October, 1958

REPORT NO. 109

Broccoli

UNIVERSITY OF BRISTOL
DEPARTMENT OF ECONOMICS
(Agricultural Economics)

AN ECONOMIC STUDY OF THE BROCCOLI CROP IN WEST CORNWALL

5-Year Investigation 1952/53 to 1956/57

PRICE FIVE SHILLINGS

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AN ECONOMIC STUDY OF THE BROCCOLI CROP IN WEST CORNWALL

5-Year Investigation 1952/53 to 1956/57

BY

HELEN M. COLE, B.Sc. (ECON.)

FOREWORD

Broccoli growing is a long established industry in West Cornwall largely due to a climatic advantage which favours a winter crop. When out of season vegetables were less plentiful than to-day, the high prices received for this crop made it a profitable venture despite the distance from the market, and it fitted into a system of farming which had been developed in this region based on intensive stocking and manuring on limited acreage.

From time to time the enterprise has faced various crises. In the inter-war years the industry was boosted by resort to tariffs which kept out the European competitor. From 1926 onwards the acreage grown rose steadily, so that by 1934 when the first serious attempt to study the economics of the industry was made, we find MacGregor saying, "It remains to be seen whether such an increase in acreage is justified, in the light of the present prices ruling in the main markets . . . although the crop fetches an appreciable income to the agriculturists and horticulturists in Cornwall, it is probably less known as an expensive crop to grow."

The acreage did expand, but in the decade after the war-time boom in prices West Cornwall broccoli growers are once again encountering very considerable difficulties, particularly as they have now lost much of the natural advantage they once enjoyed for the production of out of season crops. Apart from intensified competition from abroad encouraged by the present tendency to think in terms of more liberalisation of trade with the European community, transport costs have risen steeply and the crop has spread to other areas of the country.

Because of the concern of Cornish growers about the situation, the University was approached by representatives of farmers and horticulturists of the county to undertake a survey of the production side of the enterprise. In the first instance it was intended to undertake a one-year investigation, but due to abnormality of the season the investigation was extended. In fact, it has run for five years, and in some way or other all five have been abnormal seasons. Perhaps there never was a normal season for any crop. Even so, reference to the weather records would suggest that this period has been rather exceptional.

However this may be, it is hoped that the study undertaken by Miss Cole has thrown some light on the problems which now beset this rather specialised and localised enterprise and the reasons for the present decline in the acreage grown in Cornwall. Other aspects of the crop, particularly those relating to marketing, have been studied elsewhere. In 1958, when contraction rather than expansion seems to be the feature of the industry, might we not again query the trend?

S. T. MORRIS,
Provincial Agricultural Economist.

ACKNOWLEDGEMENTS

The Department of Economics (Agricultural Economics) wishes to say a very sincere "thank you" to all the growers who, during the five years in which the broccoli investigation was carried out in West Cornwall, supplied the data and kept the records on which much of this report is based. The author would like to add her appreciation of the courtesy shown during the various visits and the co-operative spirit in which the growers assisted her.

Our thanks are also due to those individuals in the Ministry of Agriculture, Fisheries and Food, the N.A.A.S., the N.F.U., the firms of Commision Agents, Meteorologists and others who supplied various facts and figures incorporated in the report.

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A Broccoli Harvest Scene—
Perranuthnoe, near Penzance, Cornwall

INTRODUCTION

The broccoli plant, which is grown in West Cornwall and other counties in England and Wales during the winter months, is a hardier variety of the more familiar cauliflower that comes to maturity during the summer and autumn seasons. Officially the term broccoli refers to crops that mature in most areas between January and June. It is also used in speaking of the Extra Early Roscoff variety, maturing in the South West sometimes as early as October but usually in November and December.

The Cornish broccoli season extends over the six months November to April. During the five seasons 1952/53 to 1956/57 at least 95% of the crop was marketed in this period. Thus, during the first two months of the Cornish season broccoli marketings overlap with supplies of autumn cauliflower from other counties, chiefly from Kent and Lincolnshire, but the broccoli crop also finishes earlier in Cornwall than in other parts of England and Wales. Cornish supplies are generally tapering off as those from Kent and Lincolnshire are reaching their peak in April and May.

