawberries in this manner, and so I think the statement is probably correct.

During the five year period 1965-70 there was a 22% increase in the number of growers. If there have been some dropouts as well, this implies an input of new growers of about 20%. A 1:5 ratio of new to established growers is a high one and one is led to the supposition that it may not be too difficult to enter the industry.'

Question

'Dr Schroder, have you any idea of how effective the influence of marketing orders, as used in the U.S.A., are in benefiting the horticultural industry in that country as against an industry without such orders?'

Schroder

'That is a very good question. It was one of the questions studied by the U.S. National Commission on Food Marketing in 1964/65. In brief, their conclusions were that activities such as grading regulation, promotion and market research, which have been carried out through the marketing order system, have been to the benefit of the industry. On the other hand, the orders have not been very successful in controlling supplies on to the market.'

Comment

'I know of a very big overseas berryfruit-growing firm called Driskels growing 1200 acres. They have their own strawberry breeder, their own plant production areas, their own marketing manager, field supervisor and cool storage, and the whole large concern is very efficient. Because of their scale and organisation, in much the same way as Watties, they appear to have a very successful business. Obviously the smaller growers (the fellow in the 10-acre bracket) are depressed and not really making the headway compared with these large firms that they feel they should be. I just thought I would throw that into the discussion because there are two sides to the story there.'

Question

'Following our Auckland delegate on this wheel of fortune here. If we accept Mr H. Brown's 'wheel of fortune' in the horticultural industry, how is he going to control gamblers hopping on the wheel?'

H. Brown

'You are not going to control gamblers. What most existing growers mean by control is - 'they want to be able to do what they want to do, but nobody else can do anything'. Now I mean that, seriously. That is the average grower's definition of control or registration and it just doesn't work! It must be realised that, it just won't work and you are not going to be able to control the 'wheel of fortune' in this way! But, you may be able to control it by planning, co-ordination and co-operation of all the distribution channels. It may be possible to rationalise the 'wheel of fortune' so that although you will still get gamblers hopping on, there is more chance of the successful, forward-looking, industrious producer staying on the wheel, at least for a longer period.

Let me make it quite clear that I believe one of the basic problems of our industry is one of overproduction or unco-ordinated production. Growers must realise if they produce, as Mr X did, twice as many goods as the total market can consume, in any shape or form, then they are going to have to take depressed prices and go out of business, or they are going to have to be content to sell only a proportion of their production. Whichever way you have it, it is the producer who is going to have to pay the bill, and there is no other answer to this! In any form of rationalisation the producer, whether you like it or not, is going to have to pay the bill if he produces more than the total market demand! I think this is the answer to the question and producers have to accept this.

The ways of rationalising production and marketing are not simple. Dr Schroder has mentioned an overseas scheme and at the Conference tomorrow we will discuss a scheme suggested for New Zealand. But don't let anybody run away with the idea that somebody can produce a Utopia whereby you can grow whatever you feel like growing and sell it at a profitable price because it just isn't on as far as I can see!'

Question

'I know that most of the berryfruit produced in New Zealand is sold, at the moment, in New Zealand. Last year I attended a Horticultural Economics Conference in France and there representatives from practically every horticultural producing country in the world said there was going to be world over-production of all forms of horticultural produce in the next five years, including of course berryfruit. Now, any attempt to control production in this country might work in the short run, but shouldn't we relate this 'wheel of fortune' to the world scene, rather than just the New Zealand scene? Is it not necessary to put the 'country' in the place of the 'grower' on your 'wheel of fortune', and what happens then in terms of control of production within this country? The main point that I am making is are we considering the control of our production for local market consumption or are we producing for the world market, which in fact is the case nowadays for most forms of produce?'

H. Brown

'I tried to make it clear in my paper that when I spoke of marketing I spoke of the total concept of marketing, which includes export marketing in all forms. We think of strawberries as food but it may be in fact that the strawberries are going to be used for face-cream; I don't know but they tell me they are very good for this purpose. I quite agree with you that we have to relate all this to the total market that New Zealand can foresee for its berryfruit production and by total market I mean not only local in all forms but world scene in all forms.'

Comment

'I don't know of any horticultural example where there are controlled plantings, where the Government or the growers themselves control the actual planting, but I do know of a number of examples where planting is controlled by other means. I refer to one example where the cling peach growers in California themselves decide that each grower must remove 10% of his acreage. If he didn't want to do that, he could purchase from other growers the right to leave his acreage intact in which case the other growers had to remove an equivalent additional amount. The other approach that most countries have is with subsidy, where they subsidise the removal of certain areas, but in both instances no control of planting comes into effect. The main reason in each case is to improve efficiency; to remove a portion of an area encourages the grower automatically to remove the inefficient portion, and similarly with subsidy.'

H. Brown

'The only thing I can say is that I don't know of any plan, certainly within our Federation, for the control of plantings. I think we have got to realise with producers in New Zealand that this is just not on, because Government has said quite clearly and in black and white, that anybody must have the right to produce what he feels like. This is apparently a fundamental concept of Government and I think it is a waste of time trying to change this, so that any form of control envisaged has got to be built around this concept. The scheme that will be before you tomorrow does in fact honour this concept. What it does do is to make it more difficult in times of surplus production for you to sell some

of the lower-grade produce, which in turn is a way of rationalising production. If a grower finds he has unsaleable produce, he quickly realises that perhaps if he grew only half as much he would then be able to sell the lot.'

Schroder

'I should emphasise that the example I mentioned was only one of a number of alternative approaches towards more orderly marketing. Mr Thiele mentioned a production control measure that economists call 'negotiable quotas'; you can produce as much as you like, but you have to buy the right to do so. The New Zealand egg producers have gone in for a scheme of this type. This is a more extreme form of organisation than a marketing order. There is a whole continuum of alternatives and the point I would like to make is that you should be aware of these if you are considering any reorganisation of your industry.'

Comment

'A form of production control has worked in the Nelson district with the hop industry which has had a production quota system of control for some years now. It is basically the same as Mr Thiele has mentioned. If a grower wants to increase his area, he should have to buy the rights from some existing grower and a new grower is unable to come into the field of production at all now. This of course would be somewhat different to the berryfruit industry which is spread right throughout the length and breadth of the country. The tobacco industry is very similar to the hop industry in the Nelson district at the moment.'

Question

'Regarding Mr H. Brown's 'wheel of fortune', my observation is that many of those who have fallen off in the last two years in the berryfruit industry deserve to have fallen because they have not applied themselves in the manner which is necessary to be efficient. I would like to ask two questions:

- (1) I would like to know something about Mr Brown's N.Z. Data Co. Ltd. I have seen the name before but I really do not know what you specifically do and why, and
- (2) I would like to know if you have done any research into any other horticultural crop?'

I. Brown

'N.Z. Data exists to open lines of communication between people who make things or sell things to the people who in fact buy them. If you want to think of me in a nice simple form, think of me as a Trade Union secretary for a million housewives acting as their spokesman except that it is the producer who pays me and not the housewives. I have not done any specific horticultural research. I was involved in a study of 400 market gardeners for the Vegetable Growers' Federation about 1963 where we did a survey to describe the industry, asking the sort of questions outlined this morning in the agricultural field. Apart from that we have organised surveys of farmers regarding what sort of appliances they wish to buy and how they would use it and we have also done work in rural areas about other products sold to farmers, like petroleum products, weedicides, pesticides, and so on. There is no essential difference in going and asking a cross-section of farmers what opinions they hold or what practices they adopt about something any more than asking a housewife about what food she chooses to buy and what attitude she has to it. In its simplest form, it is just going out and

talking to several hundred people who are very carefully chosen so that you can come back and say 'I have talked to x% of berryfruit growers; therefore all berryfruit growers think this thing, or x% of housewives, therefore all housewives think this sort of thing'.'

Comment

'There is a definite place for market research and we mustn't lose sight of the fact that the market promotion side of it is possibly very much more important. There is a story of a boot manufacturer who was exporting, and having reached saturation point in most of his markets, decided to try the African market. He called the market researcher in and told him he would pay him on results and the researcher said 'That would be quite all right; what market do you intend to exploit?' and the manufacturer said 'Africa'. The researcher said 'Oh, to hell, nobody there wears boots' but the manufacturer said 'Well, that will do me fine; if nobody there wears boots.' Selling must be looked at from both points of view and I don't think you should lose the balance between research and sales promotion. In a lot of cases the sales promotion side of it will look after the research on its own.'

I. Brown

'My point about that is 'yes', there may have been a little too much talk this morning about market research and not enough about the end use of the results for the planning of an industry strategy.'

Question

'Perhaps co-ordination is the key point?'

I. Brown

'Dr Schroder made a point I would like to examine. He said that the demand for strawberries was inelastic. It may have been but I would be inclined to dispute that this is necessarily true in the future. I don't know why (skipping the processors and the export markets) housewives buy strawberries for puddings. I don't know what substitutes she had in her mind, but peaches and ice-cream are obviously some of the things that you are competing against. If I knew what you were competing against in general; if I knew what it was housewives like and dislike about the product that you are producing; if I knew what she liked and disliked about where she could buy it, the way it was packaged and if I knew how she regarded the price for your product versus the price for peaches and ice-cream, we would be in a very good position, not only to mount a promotional campaign, but to mount a promotional campaign with rifle accuracy instead of shotgun accuracy. But it was Dr Schroder this morning who mentioned the marketing mix; production, means of distribution, price, who uses it, what it competes with, and methods of affecting other people's decision making. These are all part of the marketing mix and yet one should not be thought of without considering other things in conjunction. Co-ordination is a point very well made I think.'

Question

'I would like to make the point that the Dutch horticultural industry has an extremely efficient market intelligence service and research bureau which costs each horticultural producer about 1% of his gross output. Does the panel have any idea what other industries spend on market research or market intelligence in relation to their gross output?'

I. Brown

'No, I cannot answer the question and I don't like the question. The reason I don't like it is that I don't like setting expenditure budgets in terms of fixed percentage of gross totals. I believe that expenditure ought to be spent in solving problems related to set marketing goals. It is very easy and I know one or two industries who are in this position at the moment, where they spend - for the sake of argument - 0.5% on market research whether they need it or not. You know the old story: 'that is what we have always done, that is what we'll do'. Some years you don't need it at all, two years later you need to spend 2 $\frac{1}{2}$ % because that is the sort of problem you have to solve that year. I think it would be incredibly difficult to set percentages, and I think a more effective way would be say '1 year, 2 years, 3 years, 4 years from now we want to have accomplished these goals. We reckon it will cost so much for each goal and start accordingly'. Then if it is too much, ration the goals.'

Comment

'I did not mean to imply we should spend a certain percentage, I just wanted to have some idea of what is spent.'

I. Brown

'I am sorry, the only example I can think of is the Egg Board Annual Report. We would get some indication there of the marketing advertising research costs.'

Question

'You mentioned previously that proper research could cost every grower a sum of \$20.00 over a period of three years. Have you any idea what percentage that would be of his income?'

I. Brown

'I haven't got the vaguest idea, but I presume that you will spend more than that on cigarettes and tobacco or on any other particular vice.' (Assuming a gross income of \$20,000, this would be .1% of gross income, or with a net profit of \$5,000 it would represent .4% of net profit. Ed.)

H. Brown

'It just remains for me to thank you for your participation. I feel you have made it a lively discussion.'

Section 3

BERRYFRUIT

MARKETING COSTS

Professor W.O. McCarthy : leader

REDUCING MARKETING COSTS

Professor W.O. McCarthy
 Department of Agricultural
 Economics and Marketing
 Lincoln College

Our section topic this afternoon is concerned with reducing marketing costs.

That is the costs which occur once your berryfruit have disappeared out your gate but which you have to meet out of your cash returns from the fruit.

We're no longer concerned with consumer demand as such. We take this as being real buoyant having been stimulated in a satisfactory way by suggestions put forward by previous speakers and all the surveys which have now been done and acted on.

Right now we're looking at ways of saving a few cents a pound along the marketing pipeline. These savings of course mean that your net income must be higher.

Simply put, marketing costs (leaving aside consumer behaviour) are comprised of

Transportation
 Processing (including storage)
 Distribution (wholesaling, retailing)

Or we can say

Physical aspects
 Bargaining aspects?

I will be dealing mainly with costs of transportation and processing.

Mr Eric Hunter and Mr D.J. Haigh mainly with aspects of wholesaling and retailing

Mr Hunter as you know runs his own export business and has had wide experience in selling berryfruit in Australia.

Mr Haigh has a sound appreciation and insight in grower-processor relations.

In order to say something sensible about reducing marketing costs, I need first have data on two questions:

1. What are the actual costs involved?
2. Where do they occur?

Let's look at the second question first.

My information is that there are

700 berryfruit growers
 1,700 acres cultivation

producing

7,000 tons of fruit

of which

4,500 is strawberries

1,500 is raspberries

Of the 7,000 tons

4,500 sold fresh

2,500 sold processed

Of the 7,000 tons

6,000 sold within New Zealand

1,000 sold overseas

So my first suggestion is

Put most market research into consolidating your home base for fresh fruit before spending too many resources on overseas markets.

You might think it to be socially desirable to be known as Boysenberry Bert or Strawberry Sam, the jet set berryfruiterer flying to far off places with your punnet samples. However, first secure the local market because it will provide finance for your overseas ventures.

Now what about my first question?

What are the actual costs involved?

Until you are thoroughly familiar with their precise nature and relative importance you're not in a sound position to tackle them.

I've handed out a sheet on strawberry costs and margins. (See Table I, page 70)

The first thing I want to emphasize is that the costs and margins relate to a single grower, the College, and will undoubtedly differ from costs and margins of some of you.

This is unimportant for the purpose of our exercise which is to illustrate the components and relative importance of costs and margins.

With this information we can start thinking about ways of reducing costs.

Notice first that most of the costs occur on the farm and not between the farm gate and consumer.

My brief does not include discussing these but you think about it.

Now what about packing materials?

TABLE I

APPROXIMATE COSTS AND MARGINS - STRAWBERRIES

(Based on data from the Horticulture Department and
Mr G.W. Kitson, Lincoln College.

Note: The figures are for discussion purposes only
and are not representative of all production and
marketing conditions)

	<u>SYDNEY</u>		<u>CHRISTCHURCH</u>
	<u>Fresh</u> cents/punnet	<u>I.Q.F.</u> cents/lb	<u>Fresh</u> cents/punnet
1. Growing Cost	3.5	4.6	3.5
2. Picking Cost (labour and overhead)	4.6	6.1	4.6
3. Packing Labour	3.8	.5	3.8
4. Packing Materials	4.4	1.0	3.5
5. Freezer (running and overhead)		.9	
6. Cool Store		1.1	
7. Transport (including exit/entry fees)			
Internal	1.2	1.0	1.0
To Sydney	9.5	4.6	
At Sydney	.2	.2	
8. Commission New Zealand	1.0	1.0	2.7
Sydney	3.5	2.7	
9. Other	.3	.3	.4
10. Wholesale Price	35	28	27
11. Retail Price	50	45	40
12. Margin Grower	3.0	4.0	7.5
Total Cost	32	24	19.5

We know

Punnet	1.8 cents
Rubber band	.1 cent
Cellophane	.4 cents
	<u>2.3 cents</u>

Is there any way of reducing such a cost? Is a punnet what the customer wants? Ideally should it be larger, smaller? Could it be made more attractive? Could it be made of some other material? Having answered these and related questions with the help of consumer research and decided on the ideal package, we then try to lower the cost of the package by

- Co-op buying
- Individuals buying in bulk
- Buying for cash at a discount.

Key to these practices is grower co-operation.

Next we come to processing.

For I.Q.F. this involves freezing and storage for some time. I've assumed six weeks in this case.

Now processing plants have one thing in common. This is the larger the throughput, up to a point the lower the cost per unit of throughput.

Economies of scale or size.

U shaped average cost curve.

For example we've been doing work on size of wool selling centres in New Zealand.

But you have to be careful about fewer and larger because interested in getting cost from farm

- to plant
- to customer

as low as possible. So really concerned with transport + processing costs together.

Commission might be eliminated by direct grower to retailer or grower to processor.

Don't think we can make a general statement here.

There are arguments for and against direct selling and would need to consider each case on its merits.

Certainly the expertise of a good agent, particularly in overseas markets, is invaluable and if he can influence the wholesale price favourably then it might even be sensible to increase commission.

Last item is transport - significant factor in overseas markets. Need to think in terms of

- Rationalizing collection to market
- to airport.

Contracts with air and sea carriers.

Established carriers don't always give the best service.

Pays to collect all the facts.

For example know that

Sydney-Christchurch air freight
reduces as volume increases.

Under 250 kilos	32 cents
Over 250 kilos	25 cents

Again as in processing we come back to this question of size of consignment affecting costs.

I conclude that an important aspect of reducing transport and processing costs is the question of volume handled.

Permit me to summarize what I have said.

1. Costs incurred on the farm are the major components of total cost and growers should concentrate on these.
2. Marketing economies are possible in processing and transport but require organization and co-operation among growers.
3. The name of your organization is the Berryfruit Growers' Federation. Be expert growers and employ other experts to advise you on marketing.

MARKETING PROBLEMS IN OVERSEAS AREAS

Mr E.O. Hunter
Financial and Management Consultant
Christchurch

I was indeed pleased to receive the kind invitation of Mr Graham Thiele, not only to attend this Seminar, but to participate in it and to deliver a paper on Overseas Marketing problems. In doing so and as the ninth speaker, I am sure that you will understand my fear that some of my comments may have already been covered and that you will be asked to listen to the same story, perhaps cooked in a different way, but served up for your consumption in relatively the same fashion.

This factor naturally does not, I hope, decrease any value that you may get out of the overall Seminar, because the subject of the Seminar - viz. Marketing - is such a large one that one could listen for some time to an explanation of its many facets and must surely gain value by appreciating more fully, the terrific scope of the subject.

In preparing this talk, I have endeavoured to present to you in a practical form the problems in overseas markets, because I am sure that up to the present, many of you as growers, have not had the opportunity of examining this sector of the industry in any depth. In fact, up to the last two or three years, apart from the dispatch of fresh dessert strawberries to Australia, there has been little experience in handling these various markets.

Let me say right from the outset, that I am confident that if the industry can meet and overcome the marketing difficulties, which have been encountered over the last two years, there is no reason why you as growers, should not move forward into the future on a successful and profitable basis. My experience with many industries has shown that over the past twenty years, there has been a dramatic change in the general structure and approach of business generally. Where previously, production was looked upon as the determining factor in making sales, this has today largely disappeared and I am certain will disappear altogether in the very near future. The consumer is the person who determines to a very great extent, the type of goods required, their price, quality and delivery date. There are, of course, exceptions to this and I am not discounting the tremendous effect on sales of a highly concentrated promotion for certain goods. I do feel, however, that in your industry, this exception does not apply to any great extent and for that reason I put you in the class of the majority of industries where the Consumer's desires are paramount.

To simplify the position of marketing in the overall business cycle, let me define it as - 'the area between the grower or producer and the consumer'. Unfortunately, largely because of a lack of appreciation of the great importance of marketing, many people still look upon it as selling and nothing else. I would suggest that in your industry, because of the relative ease with which you have been able to dispose of your products in the past, no thought has been given to the changing pattern of business, nor the need to employ specialists who would be able to fill the gap, mentioned above, without your being concerned with it, except to provide the right type of product to meet the consumer. I have endeavoured to schedule a number of the more important items, which make up what could be regarded as the various stages through which marketing moves. Let us have a look at these in some detail and then perhaps relate them to the various problem areas that I mentioned in my introductory remarks.

(a) Market Research

Up to a few years ago it was generally thought that the Market Research Specialists were the 'Confidence Men' of industry. You have probably all heard of some of the outrageous claims that have been made by these people in the past and unfortunately there have been some disastrous results. Probably the most outstanding one was the famous Ford Edsel motor car, where it is generally recognized that Market Research amounted to something in the vicinity of one hundred million dollars, yet the car when it was produced was a complete flop. This, of course, is the exception and should not be taken as anything like a standard guide to the work done in Market Research. The market place is where you are going to be able to dispose of your product and unless you have sound advice in this regard you will assuredly run into serious difficulties sooner or later. As a commentary on this, let me mention that the overseas market for frozen strawberries has changed dramatically over the last eighteen months. No longer is the consumer in this case, the processor, prepared to accept block frozen strawberries. He now requires free flowing fruit.

(b) Type of Fruit

Without being an expert in the various types of fruit grown, it is obvious to me that different types suit different markets. I believe that Auckland strawberries, because of climate, are different from the South Island fruit and I know that this applies to many other natural products. The overseas buyer wants the best type of fruit for his particular market.

(c) The Most Economical Fruit to Produce

The skilled technical personnel at Lincoln College and other places have undoubtedly already supplied you with this type of information. Quite clearly, it will be basically unsound for you to grow fruit that perhaps might be acceptable overseas, but is not economical from your point of view. By this I do not suggest that you should simply change to another type. It may be that you have to change your variety rather through the blending of two types, than a complete change. An example of this of course, is something that takes place in the wool market at all times. Fortunately, in this country we produce a cross-bred wool which is most desirable for the carpet trade. In Australia, their fine wools are not acceptable nor are they economical for this trade and they have encountered innumerable difficulties and will continue to encounter these in the future.

(d) Condition and Quality

I need hardly elaborate on this, because automatically the purchaser always requires the best quality and condition of fruit. Unfortunately, I have been told of many instances on overseas markets where growers have tried to disguise unsatisfactory fruit by packing the better fruits on the top of the packages. This can only lead to serious difficulties.

(e) Packaging

Although it may be easy for you or for me as an exporter to package your fruit in a certain way, this may be totally unacceptable to the consumer. As an illustration of this, let me point out that free flowing strawberries are in great demand in the supermarket in Australia, provided they are packed in eight ounce packets. This trade, however, is gradually changing and although there is still a demand for these packs, the

consumer is concerned that he or she is paying a price far in excess of what he would pay if the fruit were delivered in bulk and so we see the change to bulk bins in the large stores and the consumer purchasing in one pound or two pound loose packs as they want them.

(f) Storage

I am always inclined to feel that the producer of any goods, whether they are fruit as in your case, or manufactured articles, completely overlooks the vital necessity of proper storage. Even in manufacturing industries, one finds considerable expansion in production plans without providing for the necessary storage. I would suggest that in the case of your goods, this is probably the key point which must be given constant examination and investigation. If the goods have to be frozen as most of them are, they must be delivered to the freezer in a certain condition and they must be kept at a temperature which will ensure the continued good condition of the fruit. You must realize of course that this does not only mean storage at this end, but also handling and storage facilities at the consignee's end. He is vitally concerned to see that his substantial purchase is held in correct storage at the correct temperature until the fruit is converted into the finished product for sale.

(g) Sampling

This demands expert attention at all times. After all, the sample is your only means of bringing before the consumer, the type of product that you have available. Temperature, packaging materials, distance from the point of dispatch, are only a few of the factors that must be taken into account.

(h) Selling and Price

We must all surely be aware of the modern approach to selling. At a time when competition, not only from other fruit growers, but from other producers of food products is becoming intense, selling is a highly skilled operation. A salesman must not only know his product completely, but he must be able to understand the prospective buyer, his approach to the purchase of goods and also the standing of his Company and any restrictions that might be placed on him when making his purchases. It has always been understood that the simple approach to selling is that you must be able to place yourself in the position of the prospective buyer and think as he would think, not only of the product, but also of the price. At a later stage I shall deal more fully with the question of price, but you must realize that in a competitive world there is a limit to the price that can be charged.

(i) Delivery

When one is selling in a market overseas, which is also supplied by producers who are located even a matter of miles from the buyer, a high degree of flexibility is necessary when discussing delivery dates. Not only must facilities for storage, shipment, transport, etc., be available, but equally the resultant increased costs have to be taken into account. In other words there is a limit to the question of spread delivery as there is no good purpose in offering terms which would automatically eliminate a reasonable profit margin.

(j) Continuity of Supply

No buyer is anxious to deal with a vendor who cannot maintain continuity of supply. I could quote many instances of industry completely apart from your particular industry, where because of present day liquidity problems, there is an increasing demand for the

shortest possible delivery dates and regular supply of materials or semi-processed goods.

You have just completed listening to an excellent explanation by Professor McCarthy on 'Cost Reduction from the Farm Gate to the Consumer'. If there is one area where I am satisfied considerable savings can be made in all industry, it is in the transportation and storage of goods. Cost reduction should be automatically accepted by everyone if they are to continue to expand and grow successfully. Appreciation of cost reduction has been demanded by the changes that have taken place in business generally and the increasing cost in every facet of the business cycle. You will probably be well aware that in basic costing there are only three principal areas into which all costs can be subdivided:

- (a) Labour
- (b) Material
- (c) Overheads

Your industry by reason of the need for extensive manual work, is forced to bear a high percentage of labour costs. Unfortunately, these costs per unit or per pound of product, continue to increase year by year, but I say quite definitely that your only hope of overcoming them is to improve your efficiency at all times and possibly to use the latest and most modern method in harvesting your crop. As you know, Lincoln College in their Horticultural Research Division, has prepared figures in depth covering all aspects of the growing and picking costs of fruit, etc. I have used these figures in assessing the proportion of the final price to the consumer, which can be classified and readily understood. These figures show that in the case of a selling price of block frozen strawberries on F.I.S. Sydney terms of 22.5 cents per pound, a simple subdivision is as follows:

Production	12 cents
Marketing	7 "
Margin	3.5 "
	22.5 cents

It would be beyond my knowledge to question the figure of twelve cents as production costs, but no doubt you will have the opportunity of challenging this at a later stage, when the forum is held. I can, however, explain the build-up of the costs in marketing:

	<u>cents/lb</u>
Packaging	1.0
Cartage into store	.2
Storage	1.3
Sea Freight	3.5
Duty, etc.	.3
Agency	.5
	6.8

These would represent minimum figures and unfortunately, from day to day, we are constantly being advised of increases in almost every item. You will see from this that a simple calculation can be made, whereby it can be accepted that the actual cost ex store and before any margin is taken into account can be accepted as two-thirds production and one-third marketing. This proportion must surely indicate to you the great value of the marketing area, because simply stated it means that if there should be any fall down or collapse in the marketing side, the two-thirds cost incurred by you in production will also be lost and the amount paid out (and you must recognize that this money has actually been paid out by you) will not be recovered.

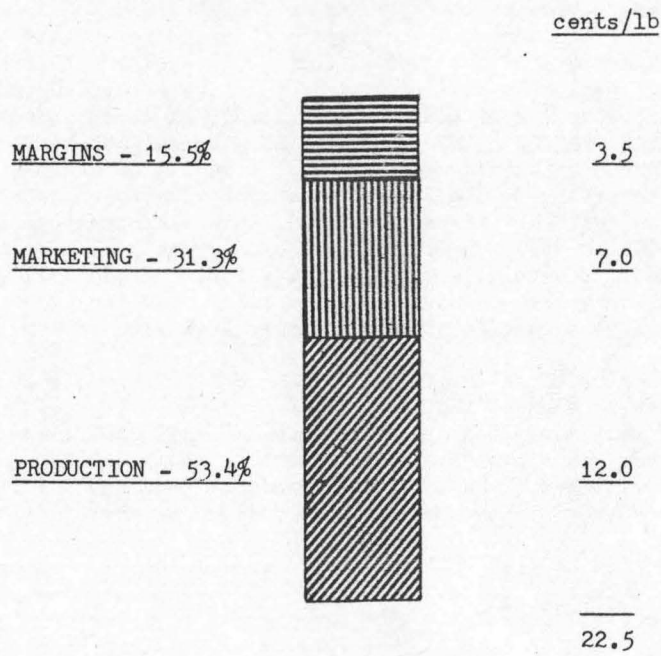
It would be impossible for me in giving a talk of this type to go into any great detail on the modern approach of Cost Reduction to the close co-ordination of Production and Marketing or to the relative importance of every individual item, but I would like to impress upon you the fact that is today inescapable, because of changed conditions, that you should now regard the market side of your whole operation as the key point from which success or failure will emanate.

To illustrate even more forcibly the breakdown of the cost structure referred to above, I have shown in Figure I the proportion of the final selling price to a processor.

FIGURE I

SELLING PRICE BREAKDOWN

STRAWBERRIES BLOCK FROZEN : SYDNEY



As a general comment, let me say in addition to the points I have made above, you must recognize that trading conditions are vastly different today to what they were even three to five years ago. All of these factors come back to basic costing and must be recognized not only by the grower or producer, but also by your marketing specialists. Changing demands by consumers, which are revealed by market research, must be accepted and there should be no grower who feels that 'What was good enough in the past is good enough for the future'. There is a saying in business management that any organization which is satisfied to stand still must go backwards.

Competition is now so intense that the up and coming dynamic organizations are literally pushing out those, who for years, have felt they commanded a high percentage of the market and therefore had no reason to change their thinking. You know in your own industries that changes have taken place in mechanical handling and transport, also in the automation now applied to the picking of fruit. If you do not accept these and change your procedures accordingly, the best marketing in the world cannot save you from complete failure. At the same time you must recognize that in this world of specialization, you as growers must look to your marketing men to assure you of success in your own area.

As a further explanation of the points already made, not only in the area of marketing, but in the overall cost structure from the initial planting of your berryfruit plants to the final delivery to the consumer, I have set out in Table I as many of the stages or Cost Centres, as is possible under present circumstances. I have done this in an endeavour to emphasize the point which I am constantly making to growers, that just like in every industry you have to accept the fact that there is great movement between the planting of your plants and the final delivery of your fruit. Each stage in cost language is looked upon as a Cost Centre and you must accept the fact that from stage to stage, or cost centre to cost centre, additional charges are being added.

It is therefore paramount that you keep a ready record and understanding of the way in which these costs keep adding up. It is not for me to explain to you what you should do in your particular area of the overall berryfruit cycle, but perhaps I can illustrate my thinking in this regard by stating that if you have a throughput of say twenty ton of fruit or 44,800 lb, a saving of even one cent per lb in your production costs will mean an overall saving of \$448.00. My experience as a consultant has proved to me that in general, once a direct attack is made on costs, a saving of at least 10% can be made at any one stage. Reverting to the figures which were quoted on page 74 and estimating that the production costs are 12 cents a pound, this means that on the production of twenty ton or 44,800 lb, your production costs add up to \$5,376. A saving of 10% is of course \$537 and this surely is worth striving for. I can tell you that in a number of cases where I have worked on Cost Reduction plans, the savings have amounted to well over 10% and actually in manufacturing industries have reached 40% to 50%.

This saving can be effected without a great deal of trouble and under present conditions I sincerely suggest that you have a very close look at this side of the operation so that your marketing specialist can have his hand strengthened when he is asked to market your goods overseas. To revert to Cost Centres, let us have a look at Table I. As you will see, I have listed various charges and I think that all of you, probably in your own experience, could add on one or two more.

You will see, in the case of fresh strawberries, that this adds up to ten operations and is a greedy consumer of costs. The same happens in the case of block frozen, which is unfortunately the 'Cinderella' of the industry at the present time. Here we have eleven operations. In the case of free flowing or I.Q.F. strawberries, there are thirteen

cost centres. If nothing else should come from listening to this paper, I would earnestly suggest that to ensure success in the future, you have a close look at each one of these cost centres and their application in your own particular case.

TABLE I
COST CENTRES : STRAWBERRIES

<u>Fresh</u>	<u>Block Frozen</u>	<u>I.Q.F.</u>
Growing	Growing	Growing
Picking	Picking	Picking
Weighing	Weighing	Weighing
Sorting	Packing and Packing Materials	Preparation and Freezing
Packing and Packing Materials	Delivery to Cool Store	Freezing
Delivery to Market	Storage	Packing and Packing Materials
Delivery to Airport	Sampling	Delivery to Cool Store
Air Freight	Sales Expenses	Storage
Collection Costs	Freight - Sea	Sampling
Sales Commission	Duty and Clearance Costs	Selling Expenses
	Agency or Distribution Fee	Freight - Sea
		Duty and Clearance Costs
		Agency or Distribution Fee

Marketing Problems

The following list summarizes what I consider to be the areas in which many of the marketing problems are today encountered.

- | | |
|---------------------------|------------------------------|
| 1. Type of Fruit | 2. Size of Fruit |
| 3. Storage Facilities | 4. Packaging - Type and Size |
| 5. Pricing | 6. Deliveries |
| 7. Freight | 8. Finance |
| 9. Customer Credibility | 10. Goodwill |
| 11. Sentiment in Business | 12. Confidence |
| 13. Market Expansion | 14. Overhead Costs |
| 15. Margin of Profit | |

I am sure that a quick run through these items will more clearly point out to you the difficulties that I have encountered and I am sure those met by all exporters. You may say that my experience has been that a number of these problems have been promoted only because of a lack of liaison between the grower, the marketing specialist and the consumer. In other words the gap which I refer to above which is filled by the marketing specialists, has not been handled efficiently and all parts of the business operation have suffered accordingly. You will all be aware of the losses which have been incurred over the past season, principally because of an atmosphere of doubt and distrust, which has been raised in the minds of the Australian buyers through the inadequacies of the New Zealand exporters in the past. These doubts must be cleared as quickly as possible and although endeavours have been made to do this at Government level, nothing will ensure success like improved efficiency. The buyer must have his confidence restored, not only in you and your product, but in the exporter or marketer to deliver the goods at the right time, at the right price and in the quantity and type required.

If I might finish on a note which I feel must apply to the whole seminar, it is that your industry must face rationalization in an urgent sense. This does not only apply to the marketing side of the industry, but also to the grower as well and unless you do so, I can see no soundly based future for your industry. You will all be aware that it is the weakest link in the chain that determines the strength of the chain and there is no point in efficient growers or efficient exporters continuing to operate, if, within the group or chain, there are a number of weaknesses, which can drag down the whole industry and destroy it.

These thoughts may sound rather alarmist to you, but they are basic and fundamental and I would say the same to any other industry if I were facing them. The future results are in your hands and you are the ones who should be most vitally concerned with the future.

OUR EXPERIENCE WITH EXPORT MARKETS FOR BERRYFRUIT

Mr D.J. Haigh
D.J. Haigh and Co. Ltd
Timaru

There appears to be a very good demand for strawberries. This would be the most popular berryfruit as far as our experience with export markets is concerned.

At present most strawberries appear to be exported block frozen. The maximum F.O.B. price for block frozen strawberries, as far as we are concerned, would be 15 cents per pound. This means that at the most, we would be prepared to pay 9 cents per pound for the fruit delivered to our factory.

There is a very good demand for I.Q.F. strawberries but there are limited supplies available from New Zealand. I.Q.F. strawberries would command a premium of 6-7 cents per pound over block frozen strawberries and could be sold at 21 or 22 cents per pound F.O.B. For a high quality dessert fruit, delivered to the factory, we would be prepared to pay 15 cents per pound for the fruit.

With strawberries it must be understood that Japan has very good local supplies and that there is a lot of competition from fruit processed in Mexico and the U.S.A. The U.K. market is out because of the high shipping freight involved and the fact that they have low priced supplies available from the Continent.

The varieties preferred by overseas buyers would be Gauntlet and Cambridge.

Raspberries

There is quite a good demand for raspberries but once again very few supplies are available in New Zealand that have been processed as free flow.

Present price indications would be approximately 20 cents per pound F.O.B. for block frozen, making a maximum we would be prepared to pay, as a processor, of 15 cents per pound delivered to the factory.

For high quality fruit, freshly packed, with no white tips or green parts showing, which could be processed by a mobile installation on the farm, a 4 cents per pound premium could be obtained on the export market, making a maximum F.O.B. price of 24 cents per pound. To encourage a processor like Haighs to set up to process fruit on the farm, an agreement would need to be reached to purchase the fruit at about 14 cents per pound.

A contracted supply of raw material is essential and every endeavour should be made by growers to supply their commitments.

It is very important that when processors undertake to supply overseas markets, that they actually supply the goods. In many cases consignments are sold before processing seasons. Snap freezing is very important as the longer the fruit takes to freeze, the poorer quality results.