The broccoli crop in Cornwall has a history of 100 years or more and until recent decades it was grown from Cornish seed strains. From early in this century the Cornish heads compared unfavourably with those that were being imported from the Continent and while the total cauliflower acreage in England and Wales was steadily increasing, the Cornish broccoli crop hardly expanded until the Roscoff seed strains were introduced there in the early 1920's.

The institution of protective tariffs in 1932 effectively reduced the then high level of cauliflower imports, the larger part of which entered the country during the winter season, and this gave an added stimulus to the increasing broccoli acreage in Cornwall. At the same time the grading and packing of Cornish heads reached a high standard under the leadership of H. W. Abbiss. In this pre-1939/45 world war period the cauliflower and broccoli area increased in other parts of England and Wales as well and especially in Kent.

Along with most other home-grown vegetables the cauliflower and broccoli crop expanded considerably after 1940 in response to the war-time and immediate post-war shortage of food. The maximum area of broccoli in England and Wales, about 25,000 acres, was reached in the 1946/47 season.

Towards the end of the 1940's the demand for vegetables lessened as a greater variety and quantity of foods became available. At the same time home-grown cauliflower and broccoli supplies were swollen by the re-admission, in the severe season of 1946/47, of winter cauliflower imports from the Continent. The total tonnage received then was nearly double the average imported in the pre-war seasons of effective tariff protection.

By 1946/47, owing to the fall in the value of money, the original tariff rates had lost their "protective" power and in three years the imports more than trebled in quantity. In the 1949/50 season winter cauliflower imports reached their highest level. From January, 1950 to

December, 1953 they became subject to quota restrictions—but from the latter date the quotas were abolished and the pre-war tariff rates were doubled.

The decline in the broccoli acreage at home was larger and occurred sooner in Cornwall than in the rest of England and Wales. In 1946/47, the Cornish acreage was 39% of the total. By 1956/57 it had dropped to 27% and was barely two-fifths of its near 10,000 acre peak in 1946/47. Of even greater concern perhaps was the fact that the acreage in Cornwall in the mid-1950's fell below that of the 1930's, before the war-time increase took place. The Cornish acreage in the 1950's has dropped to something like 70%, of the area grown in the pre-war years. It was this phenomenal post-war acreage decline that led to the request for an economic investigation of the Cornish broccoli crop.

The big reductions in the Cornish acreage can be attributed mainly to the large imported tonnages of winter cauliflower, although weather conditions were also a factor. The bulk of imports entering the country from 1946/47 onwards came in the three months January to March and competed directly with the main marketings of the Cornish crop. Furthermore the quality of the Cornish crop was unable to compete with the more carefully graded packs that were subject to compulsory inspection before leaving the Continent*.

The decline in the quality of the Cornish crop was the inevitable result of the large immediate post-war expansion. The restriction of facilities for producing the seed of early varieties abroad, coupled with the increased demand to plant the larger acreages led to a deterioration in the quality of the seed distributed for commercial use and consequently of the crops. The large increase in acreage also meant that some of the crop was grown in parts of the county and in conditions less well suited to its production than the smaller pre-war area. Grading and packing standards suffered as well through the demand, in the lean years, for quantity rather than quality. Old established growers temporarily lost the art and new ones hardly acquired it.

Although the presence each season of large quantities of relatively good quality winter cauliflower from the continent exerted a repeated pressure on market prices for Cornish broccoli, the seasons in which the major reductions in the Cornish acreage occurred appear to have been precipitated by the widespread damage to the Cornish crops, occurring during some very severe winters.