Standards for export of frozen berryfruit would be of considerable help to ensure that this country markets a reputable product. Our competitors such as the U.S.A., have standards and processing methods to ensure top quality.

General Comments on Export Markets

During my recent overseas visit, I was shown a number of samples by overseas buyers of New Zealand berryfruit which were of an extremely low quality. Both strawberries and raspberries that had been exported as free flow had obviously not been processed correctly and were in large frozen clumps. In addition to this freezing problem, the fruit was, in many cases, either over-ripe or green and the comments passed on by the overseas buyers indicated that they considered all New Zealand berryfruit production as being of an extremely low quality.

I understand that, at the moment, the Australian growers are complaining that New Zealand berryfruit is being dumped on the Australian market and more will undoubtedly be heard from the Australians in this regard.

SECTION 3 - PANEL DISCUSSION

BERRYFRUIT MARKETING COSTS

Mr J.G. Hudson (chairman)
 Professor W.O. McCarthy
 Mr E.O. Hunter
 Mr D.J. Haigh
 Mr C.W. White

Hudson

'Ladies and gentlemen, I would also like to introduce to the panel, Mr White, Manager of Watties. Professor McCarthy and Mr Hunter commented on cost savings that can be made and I think this is one of the important things that came out of this last session. Now it is a long time since I have sat in a place like this and listened to 30 minutes of such sound common sense; I refer to Professor McCarthy's address. I think the most significant and impressive remark made was that we must get our home market in order first. Three things are written up on the board here - transportation, processing and distribution costs, and I think we could possibly add commission to this, and also stress that understanding and co-operation between growers is essential. We have had Mr Hunter to speak to the Canterbury branch before; he is always a most impressive speaker and a very interesting one. I could perhaps emphasise again that we must face up to economics and ease our costs with improved management techniques. Mr Haigh expressed concern about the low quality of some New Zealand berryfruit and he also recommended that a grading standard should be introduced here, or something along these lines; also to have co-operation between the grower and processor. I now throw the discussion open and call for questions.'

Question

'I would just like clarification of a note I have made here while Mr Haigh was speaking. 'F.O.B. strawberries 9c/lb' Did he say on his farm or on the farm?'

Haigh

'Ex the farm delivered to the factory destined for solid pack processing.'

Question

'Mr Haigh mentioned that when overseas recently he had complaints, specifically in Australia, about New Zealand berryfruit being dumped. Can I ask him what he meant by this and can he put a date on this statement. He would be aware that New Zealand and Australia had held inter-industry talks together with processing interests in January of this year and I thought this problem had in fact been cleared up. I am rather concerned to hear that this matter has been re-opened and I would like him to give some more specific details.'

Haigh

'We receive feed back in the field of market information from our agents, marketers and wholesalers. Our present feed back indicates that small quantities of frozen strawberries have been sent to Australia by various exporters. These exporters have been without frozen food marketing experience and without on the spot liaison. In some cases our information informs us that quality, presentation and packaging have not been up to standard. Unfortunately some of these small lots have had to be sold on arrival at low prices.'

Australian growers watch imports and in the case of small lots sold at below normal prices, are inclined to make much noise at their own Government level. The word 'dumping' always seems to come to the fore, irrespective of the consignment size. At present we understand Australian growers claim they are quite capable of supplying their own market. A full knowledge of marketing, quality control and customer potential is essential.'

Hudson

'I think that growers and processors should co-operate a great deal more with each other. In Canterbury we formed a Blackcurrant Marketing Authority last year and we find that we can work in with the processors very well - I think this is very important.'

Question

'I would like to know what Mr Hunter's opinion is on the potential market for berryfruits and could the market be stable enough to allow expansion of the industry on a sound basis?'

Hunter

'This is a very extensive question because you are covering the whole field and talking about fresh, frozen and other process outlets. Frankly I wouldn't like to comment on the fresh market because I don't know very much about it. We did send a certain quantity over to Australia last year but this was not very successful. With the block frozen, as I mentioned, I think that Australia is dried up; I don't think there is any question about it, within a very short time it will be right out. They are selling block frozen in Australia, but they are offering a ridiculously low price, but I think here there are other markets for block frozen. South Africa and Canada are possibilities, but I don't know too much about demand. We have had a number of enquiries from Japan, but they are buying very cheaply from Mexico and this is really ruling us right out altogether.'

I would say though, that with I.Q.F. strawberries, there is almost an unlimited market, not only in Australia but further afield. In Perth they were importing I.Q.F. strawberries from Poland at 39 cents/lb. It is just ridiculous that they should have to bring them from Poland for a start and I would think from enquiries that were made of me, we could make a handsome profit by selling them in Perth at about 35 cents/lb. I think that these are the fields we have got to go for. I think that the fresh, and the I.Q.F. fields are important but block frozen is out.'

Question

'Could Mr White tell us if he has heard of any interest in blackcurrants from the Japanese market?'

White

'No, but before coming here today, I did make some enquiries from our Hastings office. We have an export division based in Hastings where all our exports are orientated, all the information comes in, and all the prices go out. It appears the possibilities of exporting blackcurrants from New Zealand are fairly remote, at this time. I would just like to tell you at this stage that about 12 months ago, we were exporting products to Japan quite successfully, and making a profit. Six months ago, this profit had been reduced somewhat, mainly because of freight rates. As of now the possibility of export to Japan has been reduced a lot more. Let me tell you that the cost of freight of frozen foods is 5 cents/lb, from New Zealand to Japan, 4 cents/lb from Australia to Japan, and 3-5 cents/lb from South Africa to Japan. The thing of most concern to us is that the export price of freighting from Mainland China to Japan is 1.6c/lb. Now I feel that wooing of Mainland China by the U.S.A. might encourage the production of crops in Mainland China that could be exported throughout the world.

Getting back to the question concerning the possibility of exporting blackcurrants, our company looked at the price of importing blackcurrants strangely enough, just recently, and we could import blackcurrants C.I.F. New Zealand towards the end of last year at 25 cents/lb. Now if you want to do a little bit of calculation and exercise you can work backwards, and see what the F.O.B. price from New Zealand would have to be if we were trying to compete on overseas markets with people who can land blackcurrants in New Zealand at 25 cents. I do not know where these came from but I think they were from the U.K. The possibilities of exporting blackcurrants, in my personal view, at the price we would have to pay to the New Zealand grower is fairly remote.'

Question

'May I ask Mr White another question of clarification. Could he please tell us what form of preservation these blackcurrants have? Were they in SO₂, were they frozen, or were they steam sterilized?'

White

'SO₂'

Question

'Has anybody any idea what boiled strawberry is? I believe there has been an inquiry from Japan for this type of product.'

H. Brown

'Yes, this enquiry has been in New Zealand several times and costings and quotations have been sent out. A boiled strawberry is a heat-sterilized strawberry, in cans either 4 gallon or A10 cans. It has to be a tropical fruit pack; there are certain problems I understand from the canners who can do this type of thing; there is not 100% success in the method of heat sterilizing. Some of the cans may blow up, in fact they recommend that the cans, even though heat sterilized, ought to be kept under refrigeration. The cost, because of the labour involved, the cost of the cans and other packaging, made the product very dear and we were not able to finalise any business with Japan. If there is a processor who could heat-sterilize strawberries economically, there is no reason why this cannot be looked at again. The strawberries are available, but the costs from the strawberries on were just too high.'

White

'To my knowledge there is no processor in New Zealand doing heat-sterilization. You are probably referring to the steri-flame sterilization, where it is a high-temperature, short time sterilization.'

H. Brown

'They were not in fact using this method, although I understand this would be the better way.'

White

'As far as I know, this is about the only method which is satisfactory. There is nobody in New Zealand doing this to my knowledge.'

Question

'Mr Haigh, you quoted I.Q.F. strawberries at 15 cents/lb. The other day I say I.Q.F. strawberries supplied by a grocer in a shop at 27 cents/half-pound which is 54 cents/lb to the consumer against 15 cents to the grower.'

Haigh

'Up to 27 cents could possibly be a retail price for half-pound packs of frozen strawberries in New Zealand shops. Frozen strawberries in small packs do not enjoy a very large market. Processing volumes are low, causing high production gearing costs, distribution costs are high and in general, retailers require larger margins for slow moving lines which take up cabinet space. The small New Zealand base market reflects in the ability of processors to export.'

H. Brown

'A question for Mr Haigh, a question of clarification on something that worries me and I am sure worries many other growers. He mentioned in talking about contract prices, that processors were prepared to pay for commodities. His statement was that 'the processor offers a contract price, nobody has to produce' and he concluded it by illustrating a well-known commodity which has received some publicity, and saying again that 'this was the best price that processors could offer for that particular commodity'. I will accept from Mr Haigh that a processor offers a grower a contract price for a raw material, which is the best price that the processor can afford and beyond this price it would be uneconomical for them to handle this raw material. The raw material is just one of the components in the finished product. Can you explain how processors can argue in this way on raw material costs but when it comes to other costs in that component they argue differently? For instance, the cost of cardboard containers recently went up 12½%. Processors didn't say to the manufacturers of cardboard containers 'I am sorry, but we are paying you the maximum price that we can pay, anything else would make this product unacceptable on the market, we therefore will not and cannot pay more or we will not use cardboard containers'. Another example concerns the unions. The workmen in processing factories received quite a substantial rise, but we didn't hear processors say to the unions 'I am sorry, we cannot pay you any more because any other increase in our components will make this product completely unsaleable'. Now I just cannot understand (I am sorry, I am probably very dumb) why one statement can be made in relation to a basic raw material and does not apply to other costs involved in producing the finished product!'

Haigh

'Processors have had the same grower thoughts put up to them over the last few months by the pea growers. Every effort has been made by processors to hold costs, but they have been unable to restrict increases in wages and charges.

The processing industry has been united in its efforts but unable to hold against other industries giving increases. Labour has been the greatest single cost increase but over average process lines labour costs amount to about 7% of the total costs.

Our small base market of 3 million people, spread over a costly distribution area does not help our export ability to meet overseas competition. Most of our export markets are long distances from New Zealand with heavy rising freight costs. We need export markets to get production volume savings. Countries we are competing with have big local markets within 100 miles of processing plants, possibly eight million people, meaning low distribution costs.

To export we are conscious that there is a limit we can charge on our home market.'

H. Brown

'Mr Chairman, I am sorry, this is not adequately answered. I am not trying to trap Mr Haigh here. I want him to understand that this is a very important fundamental question to an industry which is told nationally, it is told throughout this seminar, is told by the N.Z.B.C., is told by everybody and it feels itself, that it ought to be seeking to increase its production in the national interest and to increase its markets both external and internal. One of the fields in which we can do this is by product diversification and processing diversification, but if we are going to have to increase against the background that Mr Haigh has given us, it becomes obvious at the very outset that it is an impossibility before we start.

You mentioned that labour costs were only 7%, and you mentioned that packaging is a high cost, but you didn't really answer my question. Forget about the raw material costs; what would it cost you to produce and market a 15 oz packet of water where you have no material cost?'

Haigh

'We would have to find a market for frozen water. In the case of frozen peas, an estimate would be perhaps 5 cents less for water, in the bag instead of peas, retail. All processors are trying to get the best possible price for their products and I do not think any processor is earning more than would be expected by capital investors. All processors are extensively researching for new products and combinations. Perhaps better prices might come from these. Our future could possibly be with higher value products, better able to stand increasing freight and export costs. Large sums are being spent towards research. Freight costs on some frozen process lines amount to as much as 1/3 of the price we receive overseas for the goods.

We have not got a crystal ball and can only pay for raw materials in relation to what we think selling prices will be twelve months ahead.

In the future, processors and growers want to keep close together and understand each other's problems and likely future prospects. The maximum research into profitability should be done before speculative crops are grown for processing.'

McCarthy

'I am just on the sideline in this discussion, but from a theoretical point of view, it seems to me that the farmer in this instance has absolutely no bargaining power whatsoever, and the reason he has no bargaining power is because he is not united. If Mr Haigh goes to buy a cardboard box from each of 63 cardboard box suppliers, he is going to be quoted precisely the same price; and this to me is the whole crux of the matter. The farmers just are not organised. They are not a business group and Mr Haigh is dealing with other business groups, and these other business groups say to him 'Right, this is the price and that is it' so what can he do except try and reduce his costs the only way he possibly can, by bargaining with someone who is prepared to lower the price of the product?'

White

'I would like to add something to this topic. We seem to have got on to peas. I don't know what the connection is between peas and berryfruit except the shape and the principle. Mr Brown asked the question 'Why can't we pay more?' I would like to put our company's views, if this is of interest to the meeting. Watties came to Canterbury primarily because there is an export market (or there was an export market) for peas and we could grow peas in Canterbury at a lower cost than we could grow them in Hawkes Bay. Costs are higher in Hawkes Bay principally because we would be competing with different varieties of raw materials which are grown in Hawkes Bay. We are quite open about this. We have spent \$4 million on the factory in Christchurch mainly based on the export of peas, and when it comes to the price we can pay for any raw material that we are processing, this is all based on export. We have two factories in New Zealand that can produce and are producing all that New Zealand can absorb in most lines, whether it be in berryfruits, peas, canned goods, pet food or whatever it might be. This is based mainly on an export industry, and if it is going to be a viable proposition in the future for Canterbury, we have got to be able to export. We are faced with all these additional costs, freight, packaging, labour, and all other costs, and if we are going to export and are going to keep this factory going, we must be able to get the product at the right price. Now, we don't want to pay any more for the raw material than we have to. We think possibly the answer to this is to try and get a greater yield per acre. This is the only answer we can see. The grower has to get the same return - if he has got 10 acres and he is getting \$100 an acre, he is getting \$1,000. Now if his price drops down to half, he needs to get twice the yield off that area, and we at the present time, with the help of Lincoln College, are investigating this and conducting experiments on our own and other farms. We hope as a result that it will be possible to produce a substantially greater yield per acre for peas which will give the grower a greater return per acre, and to us this is the only way to go.'

Hudson

'I have always stressed, among other things, that management techniques must be improved. I have spoken to one or two people who are successful and very efficient growers. Naturally they know other pea growers and in speaking to these people, have asked them about their rotation. These people have stared blankly at them and asked 'what is rotation, I have no idea?' I think this is very much to the point. Techniques have got to be improved 100% and this is part of the answer to it all.'

Goble (Vegetable and Produce Growers' Federation)

'I agree that a processor will naturally buy his commodity whether it be packaging material or raw material at the cheapest price he can get it. I also agree with Professor McCarthy that perhaps growers have been slow to organise. I think Mr Haigh would contradict him when he says that pea growers are not organised.'

There are matters here that growers find very difficult to understand; these are the high costs of export, the problems involved in export and the relatively low price that produce has to be sold at. Reverting to the pea issue for a moment, in the last four years up to 1970, the F.O.B. price of frozen peas on overseas markets rose about 41%. In February-March of this year there was a rising export market and at this stage the growers were asking for consideration of a better return. In February or March this year also the Price Justification Authority authorised 30 oz packets of frozen peas to be sold at 51 cents. Now if anybody can tell me of any letter to the paper, of any complaint to Government, any resentment or criticism from any consumer interest whatever, I will hand him a dollar. If anyone can show me that any processor in fact even proceeded to charge 51 cents I will also hand him a dollar. These are the factors that growers find very difficult to understand. In theory, Mr Hudson and Professor McCarthy were correct in that if you can lift your management and lift your yields this is part of the answer. But I think the representatives of the processors would agree that there have not been any dramatic advances in pea yields anywhere in the world and certainly not in New Zealand in the last ten years. The Director, Crop Research Division, recently forecast an increase in yield of 15% in the next ten years as a maximum.'

White

'First of all Mr Goble, I would like to say that the price of peas did go up 6 cents, to 51 cents, but it was still a lower price than they were sold at in 1962.. That is fact and I will leave it at that. Now, as far as the point about only 14% or 15% increase in yields is concerned, we are hopeful that we will be able to increase this substantially from the evidence that already has been gathered here at Lincoln and presented to us; these are commercial trials we are doing this year. We have high hopes of substantial increases from the field trials this year and if this occurs we will be very happy to make this known to everybody of course.'

Question

'Why did Professor McCarthy suggest concentrating on the local market in preference to the export market? With the expansion of the industry, surely it is in the export field that the greatest degree of expansion can be obtained?'

McCarthy

'Well, I am just basing this on the statement which I handed out. This is for strawberries alone of course, but the margin for the grower here is 7.5%, that is 7.5 cents in the dollar on the local market. Now admittedly of course you are not going to be able to have everyone double their production and still get a margin like that, but it seems to me that if this is your major market currently and given the great uncertainties of the export market which Mr Hunter has pointed out, you have got to have a secure base to work from. I far prefer to have a stable, well-organised local market here and probably some degree of rationalisation of production and marketing. Get yourself organised in New Zealand first and then you are in a sound position to move overseas and explore these other relatively uncertain markets. You see, this is where most of it goes in any case, isn't it? This is where the major part of your income comes from. Well why ignore, say 6/7ths of your income because hopefully you can sell a few hundred tons in Australia or somewhere else. Organise; be certain of your 6/7ths first. Now you say you are certain of this, but I do not believe that, because it seems to me that you are not very well-organised production-wise, or market-wise or in terms of knowing something about consumer tastes and preferences and trends in these, or in terms of cost reduction in areas that we are talking about here. But when these matters are all fixed up, then go overseas.'

Hudson

'You would be saying in a word that we are talking a little bit too much about exporting whereas we should be talking more about consolidation?'

McCarthy

'Well, my feeling just as an outsider is that emphasis here in the discussion today has been on export marketing and yet looking at the data I find that 6/7ths of your market is the internal market. This just strikes me as a little odd, that is all.'

Hunter

'You will appreciate in my talk that I did not have time to cover the question of costing for export to any extent, but I agree entirely with Professor McCarthy. As you probably know, you can get down to marginal costing, but you must have a soundly-based domestic market first. Expenses can be analysed into Fixed and Variable Expenses and no profit can be realised until the annual fixed expenses are recovered. If you can recover fixed expenses such as rates, wages and packaging and that sort of thing, on the domestic market, then you are in a position to go on the export market and reduce your price, and still earn the same rate of profit as you would on the local market at a higher price. Now this is why you must have a soundly based domestic market before you can have a look at the export market. You would be surprised at the reductions that can be made in price and at the same time realise the same profit return. Somebody at the Canterbury group questioned me on this and said that this meant that the local consumer was being penalised for export. I have heard Mr White's company's products being criticised because they are on the English market cheaper than in New Zealand. This is so in several cases and this is the reason for it. It is the recovery of fixed charges and marginal costing. Now you can only do that if you have a sound domestic market. This is why I think Professor McCarthy is absolutely correct and I agree with him entirely that we must develop the domestic market and then move over to export.'

de Castro

'On the export side we have heard a tremendous amount about what is in effect price resistance - there is a level at which there is price resistance. I feel in many instances there is a failure by many people (one of whom, and only one, is the processor) to appreciate the grower's dilemma with escalating costs. I agree with you entirely there is room for improvement, in management efficiency and cultural operations, in virtually the whole agricultural sector of New Zealand, including ourselves. But it does concern me that as costs escalate, and the standard of living rises, the producer throughout the world is generally getting a smaller share of the cake. This question I think has got to be answered; what can be done about it? Are we, in fact, underrating our article, are we underselling our article, on both the New Zealand and the export market? Is it in fact competition? Is it destroying us before we realise that something must be done to endeavour to increase our prices?'

Hunter

'I think Mr de Castro's comments are absolutely correct. But frankly this market is just not available at a higher price. We come back to the point that there must be an improvement, not only in the growers' efficiency, but also in the marketing efficiency. I think both sides have got to get together. This is the point I was trying to make before that it is no good for the grower to improve his efficiency without the exporter or marketer improving his. It has got to be a 2-way effort. All the processors and marketing agents have got to work closely together with the grower, because a grower has got to improve his

efficiency and so have we. I can assure you though that the price overseas is not going to rise. The standard of living is rising, but I am afraid that the price in many cases is not rising at the same rate.'

Comment

'Another comment which we in berryfruit have run up against is that the buyer is taking advantage of the fragmented marketing of some growers and prices have been beaten down as a result. Mr Hunter has probably found on overseas markets that he has offered a product at a certain price but the price has been beaten down by someone else in New Zealand offering the same product at a lower price. It is important that we do not undercut each other but I'm afraid there has been considerable marketing in the past where New Zealanders have undercut New Zealanders to get the business. I think this is perhaps a dog eat dog world but how can we get around this in the berryfruit industry before more money is lost in this way?'

McCarthy

'My view would be that as standards of living rise you find that people do not spend proportionately the same amount on foodstuffs as their income. This means that, except for a few agricultural commodities of which meat is one and theoretically horticultural produce another, you do not get a reasonable increase in demand. On the other hand we have people taking these raw materials and making them into a finished product and because of the way our economies operate we have escalating costs (hopefully somewhat lower than the rise in real living standards) and these are incorporated in the price of the product. It gets back to what I was saying before I think, that the bargaining power of the primary producer is so insignificant that he is the bloke that gets it in the neck all the time, and it seems to me that you must organise your industry. Alternatively, if you look at sectors of primary industry, you generally find that those producers who are well organised and have a well defined and well structured type of approach to selling their product (such as the sugar producers in Australia) are the people who are relatively prosperous.'

Hudson

'Ladies and gentlemen, before I conclude this discussion I just want to say one or two things. First of all, I wish to thank the panel very much. I thought at one stage that we were going to get a lot more people to this marketing seminar. I am afraid that it is a trend throughout New Zealand that people are allowing themselves to be misinformed and generally complacent and that to try and budge these people to this sort of thing is very nearly impossible.'

Hawley

'Ladies and gentlemen, on behalf of you all who have attended the marketing seminar; I agree with Mr Hudson that we would have liked to have seen more - I would like to thank all the speakers who have taken part. It has been a most interesting and educational exercise, and the only wish I have really is that we had been able to provide some of the answers to the questions that we have had placed in front of us. I think if we had the answers we could have gone away from here today with most of our problems solved. However, we will have to try and find the answers for next year. I am sure that all present have listened with interest to the subjects and will go away much wiser. If they are not wiser, they may be bewildered but they will get over that one. In conclusion, I would like on behalf of the Berryfruit Federation to thank Lincoln College for putting this seminar on and a special acknowledgement to Graham Thiele for organising the whole thing.'

SECTION 4

PRODUCTION AND MANAGEMENT

OF

BERRYFRUIT

Mr G.F. Thiele : leader

GROWING CANE AND BUSH FRUITS FOR MECHANICAL HARVESTING

Mr L.A. Porter
Horticultural Research Centre
Department of Agriculture
Levin

BLACKCURRANT GROWING FOR MECHANICAL HARVESTING

Introduction

Observations made on the growth and fruiting of plants in a propagation trial indicated the feasibility of establishing fruiting plants, in situ, from cuttings so as to form a hedge-row which could be cropped for several seasons with minimum or no pruning and then removed when decline in yield occurred. When this was tried it soon became obvious that such a method of management could have possibilities for mechanical harvesting of fruit by means of a relatively small and possibly simple machine.

Definition

Short-term close-spaced cropping.

Description

Dormant cuttings are set through pre-laid black polythene sheet at close spacing into well consolidated soil. Rows are no further apart than needed for access by machinery and easy inspection. Excellent establishment and maximum growth in the first season is essential for a reasonable first crop. A hedge-row is formed and cropping is continued for several seasons until yield declines. No pruning is used except that necessary for access and removal of broken or way-out growths.

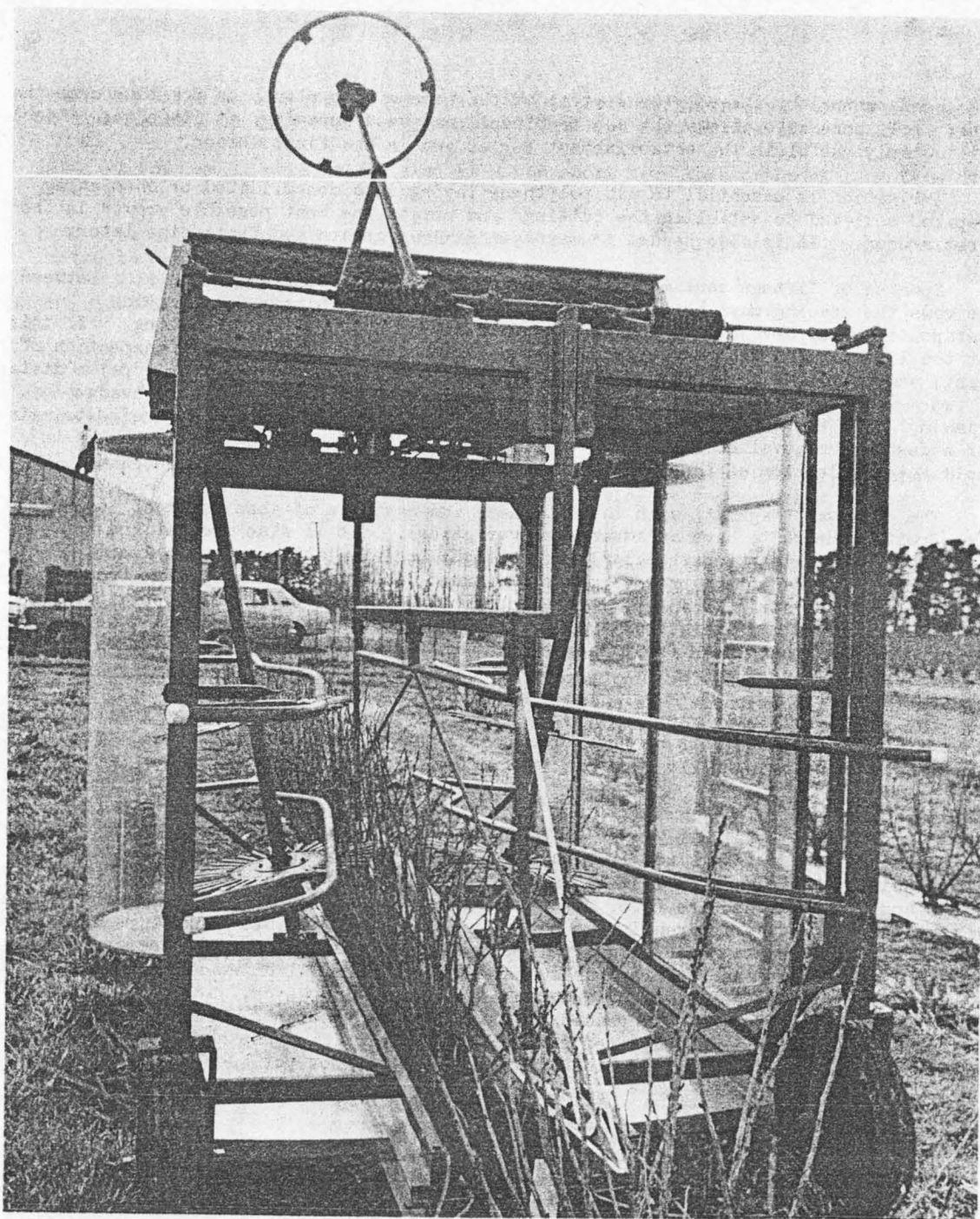
Tentative Recommendations

Soil preparation is either by normal cultivation followed by consolidation back to the original level, or if out of sward by chemical preparation.

Polythene is black, not less than 45 cm wide and not less than .0076 cm thick and anchored by edge-burying with a modified polythene laying device.

Cuttings should all be of the same length and can be between 15 and 30 cm and preferably no thinner than about 6 mm. Provided it is healthy, more or less the full length of season-old wood can be used for cuttings. Deblossoming may be necessary on some of the cuttings after they first start growing. Cuttings should be inserted for about half their length and preferably into dibble holes to avoid damage to the cuttings.

Maintenance of alleys between rows by mown clover-sward is useful as it is not too aggressive, allows a well consolidated free draining surface to be retained and reduces dust to a minimum. Cultivation in the alley causes problems not only of dust but also from the point of view of damage to the edge of the polythene. A completely weed-free condition by means of herbicides may have possibilities but has not been tried here.



A prototype of the blackcurrant harvesting machine on display in close planted (dormant season) blackcurrants at the Horticultural Research Area, Lincoln College. The machine is being developed by the Agricultural Engineering Institute, Lincoln College, in conjunction with the Levin Horticultural Research Centre and was demonstrated by Mr R.J. Harwood.

Weed control by the polythene strip at the base of the plants is positive over that area: polythene also allows the use of directional weed spraying, at its edge; this is particularly useful in the establishment period and in the first season.

Irrigation is essential to aid polythene laying into consolidated or chemically prepared soil and to establish the cuttings and obtain the best possible growth in the first season. It is also needed to maintain maximum growth and fruit size later.

Spacing of fifteen centimetres between cuttings has given good results. Between the rows the spacing must be such as to allow access of machinery for spraying therapeutants and herbicides, mowing the sward and of course, for harvesting. If this is not the limiting factor, there is still need for access to allow routine inspection of the plants and crop. With narrow machinery (perhaps ideally of the straddle type) a distance of 1.5 m would be about a minimum and this would probably mean some access 'hedge-trimming' from the third or fourth fruiting season onwards. Pruning by 'hedge-trimming' for access and removal of broken and way-out growths from the bases of the bushes to facilitate collection of the fruit by the harvester is all that appears necessary.

The cultivar 'Magnus', with the cleanness and easiness of abscission of its fully ripe fruit, appears to have an advantage over others. It is also upright and not over-vigorous and is not particularly susceptible to infestation by bud eelworm. Unfortunately it is not as precocious as 'Cotswold Cross'. Partially ripe fruit, still attached to strigs, can apparently be removed from bushes only by applying more energetic shaking. If this fruit was acceptable then other cultivars would be worth trying providing that their fruit was not allowed to become fully ripe and thus susceptible to tearing and loss of juice.

The individual fully ripe fruit of 'Magnus' would appear to have the greatest range of uses as not only could it be free flow frozen but it is also ready for almost immediate use and being fully ripe has its maximum flavour.

Results so far

With 'Magnus' cuttings set in situ at 15 cm (6 inches) apart in rows 1.8 m (6 feet) apart equivalent yields from a small trial area have been about 5,020, 8,780, 15,080, 17,540 and 7,040 kgs/hectare (i.e. 2, 3.5, 6, 7 and 2.8 tons/acre). The severe decline in the last season was apparently due not only to the considerable lack of rejuvenation of fruiting wood due to non-pruning (this was expected) but also to the access pruning required, the drought in the previous summer (which coupled with two-spotted mite, resulted in premature defoliation) and the mild winter. However, yields from orthodox plantings were also severely decreased this season. Whether the decline in active growth of these plants was over-accelerated by the drought, etc., and whether they would rejuvenate following cutting off close to the ground has not yet been shown.

Apparent Advantages

1. No hand pruning is needed. Access pruning perhaps in the third or fourth season to allow access would be needed but this could be mechanised.
2. Virtually no hand weeding is necessary as weed control is easy due to the plants rapidly forming a continuous hedgerow and the use of polythene (particularly worthwhile in the first and second seasons). Weedicides can also be used in a directional manner along the edge of the polythene.

3. Pests and diseases are less significant than in orthodox plantings because the life of the planting is relatively short term. Cuttings must initially be clean.
4. Land for leasing is more likely available for short term than orthodox long term growing.
5. Hedge-row planting of closely spaced uniform plants as in this method is particularly suited to mechanical harvesting.

Apparent Disadvantages

1. A large number of healthy cuttings must be available.
2. Machinery for closely-spaced rows is not readily available at present. Possibly straddle type machinery would be ideal.
3. Irrigation is more essential with this method than the orthodox one as good growth in the first season is relatively more important (i.e. it represents a greater proportion of the fruiting life of the crop).
4. There are more unknowns with this method than with the established system; for example very little is known of the economics of establishment.

Summary

A reasonable mean annual average yield for a period of four or five seasons appears possible from a short-term closely-spaced cropping system of blackcurrants. This system appears to lend itself readily not only to considerably reducing labour input but also to mechanical harvesting.

AN ATTEMPT AT THE DEVELOPMENT OF A SYSTEM OF TRAINING BRAMBLE CANES FOR MECHANICAL HARVESTING

Introduction

The approach to the problem of mechanical harvesting of bramble fruits has been towards devising a system whereby the fruit is in a position to not only be easily shaken off, but also to be collected without interference. Because of the probability of susceptibility to damage of fruiting laterals when in contact with a vibrating mechanism, it seems better to work towards vibration of fruit through the flori-canes and the wire. The system must also allow for easy training of primo-canes. Note: observations of such a system have indicated nothing except that it could be feasible.

Definition

Off-set horizontal-cane system.

Description

Flori-canes are tied along horizontal wires which are off-set from, and on both sides of, the row centres. The result is that horizontally aligned bundles of canes are formed. The fruiting laterals which arise from these horizontal flori-canes tend, as the weight of fruit increases, to twist around and hang more or less downward. This tendency could

conceivably be encouraged by gentle persuasion at intervals of a few days or perhaps longer. In this position the fully ripe fruit, at least with some cultivars, can be shaken off reasonably easily by vibration of the flori-canes in the vertical plane. Because the flori-cane bundles are off-set collecting devices such as trays, or endless belts, on the proposed machine would be positioned under and fairly close to the fruit layer.

Under this system fruiting laterals arising from non-horizontal parts of flori-canes would be removed.

Feasibility of this System

Though the study of a few aspects have been commenced, its real feasibility is far from proven. However, training of canes along these lines is not too far different from that used for some of the systems involving hand harvesting. Thus the system could be tried fairly easily.

AN ATTEMPT AT DEVELOPMENT OF A SYSTEM OF TRAINING RASPBERRY CANES FOR MECHANICAL HARVESTING

Introduction

Similar to that for brambles.

Definition

Off-set horizontal cane system.

Description

More or less as for brambles, at least in principle.

Feasibility of this System

Very little work has been done on any of the aspects of this suggested system. This has consisted of tying over about 30 feet of a narrow hedge-row of flori-canes so that the upper portion of these canes was tied to horizontal wires. It appeared from this observation trial that fruit of some cultivars could be shaken off the laterals hanging from the horizontally trained canes. A major problem of course, is the labour involved in the training of canes. It would seem that this would need to be mechanised before the system has much to offer. However, in the meantime this work will continue on the agronomic aspects of such a system.

GOOSEBERRY GROWING FOR MECHANICAL HARVESTING

Introduction

Pruning of gooseberry bushes and harvesting of fruit (both green and ripe) are laborious operations. In looking for methods to reduce most of this labour, a short-term cropping system, which had showed considerable promise on blackcurrants, appeared to offer some solution and is being tried on a small scale.

Definition

Short-term close-spaced cropping.

Description

As for blackcurrants but, because the habit of growth is in general far from upright, the hedgerow needs to be side-trimmed each winter.

Results so far

Fully dormant cuttings, 20 cm in length, were set, 10 cm deep at 15 cm apart in rows 1.8 m apart, through black polythene sheet as a mulch, anchored by edge burying. In the following and subsequent winters these hedgerows were trimmed vertically so that the hedge was 48 cm wide.

The most promising cultivar used was 'Yorkshire Champion' which in the first pruning season gave a yield equivalent to about 12,300 kilos/hectare (4.7 tons/acre) and in the second, 15,700 kilos/hectare (6 tons per acre). Yields in the first season from other cultivars, including 'Levin Early', were considerably lower.

Feasibility of the System

This system appears to be, in general, feasible and further work is being done on several aspects. Some modification to the system will probably be needed to facilitate mechanical harvesting.

HUSBANDRY TRENDS AND RECENT DEVELOPMENTS

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Some of the more recent developments such as the mechanical harvesting of blackcurrants and the use of trickle irrigation are being covered this morning by other speakers and a number of other developments were mentioned by me yesterday in reviewing the 1970/71 berryfruit research summary, so I intend to deal especially with varietal trends which is an appropriate time to do so as the results of the 1970 berryfruit survey are now to hand. Profitability of fruit growing is greatly influenced by variety so that a knowledge of varietal trends and new introductions is very important in making a choice of varieties.