The severest and most prolonged winter occurred in the 1946/47 season when the Cornish acreage was at its peak. The following year the

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* France and Italy, from whom we have received nearly the whole of our imports, are both geared to an export trade, with other European Countries as well as with the United Kingdom. This means, of course, that only selected curds leave the exporting country, the remainder are consumed internally whereas markets in the importing country are selling selected imports alongside the whole of the home crop. Exportable supplies have recently been drawn from an average annual production of around 200,000 tons in France and between 400,000 and 500,000 tons in Italy. By comparison the maximum post-war output from Cornwall was 55,000 tons in 1945/46. For the period 1952/57 the average seasonal output was barely 20,000 tons.

acreage there fell by 20%. As is shown more fully in Part I and in Appendix B of this report severe winters in Cornwall have been more frequent and lower temperatures have been recorded since 1940 than in the earlier period when the production of the crop was on the increase.

If the first post-war decade has been a difficult and rather depressing one for Cornish broccoli growers it finishes on a more encouraging note. For although the quantity and quality of winter cauliflower imports were a major cause behind the contraction of Cornish production, they also provided the needed challenge which has enabled Cornish growers, and those who produce the seed, to make good progress in surmounting their biggest post-war problem—that of regaining the high standards achieved before the war.

I.

MAIN TRENDS THAT HAVE LED TO THE UNCERTAIN POSITION OF THE WEST CORNWALL BROCCOLI CROP IN THE 1950's

TRENDS IN THE SUPPLIES OF HOME GROWN AND IMPORTED CAULIFLOWER AND BROCCOLI

(a) A Comparison Between the Late 1930's and Early 1950's

In the relatively normal conditions of the 1950's, when a considerable measure of recovery from the war yars has been achieved, there is a natural inclination to draw comparisons with the immediate pre-war period. For it was in the 1930's that broccoli production in West Cornwall seemed to have become established on a relatively flourishing basis.

The trend in the total cauliflower acreage, production and marketing figures for England and Wales indicates that in the post-war decline they have not fallen to the pre-war level in the 1950's.

TABLE 1

ESTIMATED CROPPED AREA, TOTAL AMOUNT OF CAULIFLOWER AND BROCCOLI PRODUCED AND MARKETED IN ENGLAND AND WALES, 1936/39 to 1952/56

Period	*Acres*	*Total Produced Tons*	*Total Marketed Tons*	*Total Marketed as % of Total Produced*
1936/39	30,969	195,240	191,750	98
1940/44	31,982	198,000	194,200	98
1945/49	47,303	251,800	238,200	95
1950/54	36,422	216,800	214,000	99
1952/56	34,281	200,600	195,400	97

Source: Horticultural Statistics, M.A.F.F.

Over the same period the statistics show that the Cornish broccoli crop has not shared in this general trend, while in other counties, particularly in Lincolnshire, the crop has increased phenomenally as compared with the pre-war years.

TABLE 2

BROCCOLI ACREAGES IN ENGLAND AND WALES, 1935/39 to 1952/56

Period	*Cornwall*	*Kent*	*Lincs.*	*Rest of England and Wales*	*Total*
*1935/39	7,367	3,227	574	2,316	13,484
*1940/44	6,933	2,144	886	3,382	13,345
1945/49	8,345	3,137	2,353	8,828	22,663
1950/54	5,186	2,914	1,992	6,277	16,369
1952/56	4,234	2,838	1,895	5,349	14,316

Source: Horticultural Statistics, M.A.F.F.

* These calculations are not based on June 4th acreage returns alone, because they provide an incomplete record of broccoli acreages, but on those adjusted according to the proportionate average increase of September 4th returns over June 4th returns since 1945, when September acreages were first recorded.

The monthly distribution of marketings from these broccoli producing counties in England and Wales, averaged over five seasons 1952/53 to 1956/57, shows that competition with the Cornish crop occurs mainly at the beginning of the Cornish season, in November and December when the crop overlaps with the autumn cauliflower, and again towards the end of it in April.

TABLE 3

AVERAGE MONTHLY MARKETINGS OF LATE AUTUMN CAULIFLOWER AND BROCCOLI IN ENGLAND AND WALES

November to April 1952/53 to 1956/57

	November	*December*	*January*	*February*	*March*	*April*	*Total*
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Cornwall ..	1,046	3,532	3,538	3,152	4,116	3,930	19,314
Kent	7,856	3,526	1,097	706	2,298	5,088	20,571
Lincs. ..	5,286	2,230	212	—	178	1,998	9,904
Other Counties	8,012	2,470	903	894	2,708	7,263	22,250
Total ..	22,200	11,758	5,750	4,752	9,300	18,279	72,039

Source : Horticultural Statistics M.A.F.F.