The 1970 berryfruit survey showed that 'Redgauntlet' was by far the main variety of strawberry occupying 419 acres or approximately 70% of the strawberry acreage. In the previous survey, in 1965, it accounted for 328 acres or again about 70% of the strawberry acreage but in the first survey, in 1960, it occupied only 70 acres or only 23% of the strawberry acreage. 'Cambridge Favourite' was the second most important variety in both 1970 and 1965 occupying about 20% of the strawberry acreage in both surveys compared with only 13 acres or 4% of the strawberry area in 1960.

'Tioga' introduced a few years ago, occupied 34 acres or 6% of the strawberry acreage in 1970 which could well increase substantially in the future. Its fruit is firm attractive and good flavoured and the plants are capable of high yields although very early planting is necessary to achieve this in the first year. Cold stored plants can be used for early planting but unfortunately losses of them have on occasions been rather high for as yet unexplained reasons.

Turning to raspberries, the acreage of 'Marcy' increased dramatically from 58 acres in 1960 to 476 acres in 1970 or from 12% of the raspberry acreage to 58%. 'Lloyd George' which was by far the leading variety in 1960, declined to second position in 1970, a decline from 51% of the raspberry acreage to 16% and in the same period 'Red Antwerp' dropped from second position in 1960 to fourth in 1970. The acreage of 'Taylor' increase steadily between 1960 and 1970 from 16 acres to 110 acres, and in 1970 was third after 'Marcy' and 'Lloyd George'.

This season the American raspberry varieties, 'Willamette', 'Fairview', 'Sumner' and 'Canby' have been introduced by Levin Horticultural Research Centre and quite a number of new ones are under trial or will be tested later. One of the needs is for some better quality varieties that will process well, and looking to the future, harvest mechanically, needs of which the raspberry breeders are very conscious.

The boysenberry is the third most important berryfruit in terms of acreage having increased from only 27 acres in 1960 to 89 acres in 1965 and 279 acres in 1970. The increase has primarily been in the Nelson and Bay of Plenty districts. Undoubtedly, some so-called boysenberries are really youngberries whose fruit is more shiny than boysenberry and ripens about a week or two earlier. Dryberry disease can be a major problem in the growing of boysenberries and normally necessitates a full spray programme to control it.

Loganberries are the only other bramble being grown commercially except for small numbers of five new introductions, 'Aurora', 'Marion', 'Olallie', 'Smoothstem' and 'Thornfree'. The first three produce high quality black fruit of blackberry flavour and are in season about the same time as loganberry, that is a week to ten days before boysenberry. Both 'Smoothstem' and 'Thornfree' as their names imply are thornless and they fruit distinctly later than all the other brambles mentioned, the main picks at Levin being mid to late February. Their fruit has a true blackberry flavour but when eaten the seeds are rather evident. Another thornless bramble that we can look forward to is a thornless form of loganberry which has performed better in England than the thorned one and which is now under observation here for possible release.

The acreage of blackcurrants has trebled in the last ten years from 51 acres in 1960 to 155 acres in 1970 and could well show a further marked increase in the next few years with the anticipated advent of a mechanical harvester. In 1970 Goliath was the main variety as it has been for many years, being closely followed by 'Magnus' and 'Cotswold Cross'. 'Magnus' is the only variety at this point of time that can be confidently recommended for mechanically harvesting with the N.I.A.E./L.H.R.C. machine. It has an upright habit and the berry doesn't tear although, at least in some districts, it is not as heavy a cropper as 'Cotswold Cross' or 'Goliath'. A number of varieties from overseas have already been imported for testing and undoubtedly more will follow following their release in the U.K. and Europe as the outcome of the breeding being done there.

The main gooseberry variety is 'Farmers Glory', as for many years, with 'Levin Early' the only other variety grown to any extent, 36% in 1970.

I will now turn from varieties to some other aspects of berryfruits. High yields per unit area are most important in maximising profitability and high plant densities can help to achieve it. Strawberry growers in Auckland have been very close planting for quite a number of years and it is now common practice in most other districts. Overseas, extreme plant densities are being tested in a system referred to as 'solid bed planting' in which plants and the runners from them are allowed to grow and cover the whole area, a system which has become feasible with the availability of herbicides to give year round weed control and the probability of a mechanical harvester. Whilst the hill system of raspberry growing is still being used for some new gardens, the hedgerow system is now being more commonly adopted with close planting of the canes in the row to obtain high yields early in the life of the plantation.

Polythene mulching of strawberries is now so common that it is almost impossible to find any not mulched. Use of black polythene in conjunction with residual and contact herbicides for weed control between the mulched rows has now completely eliminated cultivations. Polythene mulch is now also commonly being used in the establishment of blackcurrant and gooseberry cuttings both in nursery beds and short term cropping plantations and also for poplar cuttings planted as windbreaks.

Non-cultivation of cane and bush fruits is now common with the soil being kept completely bare of weeds overall by the use of herbicides or used in conjunction with an inter-row sward. Normally, simazine is used as the basic residual herbicide but more recently dichlorbenil and chlorthiamid have been found useful, particularly for cleaning up weedy plantations. Overseas bromocil and terbacil seem promising on raspberries.

Growth regulators, apart from rooting compounds, are not yet used commercially in berryfruit. However trials indicate that they could come into use for various other purposes such as assisting fruit drop, particularly in connection with mechanical harvesting, and for regulating growth and flowering and assisting bud break.

Eelworm has now been established as a primary cause of dieback of boysenberry that has occurred to varying degrees in a number of boysenberry gardens in recent years. Use of parathion has given some measure of control but more satisfactory methods are needed.

Overseas, the systemic fungicide benomyl has generally given rather better control of Botrytis on strawberry than the other commonly used materials, captan, thiram and dichlofluanid, although preliminary testing has not confirmed this here but mildew control has been excellent.

Soil fumigation with a mixture of methyl bromide and chloropicrin has been used by a number of strawberry growers for some years primarily for the control of weeds and root rots but more recently it has been found of value for the control of a root disease of raspberry that is prevalent in one area.

Regarding spraying, a recent experiment on cane spot control of raspberry clearly indicates that inadequate spraying rather than the spray chemical used is the more likely cause of poor control and in a number of cases of poor control of disease in strawberry and boysenberry last season growers had been applying too little fungicide by using high volume strengths for semi-concentrate spraying.

In conclusion, growers are becoming more conscious of the need for shelter for berryfruits, particularly cane fruits, which is supported by a recent report of distinct increases in yields of raspberries in Scotland from the use of windbreaks. Wind damage is not always spectacular in the form of broken shoots, torn foliage or bruised berries but the cause of a general depression in growth and cropping.

INVESTIGATIONAL WORK WITH TRICKLE IRRIGATION

Mr J.S. Dunn
 New Zealand Institute of
 Agricultural Engineering
 Lincoln College

The trickle system of irrigation used successfully for a number of years in glasshouse cropping has been simplified for use on a field scale.

Pressures and flow rates are much below those used in conventional irrigation systems so that capital investment in pumps and supply mains is appreciably less.

Overall water use is considerably reduced by eliminating evaporation losses during application and supplying only the plants' exact requirements. In this way water sources normally considered too small for irrigation may be used.

The complete reticulation system for trickle consists of extruded polythene pipe of various densities and diameters and the simple method of jointing almost eliminates the need for proprietary fittings.

Development for field use was started by Symcha Blass in Israel in 1962 and its application spread to Australia in 1965. It was soon being used on a practical scale in various forms in both these countries and recently it has aroused considerable interest throughout the world.

The system has been used and observed under New Zealand conditions by the New Zealand Agricultural Engineering Institute at Lincoln and elsewhere for the past two seasons. Within the last year many commercial installations have come into use in various parts of the country.

Description

The basic components of the system are a header pipe, usually of $1\frac{1}{2}$ or 2 in. diameter, laterals of $\frac{1}{2}$ in. diameter, which are inserted into the header pipe at intervals, and small diameter micro tubes or whiskers of 0.20 or 0.35 inch internal diameter inserted into the laterals. (Diagram 1, p.104) A thin wall (0.06 inch thickness) lateral pipe having the same external diameter as standard $\frac{1}{2}$ inch water pipe but with an internal diameter of $\frac{5}{8}$ inch is being extruded for trickle use. A thin wall $\frac{3}{8}$ inch pipe has also been introduced recently.

The small bore of the whisker restricts the rate at which water can leave the lateral, but the degree of restriction depends on the length of the whisker. A long whisker severely restricts the flow, but by shortening it, the flow rate can be increased. In this way, for any pressure, a wide range of delivery rates can be obtained.

As the reverse is also true, we have a simple means of accommodating varying pressures along the lateral to ensure a uniform delivery from each whisker in it. Undulating country can therefore be irrigated with a high degree of uniformity without the use of flow control valves or juggling with different pipe diameters; and long laterals need no longer result in poor watering at the ends farthest from the supply.

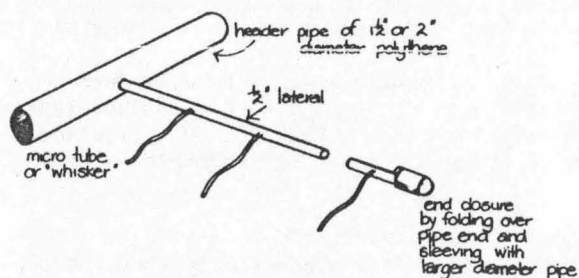


Diagram 1

Basic components of trickle irrigation

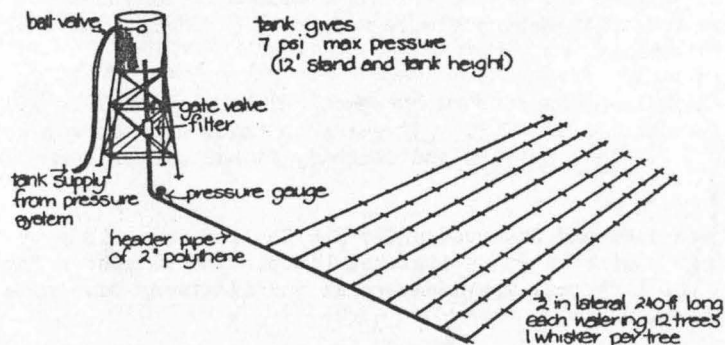


Diagram 2

Layout of one-acre trial area in Loburn orchard

Alternative metering devices are being produced in various forms overseas. These are proprietary articles usually moulded from polypropylene and considerably more expensive than the extruded whisker. Despite claims that they are more effective, this has not been proved and they do lack the versatility of the whisker.

Laterals are connected to the header pipe by inserting them with a screwing action into holes drilled with a sharp wood bit. The hole should have a diameter $1/16$ inch less than the outside diameter of the lateral. To ensure a good fit it is advisable to check the diameter of each batch of lateral pipe. Some variation does occur in the pipe from different manufacturers. A depth stop on the bit will prevent it penetrating the far side of the pipe.

Whisker insertion uses a slightly different technique, but again makes use of the elastic properties of polythene. A circular hole slightly less than the outside diameter of the whisker is punched in the lateral wall and expanded by the enlarged shank of the punch as it enters further. The whisker can be inserted easily immediately after removing the punch, but it is soon gripped as the hole contracts. A hole may be temporarily enlarged to replace any whisker by slightly bending the lateral in the vicinity of the hole.

Header and lateral pipes are closed by doubling over the end 6 to 12 inches of pipe and either pushing on a short sleeve of slightly larger diameter pipe or by tying with string. An alternative method is to use wooden dowelling as bungs.

Pressures from 14 inches to over 60 feet head have been used in various installations but a 15 to 30 foot head is normally recommended. At very low pressures air locks can be troublesome on undulating ground but these can be displaced by running for a short initial period at a higher pressure.

Material Costs

Approximate retail prices for the various components are as follows:

2 in standard polythene pipe	\$17	per 100 ft
1½ in standard polythene pipe	\$12	per 100 ft
½ in standard polythene pipe	\$3.23	per 100 ft
5/8 in thin wall lateral pipe	\$2.90	per 100 ft
3/8 in thin wall lateral pipe	\$1.90	per 100 ft
0.20 and 0.035 in whisker	\$4.80	for 1000 ft

One acre of orchard planted at a 20 ft x 20 ft tree spacing will cost approximately \$75 for the within orchard materials. Blackcurrants at a 6 ft row spacing on the same basis will cost \$250 an acre.

Calibration

Three New Zealand manufacturers are now producing whisker material in the 20 and 35 thousandths of an inch sizes. A semi high density polythene is being used. The external diameter is the same in both cases so only one punch is required.

Calibration charts showing discharge rates at different pressures for a range of whisker lengths have been produced by the New Zealand Agricultural Engineering Institute using one manufacturer's materials. These will not be exact for materials from other sources.

A wide range of pressures can be accommodated to give acceptable discharge rates. Examples of this are given in Table I (p.106).

When cutting whisker material a razor sharp knife and a hard wooden block are recommended to prevent distortion and reduced discharge rates.

TABLE I
 PRESSURE/LENGTH/DISCHARGE RELATIONSHIPS FOR
 NOMINAL .020 AND 0.035 INCH WHISKER MATERIAL

Pressure ft.head	Discharge required gallons per hour	Whisker	
		diameter in.	length required in.
2	0.1	.020	5
10	0.1	.020	30
5	0.25	.020	4½
5	0.25	.035	28
25	0.25	.020	26
5	0.5	.020	2
10	0.5	.035	24
40	0.5	.020	16
5	1.0	.020	6
40	1.0	.035	47½

Design

Trickle systems may be gravity fed from header tanks or reservoirs, or directly fed from artesian, pumped or high pressure mains supplies. Break pressure systems or pressure reducing valves may be required when using a high pressure source or trying to accommodate extreme gradient changes.

Like any other system of irrigation each trickle installation must be specifically designed for the particular set of conditions under which it will be working.

Application

Most commercial applications to date have been on berry, pip and stone fruit due to the semi-permanent nature of such crops and a relatively wide row spacing. Per acre pipe requirement is relatively low and once installed no further labour is needed apart from starting and stopping the flow. Other uses are developing steadily.

Fruit

Individual fruit trees are watered at a rate of 1 gallon per hour with a single 0.035 in whisker fed from a lateral alongside each row. The discharge should be no nearer than two to three feet from the trunk so fungal or bacterial troubles are not encouraged.

Bush fruit in hedgerow plantings are supplied at lower rates with 0.020 in whiskers inserted between every other bush. At the closer row spacing of strawberries laterals may be laid beneath the polythene mulch of every row. However, most growers now use one lateral between two rows and feed whiskers alternatively through the mulch on either side to discharge on top of the ridges between every other plant.

Pipe burial is recommended in semi and permanent installations to obviate ultra violet degradation and the risk of damage from vehicles and mowers. Header pipes should be six inches deep and laterals two to three inches. Except with strawberries the whiskers are laid along the lateral trench with no more than half an inch protruding above the soil surface.

(a) Commercial installation. Following the installation of a one acre demonstration plot by the New Zealand Agricultural Engineering Institute in a North Canterbury orchard during the 1969/70 season, the grower installed trickle throughout 100 acres of his orchard the following year. (Diagram 2, p.104) Twelve thousand trees (apples, pears and peaches) can be watered from one bore with this permanent installation. Over 50 miles of pipe were required.

The area is subdivided into six sections each fed from a header tank supplied from the pump. In this way any or all of the blocks can be used without affecting the pressure or flow rate at any tree being watered.

This grower is extending his system to include a further 50 acres of new plantings this winter.

(b) Lincoln orchard trial. In a comparison between trickle, sprinkler and no irrigation on four varieties of apples at Lincoln College there was no difference in yield between trees irrigated by either system. The trees receiving no water suffered badly during the 1970/71 summer drought. Most of their leaves had been shed by late February and their fruit was little larger than plums. Water use with the trickle system was approximately 40% of that applied with the sprinklers. Clover grew normally between the sprinkled trees but dried off completely in the non-irrigated area. Trickle irrigated trees were each surrounded by a seven to eight foot diameter circle of lush clover with brown dried areas in between. Considerable worm activity was observed in these moist circles.

By instrumenting one of the trickled trees with six tensiometers it was possible to observe soil moisture status and water movement in the soil throughout the rooting zone. (Diagram 3) The frequency and duration of watering the trickled trees was based on the tensiometer readings.

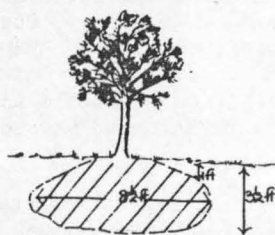


Diagram 3

Wetted profile under one whisker after
120 hours running

During the month of February 1971 the evaporation rate from an open pan evaporimeter in the vicinity of the orchard averaged 22 points per day and there was no effective rainfall. Under these conditions a steady soil moisture level was maintained around the instrumented tree by watering at an average rate of 16 gallons per tree every four days. The trees were seven years old but not particularly well grown.

The trees in one of the trickle irrigated rows were each supplied with two whiskers so they received twice the normal application. Apart from an increase in the area of clover around each tree, apple yield and quality and tree growth were no different from that of trees watered by only one whisker.

Two or more discharge points could be beneficial in very free draining soils to provide a larger volume of wetted soil in the rooting zone. In arid areas overseas where irrigation might have to provide the whole of trees' water requirements the use of trickle is not recommended in sandy soils beyond the first three years of growth. Under such conditions roots have been restricted to the discharge zone only so that tree stability is ultimately impaired.

(c) Berryfruit. Blackcurrants, raspberries and strawberries have all responded well to trickle irrigation and produced large, good quality fruit. Cane growth has been excellent

Vegetables

An acre of various vegetables has been grown at Lincoln using trickle during the past two seasons. The system worked well but the number of laterals required to completely cover the acre or the labour required for pipe movement where only a partial coverage was possible would not normally be acceptable on a commercial scale.

Two adjacent rows of established crop 20 inches apart could be watered quite satisfactorily by a single lateral fitted with 20 inch whiskers of 0.020 in material spaced 24 inches apart. But some difficulty was experienced initially when trying to germinate rows of seeds in a very dry seed bed. The whiskers lay haphazardly and discharged in all directions so that it was impossible to produce a continuous wetted surface. This was later overcome by inserting the full length of each whisker into the lateral pipe and leaving only about half an inch protruding.

Moving laterals from one pair of rows to another presented no difficulty and the laterals themselves proved to be amenable to frequent handling.

Glasshouse Crops

The whisker trickle system has been installed in numerous commercial glasshouses for tomato, carnation and pot plant production. Cost has been appreciably less than conventional trickle systems using nozzles.

A most effective but very simple water needle to locate and control whisker discharge with potted or container grown plants has been developed by a Palmerston North nurseryman.

Lucerne

Trickle irrigation of lucerne would perhaps not be an economic proposition on a large scale under normal conditions, but it would enable a very limited low pressure supply to be utilised. The response to water applied in this way during severe summer drought in Canterbury has been dramatic. On a shallow loam overlying shingle a width of 6 to 9 ft was stimulated into growth from a single lateral. With this knowledge, a

harness of five 250 ft laterals each 6 ft apart was made up so that a sixth of an acre could be watered at a time. The water supply was a $\frac{3}{4}$ inch trough supply having a no flow pressure of 30 ft head and on supply delivering 2.8 gpm at 7 ft head. This was sufficient to apply the equivalent of an inch of water every 24 hours. By moving the harness daily an acre could be watered adequately in six days to cope with average summer consumption.

Trees and Shrubs

Ornamental and shelter belt trees and shrubs on farms and in gardens have been watered using the trickle system. Exceptional growth has been observed but the need for an adequate supply of nutrients along with the water became obvious on some specimens during prolonged dry periods. A small amount of complete NPK fertiliser sprinkled on the wetted zone quickly remedied the deficiency.

Trial Plots

Small plot irrigation trials are possible using trickle with no risk of spray drift affecting the accuracy of application.

Plot work using different moisture regimes was undertaken by the Plant Science and Horticulture Departments of Lincoln College on wheat, peas and tomatoes during the 1970/71 season.

Effect of Soil Type and Rooting Depth

Little is known about the spread of water in different New Zealand soil types but some work has been done, using a barium tracer in the irrigating water, and is continuing using a neutron scatter meter.

Under the clay loam conditions in the North Canterbury orchard the wetted profile beneath one whisker when run for 120 hours under drought conditions resembled an inverted cone 8 ft across and $3\frac{1}{2}$ ft deep. In the shingle soils on the Ashley Dene farm of Lincoln College the cone never exceeded a 30 inch width. The rate of application will have some effect on the width of lateral spread.

An interesting observation was made when irrigating one plot of lucerne during the 1969/70 drought. The watering lateral with whiskers at a 2 ft interval crossed an area of dry prepared seed bed and a wide dried out grass verge before passing into a paddock of dormant lucerne. Three weeks after watering for 60 hours a 20 inch width of seedling weeds had appeared on the seed bed, a four foot wide strip of grass had been stimulated into growth on the grass verge and a green band 6 to 9 ft wide had appeared in the lucerne.

The spread of water was probably very little different in each condition but the differing rooting habits had enabled increasing widths of the wetted cone profile to be tapped.

Water Quality

Clean water is essential for successful trickle irrigation. Filters are not necessarily an integral part of a system where a wholesome sand-free deep well source or town mains are available but must be considered so in most other cases. A simple low head loss filter using a foamed polyurethane element has been developed by the New Zealand Agricultural Engineering Institute for use with open water or other possibly contaminated sources. It is now in commercial production.

Troubles from dissolved salts and colloidal clays have not been reported within New Zealand so far but it is known that these present very real problems in some areas overseas. The high iron and calcium content of some New Zealand waters may impose some limitations on the use of trickle.

Nozzle blockages in conventional glasshouse trickle systems have sometimes occurred due to algae, fungi and bacteria growing in the flexible plasticised p.v.c. pipe used in the harness. Chemical additives in the water are used to effect a reasonable degree of control in commercial installations. Such growths are much less likely to occur in the polythene pipe used in the system under review. Polythene is relatively inert and the added black pigment inhibits most light transmission.

Crop Feeding

The introduction of dilute nutrient solutions into whisker trickle systems is common practice in Israel and Australia and also in nozzle trickle systems in glasshouse installations in New Zealand. But there would not seem to be the same need for this on a field scale here where rainfall is usually sufficient to carry surface applied fertilisers into the soil and maintain them in solution.

The ability to apply supplementary nitrogenous fertilisers in solution would be beneficial with some crops.

Conclusions

The trickle system of irrigation will increase the potential area available for irrigation but its commercial use will generally be limited to high return crops and particularly those of a permanent or semi-permanent nature. It has already found favour with many fruit and glasshouse crop growers.

Good quality water is an essential and effective filtration will be a necessity in many installations. Chemical and colloidal impurities may limit its use in some areas.

Further work on the movement of water from a trickle discharge in different soils and the effect of this on rooting habit and growth is needed. The use of introduced fertiliser solutions should also be studied.

PROFITABILITY OF BERRYFRUIT

Mr A.W. Smith
 Department of Agriculture
 Christchurch

There is no economic law which states that because you produce a crop you are entitled to extract your cost of production from the market. Nor is there any law which states that you shouldn't make a certain profit per acre.

It is clear that as growers, individual profitability is dependent upon economic factors. These are basically -

1. Your product price - (which is a function of supply, demand, your quality, the quantity and price of competing products, the weather and other relevant factors).
2. Your cost - (a function of your site, yield, managerial ability, labour quality, capital intensiveness and others).
3. Your yield - (a function of your management, your aspect, your technological ability, application and foresightedness). These three variables are obviously inter-related. It is clear that individual profitability is the result of the inter-play of many of the factors which constitute these variables.

I cannot claim that the figures which you obtain would be precisely the same as mine, but I am sure that the examples and graphs will show you how profitable berryfruit crops are. I plan to discuss the profitability of strawberries, raspberries and blackcurrants grown conventionally. But, at the outset, in order to describe the relationship between price, cost and yield satisfactorily, I must consider some costs where personal considerations over-ride the economic ones.

Firstly, interest - The interest which must be paid on that which you are forced to borrow in order to grow the crop, for example to buy polythene and plants for a strawberry crop, is a cost against the crop for your particular case and for your case only. If, however, the only interest which is paid upon your property is that which you borrowed in order to purchase the land and assets on it, then the interest is an overhead. I have chosen not to include any interest in my considerations. Any person who wishes to include interest can easily do so.

Secondly, wages of management - The wages (additional to the \$1 per hour charged as permanent labour) which you pay yourself for managing the place would only complicate matters. All labour used to grow the crop has been charged against these crops at \$1 per hour.

Thirdly, overheads - It is most important that you know the level of your overheads but at the moment I wish to hold considerations of overheads until the end of this paper. Overheads do influence the profitability of the property and they may influence the profitability of the component crops which are grown.

I now wish to consider some costs of handling a berryfruit crop and as the graphs are in general based upon the assumption that fruit is sold in bulk to a processor, we must consider the cost differential between sale to the auction market and sale to this outlet. The cost of selling a crop at market is considerable. I consider that 1 lb of dessert strawberries costs 8.6c to sell at auction (when the price is 20c per lb) if they are sold in punnets. To this we must add 5c as a picking cost and so now you must get 13.6c per lb before you can contribute to growing costs. (This analysis was based on 12 ounce punnets.) Processor sale will cost the grower approximately 1c per lb so the price you need to get before some contribution is received towards growing cost is 6c per lb.

If we consider Figure 1, we can see that this is a graph of the 'gross profit' versus the price received from the processor. I have defined 'gross profit' in such a way that this is a surplus which must pay the cost of establishment, interest and wages of management. It can be likened to a gross margin but it differs in that some costs which are often considered fixed, such as permanent labour, are here paid. We can see from the figure the relationship between the 5 ton strawberry, 5 ton raspberry and 5 ton blackcurrant crop. We can also see, using the strawberry 14 ton line, that at this price a small increase or decrease in a particular return of approximately 1.5c per lb will influence the gross profit by something in the order of \$400. We can also see that at 12c per lb a 14 ton strawberry crop yields quite a high 'gross profit'.

FIGURE 1 GROSS PROFIT : PROCESS PRICE RELATIONSHIP

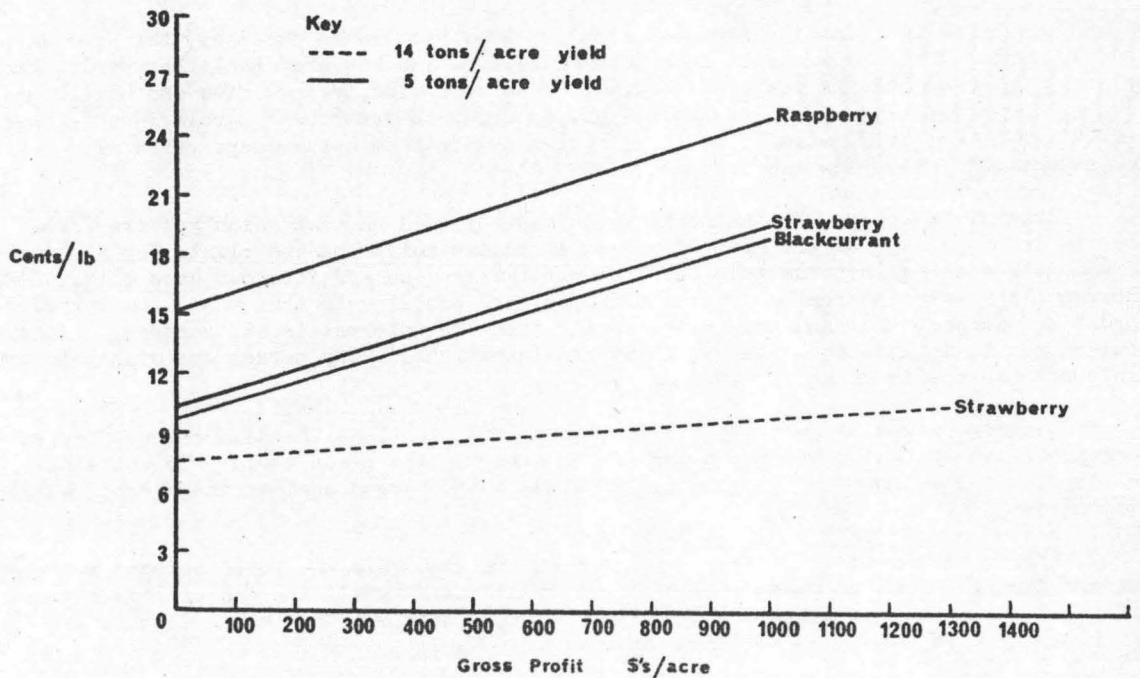


FIGURE 2 PRICE/LB REQUIRED TO COVER GROWING AND PICKING COSTS

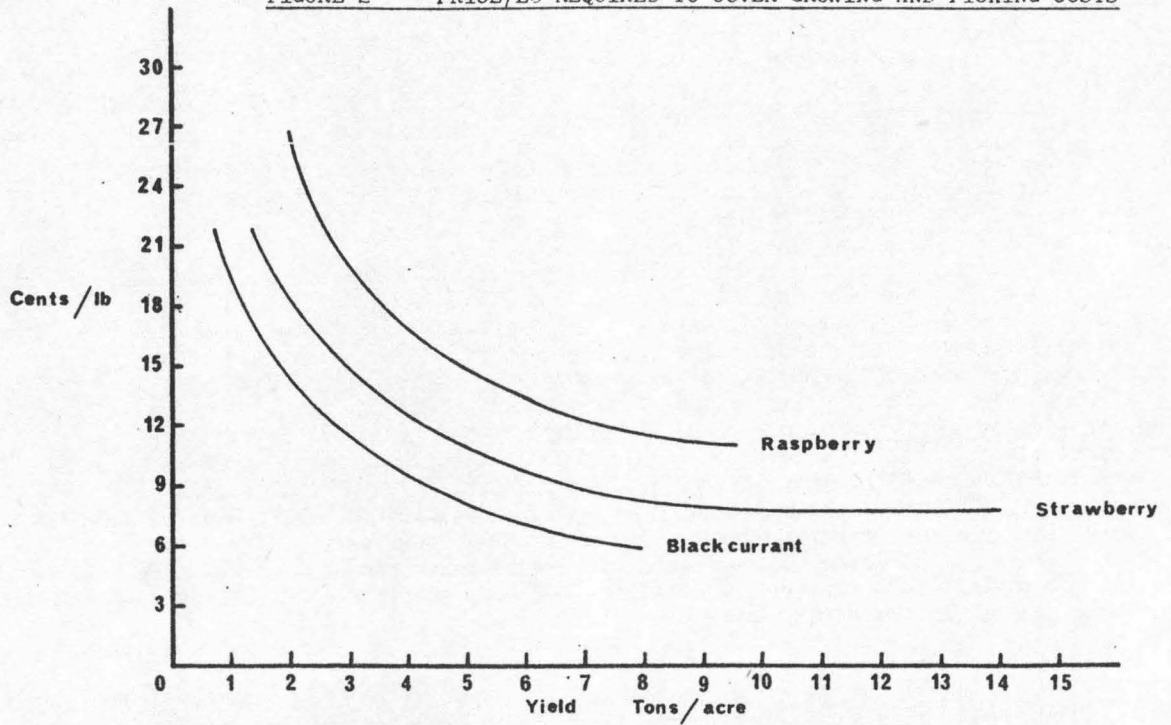
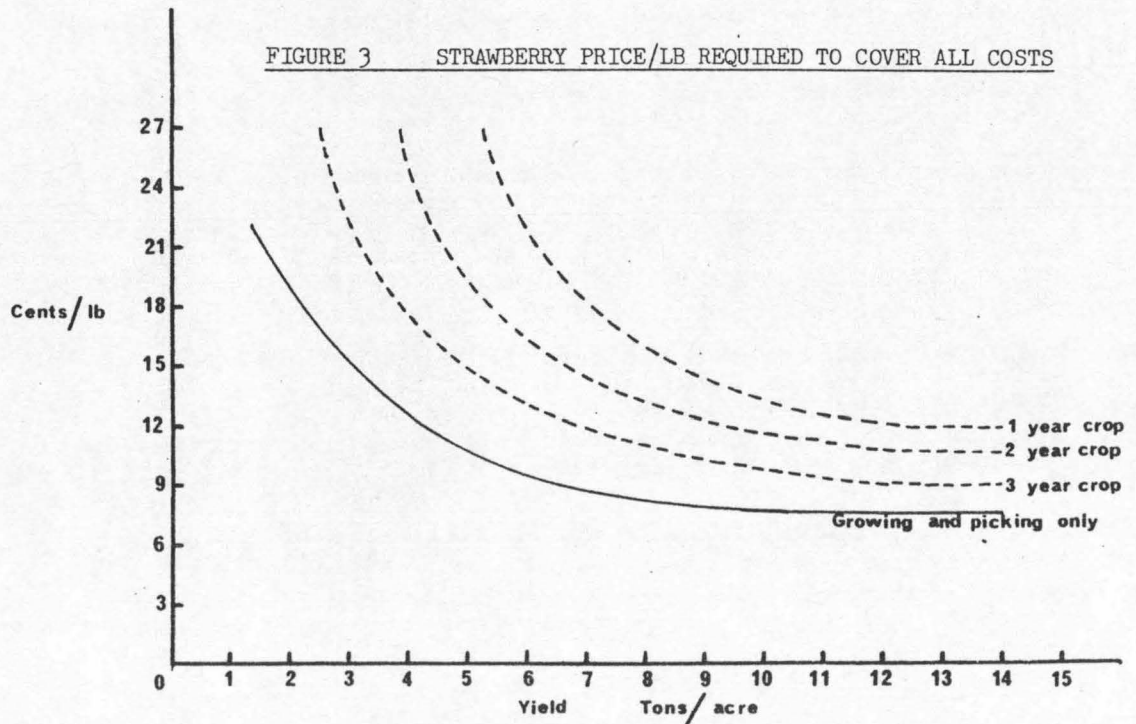


FIGURE 3 STRAWBERRY PRICE/LB REQUIRED TO COVER ALL COSTS



If we move on to Figure 2 we can see the reasons for the effects that we have just noted. This is a graph of the price per lb required to cover growing and picking costs but not establishment, interest or managerial fees.

Raspberries are considerably dearer to produce than strawberries which are dearer than blackcurrants. It is the unit relationship which I show here that effects the gross profit shown in Figure 1.

We have now discussed and seen how product price, your product cost and your yield can affect the profitability of your crop. I would now like to consider overheads of a crop. Once you have spent some money on a crop that money becomes fixed. Consider the establishment cost of a crop of strawberries. This is not cheap and if we look at Figure 3 we can see the bottom line is the price for growing and picking only (in terms of yield). The three other lines show the relationship of the prices to cover all costs when keeping the crop for one year, for two years and for three years. The costs of depreciation of the strawberry bed (which can be considered as an overhead) greatly influence the profitability of your strawberry crop. To put this another way - if it costs you \$1000 to establish one acre of strawberries and you keep this bed for one year only, then you must repay a depreciation of \$1000 in one year. If you can keep this bed for five years the depreciation which you have to pay annually is \$200. You are saving (or not paying) \$800 a year. I consider that many people remove strawberries before their removal is thoroughly warranted.

Cost Cutting

Cost cutting is a sound principle provided that you do not reduce your yield or price.