A comparison of the pre-war with the post-war imports of winter cauliflower suggests a much larger and more coincidental form of competition with the Cornish crop. This has been the real post-war challenge to Cornish growers.

TABLE 4

AVERAGE ANNUAL AND NOVEMBER TO APRIL TONNAGES OF CAULIFLOWER IMPORTS, 1935/39 to 1952/56

Period	*Per Annum*	*November to April*	*November to April as % of Annual*
	Tons	*Tons*	
1935/39	8,400	5,400	64
1940/44	—	—	—
1945/49	21,927	21,375	97
1950/54	36,348	35,123	97
1952/56	32,956	31,573	96

Source: Horticultural Statistics, M.A.F.F.

An estimation has been made of the pre-war average monthly output from Cornwall and set alongside the pre-war average monthly import figures for comparison with the monthly supplies from the same sources averaged over the five seasons 1952/53 to 1956/57.

TABLE 5

A COMPARISON OF THE PRE-WAR AND 1952/53 TO 1956/57 AVERAGE MONTHLY DISTRIBUTION OF CORNISH BROCCOLI AND IMPORTED WINTER CAULIFLOWER SUPPLIES

1936/39	*Nov.*	*Dec.*	*Jan.*	*Feb.*	*Mar.*	*April*	*Total*	*% of Combined Total*
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	
Imported	175	1,039	1,115	1,341	1,204	451	5,325	12
Cornish	2,310	3,360	5,040	9,870	14,910	4,830	40,320	88
Total	2,485	4,399	6,155	11,211	16,114	5,281	45,645	100
1952/57								
Imported	778	3,262	6,692	7,979	7,717	5,146	31,574	62
Cornish	1,046	3,532	3,538	3,152	4,116	3,930	19,314	38
Total	1,824	6,794	10,230	11,131	11,833	9,076	50,888	100

Source: Horticultural Statistics M.A.F.F.

It has been suggested that the number of severe winters experienced since the war has been a contributory factor to the recent drop in the Cornish broccoli acreage. This poses the question whether winter temperatures were more favourable to the maturing crop in the 1930's, when broccoli growing in Cornwall was a more flourishing industry than it has so far been in the 1950's. A comparison of the average minimum January and February temperatures for the two periods shows that this has been the case.