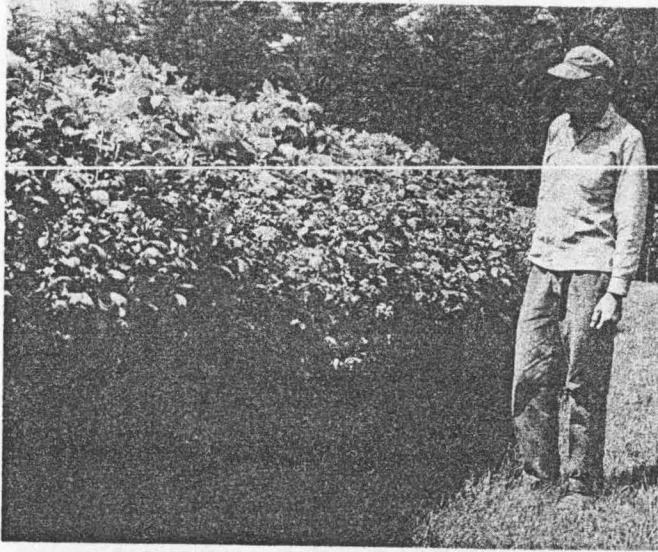
If we assume that you can pare \$100 per acre from your costs and if we assume that it reduces your yield by two tons and if you make \$60 nett per ton, then your cost cutting is not worthwhile.

Fertilizers and irrigation are two good examples of where you can't afford to be sub-optimal in your applications.

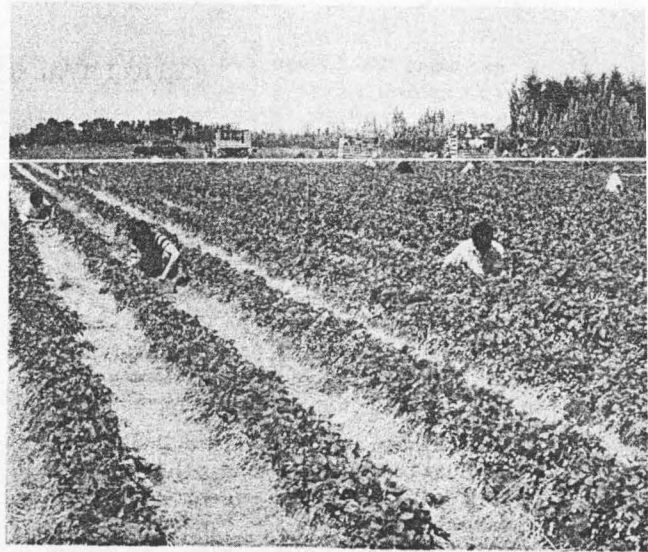
Another effect which can influence the profitability of your property to a great degree is its size. On most of the berryfruit units in New Zealand I think it would be fair to say that one of the greatest financial items in the business is personal drawings. This is not an effect on the crop itself but on the property. If you need \$5,000 worth of drawings a year to live and you have only five acres to derive it from, then this is \$1000 per acre which is an awful lot of overhead.

It will now be clear from this discussion that the concept of an overhead can be very broad and I feel that all growers require a clear definition in their own mind of the costs. They need to know for themselves from their own property, as the year goes by, their production costs, their marketing costs, their overheads and their establishment costs. By taking more interest in these facts and figures, I am sure that many growers will benefit.

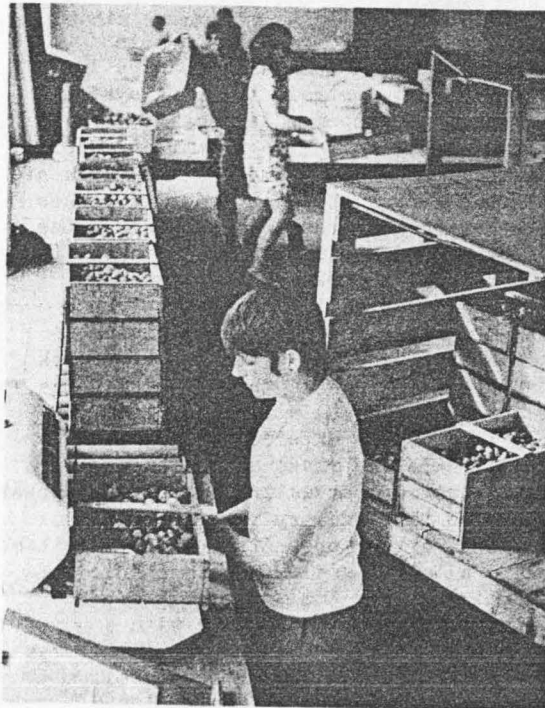
To sum up - the profitability of a particular crop or enterprise depends basically upon the yield of that crop and upon the price you receive from that crop, not so much upon the scale of the crop nor the costs incurred in growing it.



Mr Pat Fox, Horticultural Research Manager, inspecting Marcy raspberries trained for tests on mechanical harvesting.



Strawberries, 2 year old Red Gauntlet, in peak harvest at the end of November.



The packing shed handling between $1\frac{1}{2}$ -2 ton of strawberries/day for bulk and I.Q.F. export.



Mr Graham Thiele addressing growers in a blackcurrant block during the field day in August.

HORTICULTURAL RESEARCH AREA, LINCOLN COLLEGE

OPERATION AND OBJECTIVES

Mr G.F. Thiele
Senior Lecturer in Horticulture
Lincoln College

Introduction

Lincoln College is a University College of Agriculture offering degrees and diplomas in Horticulture (among other courses). To stimulate interest and to teach effectively in a subject it is essential for a lecturer to research and provide leadership and demonstration in the subject. In horticulture this might be either laboratory or field level research and obviously, in subjects such as economics, management and marketing, as well as husbandry aspects, the work cannot be completely effective in an office or laboratory.

'Why do you need a five acre area of strawberries on which to conduct research?' is a common complaint. The answer is simple but twofold.

- (a) This is not a duplicate or subsidiary of the Horticultural Research Centre in Levin. The work at Levin, as I understand it, is directed towards husbandry problems, varieties, fertilisers, disease, pest and weed control, training systems and so on. We use their results in producing crops on a commercial scale. We are concerned with the economics of production and marketing. We keep records of, and critically evaluate, all costs and returns to determine the inefficient parts of production. We concentrate on high cost sections of production in order to reduce overall costs. We conduct work study and work measurement research because of the tremendously high cost of labour in production of most berryfruits. As economists, we know of the theory of 'economies of scale' but does it work in practice? Is the production of strawberries on a scale of half an acre equivalent to that on a five acre scale? What are the financial management pros and cons of involving labour saving capital equipment on a larger scale compared with extensive hand work on a small scale? Could not the industry itself supply some of the answers? Yes, but remember we must also learn by experience and as a result, attempt to lead the industry in the facts it requires to know. In learning by experience we have discovered, sometimes to our financial pain, that there are risks and pitfalls to be overcome. We know now the problems of weather, disease, harvesting labour and market demand fluctuations and have been able to pass on to the industry precise details. This would have been impossible on a small scale. Furthermore, it is quite inevitable that horticulture in New Zealand will move toward a larger scale, more mechanised form of production just as supermarkets have developed from the small shopkeeper, retail industry. This does not mean that the small specialised grower with a particular production or marketing advantage will be eliminated. These will always have a place in the industry but if New Zealand is to expand its horticultural production to compete efficiently on world markets then it must intensify its agricultural production for non-fresh, processed and frozen product outlets. From this point of view it could be said that some of our research will be of detriment to existing producers. I'm afraid this is so but there has been, and still is, plenty of warning of impending change and those who refuse to recognise and adapt to change (no matter what walk of life) must suffer.

- (b) This is not a Government institution and does not receive its operating expenses in the way that the Levin Research Centre does. Apart from small scale grants for specific research, we must be self-supporting. We cannot exist without selling our produce but we have no desire to compete or interfere with the incomes of those we are trying to help. To minimise this we have geared our production for export and have not been afraid to experiment with various forms of export and export markets. During the last season, the quantity of strawberries we had involved allowed us to hold out against downward price pressure on the Australian market so that costs were covered by the final price. I hope this in some small way helped to introduce a degree of stability and control.

Personally my object is to export as much of our fruit as possible and not to interfere with the local market. I regret there has been some cause for complaint beyond my control during the last year. Nothing but good can come from bringing any dissatisfaction into the open.

Financial Aspects : Budgeting, Capital, Trading

The financial affairs of our research area are not secret and are available at any time for perusal and discussion. The following summarised information has been extracted from the Lincoln College Farm Accounts for the year ending 30 June 1971. These are prepared by the Accountant in conjunction with the estimates for future years supplied by the Horticulture Department.

We firmly believe in annual and development budgeting and budgetary control from month to month.

HORTICULTURE RESEARCH AREA

STATEMENT OF CAPITAL

as at 30th June, 1971

FIXED ASSETS

LAND AND BUILDINGS (Government Valuation 31.12.67)	33,935
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PLANT AND MACHINERY (Cost less depreciation)	<u>25,487</u>
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<u>TOTAL FIXED ASSETS</u>	\$59,422
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UNSOLD PRODUCE

(Current Market Values)

Strawberries	<u>20,000</u>
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<u>TOTAL UNSOLD PRODUCE</u>	<u>\$20,000</u>
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<u>TOTAL CAPITAL</u>	<u>\$79,422</u>
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NET RETURN

(After allowing 5% interest on capital)	\$2,625	=	3.31%
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LAND USE PLAN 1971-72

<u>Berryfruit</u>	<u>Area</u>	<u>Estimated Yield per Acre</u>
<u>Strawberries</u>		
Tioga (to be established January 1972)	2 acres	nil
Tioga 2nd year	$\frac{1}{2}$ acre	10 tons
Red Gauntlet 2nd Year	2 acres	15 tons
Red Gauntlet 4th Year	$2\frac{1}{2}$ acres	6 tons
Total Strawberries	7 acres	
<u>Blackcurrants</u>		
1st Year (to be established August 1971)	$2\frac{1}{2}$ acres	nil
2nd, 3rd and older	$1\frac{1}{2}$ acres	1 ton
Total Blackcurrants	4 acres	
<u>Boysenberries</u>		
4th Year	1 acre	3 tons
<u>Raspberries</u>		
4th Year	$\frac{1}{2}$ acre	5 tons
<u>Gooseberries</u>		
3rd Year	$\frac{1}{8}$ acre	$\frac{1}{2}-\frac{3}{4}$ ton
<u>Total Berryfruit</u>	<u>12 $\frac{5}{8}$ acres</u>	
<u>Tree Fruit</u>		
Transplanted apple orchard	3 acres	
New Orchard	4 acres	
<u>Total Tree Fruits</u>	<u>7 acres</u>	
<u>Vegetables</u>		
Tomatoes	$1\frac{1}{2}$ acres	
Onions	1 acre	
Asparagus established 1 year	$\frac{1}{2}$ acre	
Asparagus to be established 1971	$\frac{1}{2}$ acre	
Cucurbits	$\frac{1}{2}$ acre	
<u>Total Vegetables</u>	<u>5 acres</u>	

Grass The remaining 9-10 acres of the research area (total 34 acres) will be sown to grass for soil improvement.

Original 'market garden' area Apples, pears, peaches, asparagus and blackcurrants still remain in this area and have been included in budget estimates.

HORTICULTURE RESEARCH AREA

For Year Ended 30th June 1971

GENERAL FARM OPERATING

	Budget 1970/1971	Actual 1970/1971	Budget 1971/1972
<u>REVENUE FROM:</u>			
Sales	21,672	33,144	25,932
Net Teaching Charge	300	377	378
Sundry Receipts:			
Grant for Irrigation		790	
<u>TOTAL REVENUE FROM AREA</u>	<u>\$21,972</u>	<u>\$34,311</u>	<u>\$26,310</u>
<u>EXPENDITURE ON:</u>			
Standing Charges:			
Insurance	80	167	170
Rates		154	160
Administration Expenses:			
General Administration	300	800	800
Telephone and Mail		86	90
Wages:			
Permanent		5,429	6,320
Casual		16,130	12,200
Cropping:			
Containers	175	382	350
Fertilisers:			
Tons Manures	180	607	510
Seeds:			
Cropping			60
Strawberry plants	25	800	720
Shrubs, Trees			10
Vehicle Expenses:			
Fuel	220	149	180
Repairs and Maintenance:			
Plant and Machinery	1,050		1,020
Motorised		291	
Other		1,221	
Buildings	104	133	150
Fences, Yards		23	30
Irrigation	525	729	
Tools, Hardware	25	70	70
Plastic			780

General Expenses:			
Weed and Pest Control	1,500	1,616	1,320
Extra Spray	50		
Electricity	100	574	450
Freight	150	501	430
Equipment Hire		200	200
Fruit Trellises			900
Sundry Expenses	630	559	600
Appointments	100	390	300
<u>TOTAL CASH EXPENDITURE</u>	<u>\$20,648</u>	<u>\$31,071</u>	<u>\$27,880</u>
Depreciation:			
Plant and Machinery	600	615	1,040
<u>TOTAL AREA EXPENSES</u>	<u>\$21,248</u>	<u>\$31,686</u>	<u>\$28,920</u>
<u>SURPLUS FOR YEAR</u>	<u>\$724</u>	<u>\$2,625</u>	
<u>DEFICIT FOR YEAR</u>			<u>\$2,610</u>

HORTICULTURE RESEARCH AREA BUDGETFor year ending 30th June 1972.REVENUE FROM:Berryfruit

Strawberries	112,000 lbs	at 17c	19,040	
Blackcurrants	3,300 lbs	at 20c	672	
Boysenberries	6,720 lbs	at 25c	1,680	
Raspberries	5,600 lbs	at 20c	1,120	
Gooseberries	200 lbs	at 25c	50	
			<hr/>	\$22,562

Tree Fruit

Apples	300 bush.	at \$2	600	
Pears	40 bush.	at \$2	80	
Peaches	80 bush.	at \$3	240	
			<hr/>	\$920

Vegetables

Tomatoes	50,000 lbs	at 4c	2,000	
Onions	6 ton	at \$50	300	
Asparagus	1,000 lbs	at 15c	150	
			<hr/>	\$2,450

<u>TOTAL CROP REVENUE</u>	\$25,932
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<u>Net Teaching Charge</u>	\$378
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<u>TOTAL REVENUE</u>	<u>\$26,310</u>
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EXPENDITURE ON:Wages

Appointments	300	
Permanent	6,320	
Casual	5,050	
Harvesting	7,150	
	<hr/>	\$18,820

Standing Charges

Rates	160	
Insurance	170	
	<hr/>	\$330

EXPENDITURE ON: (cont'd)Administration Expenses

General Administration	800	
Telephone and Mail	90	
		<hr/>

\$890

Working Expenses

Plants and Seeds		
Strawberries	720	
Vegetable	60	
Trees	10	
		<hr/>

\$790

Fertiliser	510	
Weed and pest control	1,320	
Electricity	450	
Containers	350	
Freight	430	
Fruit trellises	900	
Plastic	780	
Tools	70	
Sundries	600	
		<hr/>

\$6,200

Repairs and Maintenance

Buildings	150	
Plant	1,020	
Fences	30	
		<hr/>

\$1,200

Vehicle Expenses

Fuel	180	
Equipment hire	200	
Cars	60	
		<hr/>

\$440

TOTAL CASH EXPENDITURE

\$27,880

Depreciation

Plant and Machinery		1,040
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TOTAL EXPENDITURE

\$28,920

NET DEFICIT 1971-72

\$2,610

In accordance with normal business practice this budget is conservative and will be reviewed when yield and price can be estimated with more certainty.

It is based on the decision by Farm Committee to remove half of the present 5 acres (rising 4 year old) area of strawberries and replace them with a 2½ acre planting of close spaced blackcurrants for mechanical harvesting.

In the development years, prior to the new orchard supplying most of the revenue, the Horticulture Research Area budget has relied on strawberries for most of its revenue. The estimated deficit of \$2,610 in the 1971-72 financial year results from the decision to concentrate more on blackcurrant research. Four additional budgets indicate alternative results possible under varying conditions of production, price and area.

DEVELOPMENT PLANS FOR THE 1971-72 FINANCIAL YEAR

- (a) A proposed 2 acre area of Tioga strawberries to be planted in January 1972 has been included in the budget.
- (b) Two and one half acres of the present 5 acre Red Gauntlet strawberry area will be replaced with close planted blackcurrants for mechanical harvesting.
- (c) Modifications to the existing freezing unit are essential to allow an increase in the amount of berries produced I.Q.F.
- (d) Trellises for the new orchard have been allowed for at \$900. Development of a variety of training methods will be done in conjunction with our Engineering Institute research project.

PARAMETRIC BUDGETING

- (a) Strawberry price 1c less than anticipated

REVENUE

Strawberry income 112,000 at 16c
All other revenue

17,920
7,270

TOTAL REVENUE

\$25,190

EXPENDITURE

As before

TOTAL EXPENDITURE

\$28,920

NET DEFICIT (1971-72)

\$3,730

- (b) Strawberry yield 9 ton per acre on 4th year Red Gauntlet, (3 ton per acre more than anticipated assuming $2\frac{1}{2}$ acres of 4th year)

REVENUE

Strawberry income 128,800 at 17c	21,896	
All other revenue	7,720	
	<u> </u>	\$29,166

EXPENDITURE

As before	28,920	
Add additional harvesting expenses (6c per lb)	1,008	
	<u> </u>	\$29,928

NET DEFICIT (1971-72)\$762

- (c) Strawberry 5 acre (4th year) Red Gauntlet area retained as at present assuming a yield of 6 ton per acre.

REVENUE

Strawberry income 145,600 at 17c	24,752	
All other revenue	7,270	
	<u> </u>	\$32,022

TOTAL REVENUEEXPENDITURE

As before	28,920	
Add additional expenditure		
Production 300		
Harvesting 2,016	2,316	
	<u> </u>	\$31,236

NET SURPLUS (1971-72)\$786

- (d) Strawberry 5 acre (4th year) Red Gauntlet area retained as at present assuming a yield of 9 ton per acre.

REVENUE

Strawberry income 179,200 at 17c	30,464	
All other revenue	7,270	
	<u> </u>	\$37,734

EXPENDITURE

As in (c) above	31,236	
Add additional harvesting costs	2,016	
	<u> </u>	\$33,252

NET SURPLUS (1971-72)\$4,482

Future Development

Although work will continue on strawberries (particularly that associated with I.Q.F. production and marketing) the area in strawberries will be gradually reduced as more emphasis is placed on the other berryfruit.

With mechanical harvesting of blackcurrants on a commercial scale almost a reality, a 1 hectare ($2\frac{1}{2}$ acres) area of blackcurrants has been planted at a spacing of 6 ft between rows and 6 inches between plants. The object, as with strawberries, is to determine the cost of production and attempt to break into the juice market as a result of mechanised production on a large scale.

A development budget was prepared and is presented on pages 124 and 125. Although the acreages proposed are to be varied slightly from that presented, the profit margins and general policy vary little from the original. In all this work the doubtful feature is the availability of outlets. This is part of our function we believe, to produce efficiently so as to be able to profitably sell at a price which will allow processors to compete on world markets. It is quite silly for speculators to plant large areas of blackcurrants at present before markets have been developed. In fact, there may prove to be very limited outlets.

The next crops to receive attention will be raspberries and boysenberries and rows have been trained already to facilitate preliminary development of a shaking device on which to base mechanical harvesting.

We feel strongly, along with leading growers, that the future export of berryfruits must be predominantly in the I.Q.F. form and efforts are being directed towards efficient and economical production of a high quality I.Q.F. product. Much of our harvesting and freezing involves detailed work study into methods of harvesting, variation in rates of picking, worker satisfaction, job instruction, fruit movement from field to consumer, handling in the freezer and so on.

We foresee the development of equipment for in-field freezing and hope to do some preliminary testing this season. In the States and other countries attention is being focused on Freon as a freezant to be used in conjunction with a harvesting machine. Suitable Freon is not available in New Zealand at the moment and certainly the price if it were, could not match the 1c/lb of berryfruit frozen which is the price being quoted in California. We imagine the time when growers would all have small scale freezing or holding plants and a refrigerated truck would call on a regular basis to take to a central store in much the same way as refrigerated tankers call at town milk supply farms.

Record Keeping

Over the past three or four years we have been attempting to develop a sound recording system so that all labour and machinery time and materials spent on each crop are recorded accurately. From time to time some of this information has been published in so-called 'gross margin' form as a talking point, a guide and a stimulus to others to follow suit. Any recording system makes one thoroughly aware of all costs in the business and invariably produces figures of a magnitude not imagined before. By having labour records we have known clearly where to concentrate on work study and mechanisation efforts and gradually we are eliminating the major areas of expensive labour usage.

HORTICULTURAL RESEARCH PROPOSED SCHEME : ESTIMATED REVENUE

	1969- 1970	1970- 1971	1971- 1972	1972- 1973	1973- 1974	1974- 1975	1975- 1976
Strawberries							
Area (acres)	6.5	7.48	5.0	7.0	6.5	4.0	4.0
Yield (tons)	82	75	50	41.5	45	36	28
Income (\$)	27,400	26,760	19,040	15,803	17,136	13,708	10,662
Raspberries							
Area (acres)	0.4	0.4	0.8	0.8	0.8	0.8	0.8
Yield (tons)	0.6	2.3	2.2	2.7	3.6	3.6	3.6
Income (\$)	304	1,250	1,200	1,200	1,600	1,600	1,600
Blackcurrants							
Area (acres)	1.4	1.4	4.4	9.4	9.4	9.4	9.4
Yield (tons)	0.4	1.0	1.3	2.6	10.0	21.2	24.6
Income (\$)	161	500	600	870	3,375	7,125	8,230
Boysenberries							
Area (acres)	0.9	0.9	0.9	1.0	1.0	1.0	1.0
Yield (tons)	0.8	2.5	3.6	2.7	4.5	4.5	4.5
Income (\$)	630	1,725	2,000	1,500	2,500	2,500	2,500
Tomatoes							
Area (acres)	1.0	1.5	5.0	5.0	5.0	5.0	5.0
Yield (tons)	12	18	60	60	60	60	60
Income (\$)	500	1,200	3,169	2,968	2,834	2,700	2,700
Onions							
Area (acres)	1.0	1.0	0.5	0.5	-	-	-
Yield (bushels)	350	250	150	150	-	-	-
Income (\$)	750	300	250	250	-	-	-
Others (\$)	861	1,355	1,550	1,850	2,450	2,800	3,800
Total Revenue	30,606	33,090	27,609	24,441	29,895	30,433	29,492

HORTICULTURAL RESEARCH ESTIMATED EXPENDITURE

	1969- 1970	1970- 1971	1971- 1972	1972- 1973	1973- 1974	1974- 1975	1975- 1976
Salaries	5,627	4,850	6,100	6,150	7,250	7,300	7,450
Casual Wages:							
General	12,357	4,500	4,500	4,600	4,700	4,800	4,800
Strawberry		9,000	6,404	5,315	5,764	4,611	3,586
Containers	461	350	350	200	250	300	300
Fertilizer	593	650	700	500	500	500	500
Freight	211	550	350	350	350	350	350
Plants and Seeds	60	800	800	800	250	250	250
Weed and Pest Sprays	1,510	1,500	1,000	1,200	1,100	1,200	1,200
Fuel	269	250	275	300	300	325	325
Equipment Hire	178	200	150	150	150	150	150
Tools and Hardware	21	30	50	50	75	75	75
Sundry	1,785	650	750	750	750	900	900
Cars	100	100	100	100	100	100	100
Insurance	105	170	180	190	200	200	200
Appointments	45	195	50	50	100	50	50
Electricity	356	420	450	500	500	500	500
Rates	-	153	160	165	170	175	180
Telephone and Mail	-	65	80	80	80	80	80
Repairs and Maintenance:							
Buildings	120	140	150	150	150	150	150
Plant	1,062	900	1,000	1,100	1,200	1,200	1,250
Fencing	276	-	50	-	-	-	-
Irrigation (Capital item)		(700)					
Added Costs due to Cropping Change:							
Blackcurrants 3 acre			746	456	834	834	834
5 acre				1,252	1,390	1,390	1,390
Tomatoes			2,020	2,020	2,020	2,020	2,020
Strawberries Establishment			2,000	2,000			
TOTAL CASH EXPENSES:	25,336	25,273	28,365	28,628	28,183	27,460	26,640
Depreciation	412	600	700	750	800	850	900
TOTAL EXPENDITURE	25,748	25,873	29,065	29,378	28,979	28,310	27,540
TOTAL REVENUE	30,606	33,090	27,809	24,441	29,895	30,433	29,512
ADD TEACHING CHARGE	491	400	500	500	500	500	500
REVENUE-EXPENDITURE	5,349	7,617	-756	-4,437	-1,416	2,623	2,472



Mr Ron Mooney in his raspberry area at his property in Harewood.
Growers visited Mr Mooney's property during the August seminar.

Our records are now on a computer system where the work, machines and material are recorded according to a coding list and the total hours or material cost/crop is determined by the computer. This can be on a month to month or year to year basis and there is provision to alter or extend the crops and categories. It will allow interested growers to send in information for collating by the computer according to their own coding system. A sample of a section of the printout is presented on page 131. The few figures included for illustration are real but cannot be interpreted without detailed explanation.

It concerns me very much that with most berryfruit grown as a perennial crop, we are not taking into account changes in costs when averaging several years. This could result in the correct figure for one grower who has older plants but an underestimate of costs and margin where an area has been recently established. There are many other vague areas of costing as well concerning, for example, overheads on the one hand and weight loss during freezing on the other.

In considering a strawberry area over its three year life period we are now in a position to incorporate all costs, including overheads, and arrive at a net profit. It must be re-emphasised though that these apply to our set of conditions, using our production figures and our situation regarding production and marketing costs. They should be used as a guide only and must not be considered absolute for the industry.

STRAWBERRY PRODUCTION AND COSTS (1970 PRICES)

	1968/69	1969/70	1970/71
Yield	2 tons	13 tons	10 tons
Growing cost	16.84c/lb	3.18c/lb	4.13c/lb
Harvest and supervision	6.06	6.06	6.75
Total cost (gate)	22.90	9.24	10.88

The average cost/lb excluding the cost of land is:

1. Growing cost $(2 \times 16.84 + 13 \times 3.18 + 10 \times 4.13) \div 25 = 4.65$
2. Harvest and supervision $(2 \times 6.06 + 13 \times 6.06 + 10 \times 6.75) \div 25 = 6.34$
3. Total cost $(2 \times 22.90 + 13 \times 9.24 + 10 \times 10.88) \div 25 = 10.99$

Taking an arbitrary 'at the gate' price of 15c/lb, the profit situation is as follows:

Average profit/lb = 15.0 - 10.99	= 4.01
Net profit/acre for 3 years	\$2,246
Net profit/acre/annum	\$749
Total net profit $5\frac{1}{2}$ acres/3 years	\$12,351
Average net profit/ $5\frac{1}{2}$ acres/annum	\$4,117

This represents return on capital before taxation.

The importance of yield on profitability can be demonstrated by calculating figures based on half the actual yield we obtained. Frost, wet weather during harvesting and many other factors could easily cause a 50% reduction in yield. Clearly with a high risk, high working capital crop such as strawberries, skilled husbandry is necessary to produce economically.

	1968/69	1969/70	1970/71
Yield	1 ton	6.5 tons	5 tons
Growing cost	33.68c/lb	6.36c/lb	8.26c/lb
Harvest and supervision	6.06	6.06	6.75
Total cost	39.74	12.42	15.01
Average cost/lb = $(39.74 \times 1 + 12.42 \times 6.5 + 15.01 \times 5) \div 12.5$			
			= 15.64c
Average loss/lb = $15.0 - 15.64$			= -0.64
Average net loss/acre/annum			= \$84

With a perennial crop, the length of life of the plants presents problems in accurate costings. It seems to be traditional in Canterbury that strawberries last only three years as an economical crop and must then be replaced. We have an area approaching its fourth cropping season which is so healthy that it would be foolish to replace it. What then would be the effect of spreading the establishment costs over four years instead of three? The establishment costs at \$1,048/acre are reduced from \$350/annum for three years life of the bed to \$260/annum for four years life of the bed. This reduces the growing cost in each year and increases the net profit/acre/annum from \$749 to \$839 provided of course the yield in the fourth year is at the three year average of 8 1/3 tons/acre. Part of this four year old bed will be held for further study in the fifth year.

Conclusion

Experimental work into the economics and management of berryfruit is open to severe criticism and the College has not escaped this. But constructive criticism can do the industry nothing but good. Along with criticism comes awareness; an awareness of what figures represent and mean, an awareness of the instability of the industry, particularly with the Australian market as it is, an awareness of the processing and selling problems, an awareness of industry organisation and co-operation.

If growers are realistically aware of these problems then they are in an excellent position to solve them. To know the facts and distribute them wisely, to act on the facts to improve the efficiency of production, to co-operate with the industry in an endeavour to stabilise production and selling for the good of New Zealand, these are the objectives of our research area as I see them.

Acknowledgements

Mr G.R. Naish calculated some of the figures presented.

Mr J.H. Martin compiled the annual accounts.

TEST DATA FOR UTIM1 70/71 G. THIELE

LABOUR HOURS												
LABOUR TYPE	STRAWB A	STRAWB B	STRAWB C	STRAWB D	GOOSEB	BOYSEN BY	BLACKC A	BLACKC B	RASPBE RY	PIP FR UT	STONE FR	OTHER CR
FOREMAN	0.	8.	63.	80.	0.	51.	44.	0.	25.	0.	0.	0.
OTHER PT	0.	0.	24.	21.	0.	0.	42.	0.	11.	0.	0.	0.
STUDENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OTHER CL	0.	35.	728.	81.	0.	817.	33.	0.	347.	0.	0.	0.
TOTAL	0.	47.	861.	183.	0.	868.	122.	0.	385.	0.	0.	0.
LABOUR HOURS												
WORK CATEGORY	STRAWB A	STRAWB B	STRAWB C	STRAWB D	GOOSEB	BOYSEN BY	BLACKC A	BLACKC B	RASPBE RY	PIP FR UT	STONE FR	OTHER CR
PROPAGTN	0.	0.	202.	110.	0.	0.	0.	0.	0.	0.	0.	0.
CULTIVAT	0.	0.	38.	40.	0.	0.	31.	0.	0.	0.	0.	0.
SOIL MGT	0.	21.	114.	2.	0.	27.	12.	0.	12.	0.	0.	0.
WEEDPEST	0.	25.	506.	30.	0.	110.	31.	0.	32.	0.	0.	0.
IRRIGATN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
THINNING	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HARVESTG	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
STORAGE	0.	0.	0.	0.	0.	731.	46.	0.	340.	0.	0.	0.
PRUNING	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	47.	861.	183.	0.	868.	122.	0.	385.	0.	0.	0.
LABOUR HOURS												
WORK SUB CATEGORY	STRAWB A	STRAWB B	STRAWB C	STRAWB D	GOOSEB	BOYSEN BY	BLACKC A	BLACKC B	RASPBE RY	PIP FR UT	STONE FR	OTHER CR
PLASTIC	0.	0.	44.	34.	0.	0.	0.	0.	0.	0.	0.	0.
PLANTING	0.	0.	158.	75.	0.	0.	0.	0.	0.	0.	0.	0.
PROP SUB	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FERTHAND	0.	0.	0.	0.	0.	13.	0.	0.	0.	0.	0.	0.
FERTMACH	0.	0.	0.	2.	0.	7.	6.	0.	2.	0.	0.	0.
MULCHING	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HANDSPRY	0.	0.	0.	0.	0.	71.	0.	0.	0.	0.	0.	0.
HANDWEED	0.	0.	448.	10.	0.	0.	31.	0.	0.	0.	0.	0.
HYGIENE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
THIN SUB	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HARY SUB	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PACKING	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MARKETING	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HARY SUP	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RUNNERS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PRUN SUB	0.	0.	0.	0.	0.	196.	46.	0.	180.	0.	0.	0.
TRAITTIE	0.	0.	0.	0.	0.	535.	0.	0.	115.	0.	0.	0.
POSTS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	0.	659.	123.	0.	822.	84.	0.	301.	0.	0.	0.
MACHINE HOURS												
MACHINE TYPE	STRAWB A	STRAWB B	STRAWB C	STRAWB D	GOOSEB	BOYSEN BY	BLACKC A	BLACKC B	RASPBE RY	PIP FR UT	STONE FR	OTHER CR
TRACTOR	0.	25.	156.	62.	0.	101.	29.	0.	41.	0.	0.	0.
TRAILER	0.	7.	10.	1.	0.	6.	1.	0.	10.	0.	0.	0.
IMPLEMNT	0.	6.	50.	54.	0.	6.	1.	0.	4.	0.	0.	0.
ROTOVATR	0.	0.	11.	5.	0.	0.	0.	0.	0.	0.	0.	0.
ROTRY HO	0.	0.	0.	0.	0.	3.	0.	0.	0.	0.	0.	0.
MOWER HD	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MOWERPPT	0.	1.	1.	0.	0.	4.	7.	0.	2.	0.	0.	0.
AIRBLAST	0.	0.	0.	0.	0.	11.	4.	0.	10.	0.	0.	0.
TRAILSPR	0.	0.	43.	9.	0.	8.	0.	0.	0.	0.	0.	0.
SPRAYPTO	0.	10.	43.	9.	0.	66.	12.	0.	9.	0.	0.	0.
OTHER	0.	0.	40.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL	0.	50.	313.	132.	0.	206.	56.	0.	82.	0.	0.	0.
MACHINE HOURS												
WORK CATEGORY	STRAWB A	STRAWB B	STRAWB C	STRAWB D	GOOSEB	BOYSEN BY	BLACKC A	BLACKC B	RASPBE RY	PIP FR UT	STONE FR	OTHER CR
PROPAGTN	0.	0.	60.	36.	0.	0.	0.	0.	0.	0.	0.	0.
CULTIVAT	0.	0.	37.	72.	0.	0.	0.	0.	0.	0.	0.	0.
SOIL MGT	0.	22.	109.	4.	0.	23.	19.	0.	20.	0.	0.	0.
WEEDPEST	0.	28.	86.	19.	0.	17.	3.	0.	41.	0.	0.	0.
IRRIGATN	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
THINNING	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
HARVESTG	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
STORAGE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PRUNING	0.	0.	0.	0.	0.	12.	0.	0.	20.	0.	0.	0.
TOTAL	0.	50.	313.	132.	0.	206.	56.	0.	82.	0.	0.	0.
DOLLARS												
MATERIAL VALUE	STRAWB A	STRAWB B	STRAWB C	STRAWB D	GOOSEB	BOYSEN BY	BLACKC A	BLACKC B	RASPBE RY	PIP FR UT	STONE FR	OTHER CR
INSECTCD	0.	12.	57.	11.	0.	19.	14.	0.	15.	0.	0.	0.
FUNGICID	0.	0.	19.	4.	0.	60.	27.	0.	60.	0.	0.	0.
WEEDICID	0.	0.	48.	15.	0.	42.	9.	0.	12.	0.	0.	0.
FERTILZR	0.	0.	530.	49.	0.	68.	59.	0.	101.	0.	0.	0.
OTHERMAT	0.	19.	1404.	200.	0.	84.	0.	0.	22.	0.	0.	0.
TOTAL	0.	36.	2060.	281.	0.	201.	111.	0.	212.	0.	0.	0.

Sample of a computer printout for the Horticultural Research Area, Lincoln College, recording system.

DEPARTMENT OF HORTICULTURE BULLETINS

1. Proceedings of fruitgrowers' short course, May 1967.
G.F. Thiele, editor.
2. Advice to prospective horticultural students commencing practical work.
G.F. Thiele, 1967.
3. Extensive vegetable production.
R.A. Crowder, 1968.
4. Development of machine methods for extensive crop production.
R.A. Crowder, 1968.
5. Preliminary investigations into large-scale intensive production of tomatoes.
R.A. Crowder, 1968.
6. Horticultural management handbook.
G.F. Thiele, 1969.
7. Economics and management of fruitgrowing.
T.M. Morrison, editor, 1968:
8. Economics and management of vegetable growing.
T.M. Morrison, editor, 1969.
9. Process tomato growing in Canterbury - II.
R.A. Crowder, 1969.
10. Berryfruit management.
G.F. Thiele, 1969.
11. Horticultural marketing.
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12. Seminar on the production, management and marketing of berryfruit, August 1971.
G.F. Thiele, editor.