TABLE 6

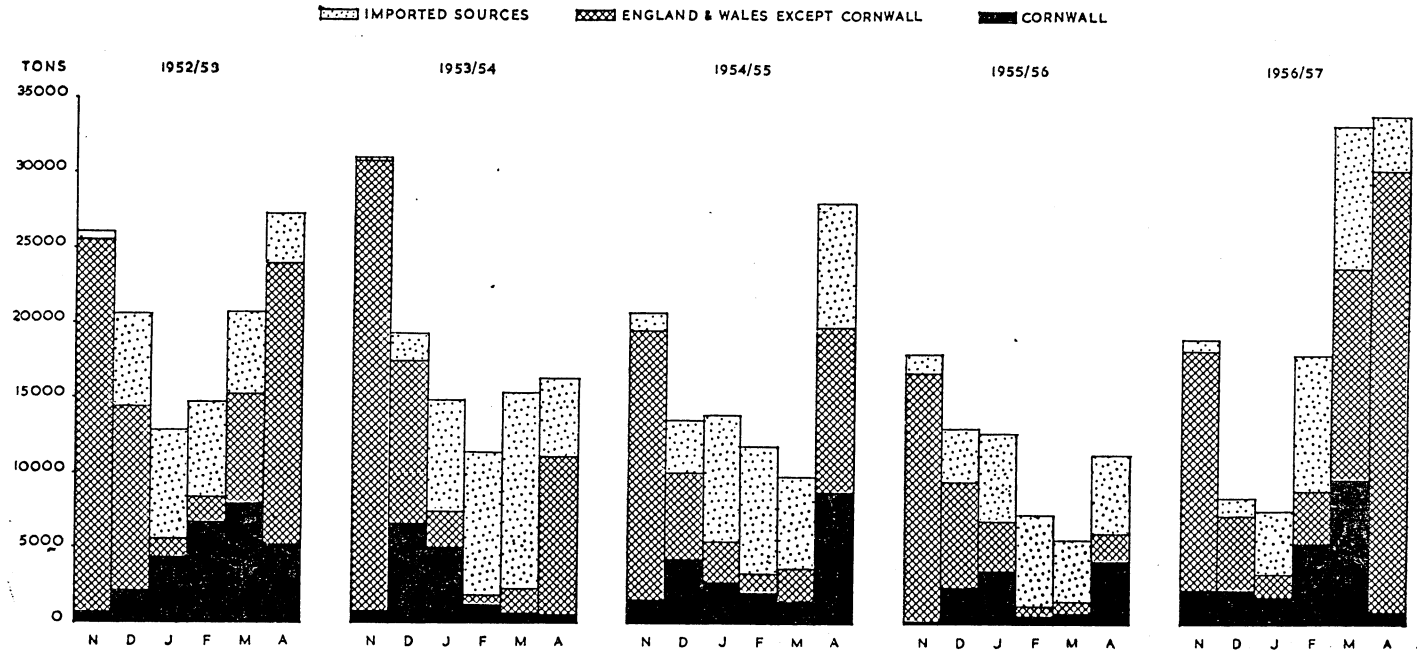
AVERAGE DAILY MINIMUM AND ABSOLUTE MINIMUM TEMPERATURES FOR JANUARY AND FEBRUARY RECORDED IN PENZANCE FOR THE PERIODS 1930 to 1939 and 1950 to 1957

Period	*January*			*February*		
	Daily Minimum	*Absolute Minimum*		*Daily Minimum*	*Absolute Minimum*	
		Temp.	Year		Temp.	Year
1930 to 1939	33°	28°	1933	32°	28°	1932
1950 to 1957	31°	26°	1950	28°	20°	1956

Source: Borough Meteorologist's Records, Penzance.

FIGURE 1

MONTHLY SUPPLIES OF LATE AUTUMN AND WINTER CAULIFLOWER AND BROCCOLI FROM IMPORTED SOURCES, FROM ENGLAND AND WALES EXCEPT CORNWALL AND FROM CORNWALL. NOVEMBER TO APRIL, 1952/53 TO 1956/57



(b) Supplies in the November to April Season 1952/53 to 1956/57

Table 7 shows the total supplies reaching the markets from Cornwall, from other Counties in England and Wales and from imported sources during each November to April season.

TABLE 7

BROCCOLI AND LATE AUTUMN AND WINTER CAULIFLOWER SUPPLIES IN THE NOVEMBER TO APRIL SEASONS 1952/53 to 1956/57

Season	*Cornwall*	*England and Wales excl. Cornwall*	*Imports*	*Total*
	Tons	*Tons*	*Tons*	*Tons*
1952/53	26,760	66,180	29,165	122,105
1953/54	14,490	56,310	37,550	108,350
1954/55	20,900	41,100	36,272	98,272
1955/56	11,900	30,200	26,332	68,432
1956/57	22,520	69,673	28,545	120,738

Source: Horticultural Statistics M.A.F.F.

In the first and fifth seasons supplies from all three sources were very similar in amount. In the three intermediate seasons supplies from Cornwall and other counties were much reduced by severe frost and in 1955/56 crops in Continental countries were also affected.

Although there were fluctuations in broccoli and autumn cauliflower acreages (as already pointed out the autumn cauliflower crop influences supplies in November and December) they were not large enough to cause such extreme variations in marketings as occurred in these five seasons. Table 8 sets out the comparative Cornish acreages, marketings and minimum February temperature for each season.

TABLE 8

CORNISH BROCCOLI ACREAGES, TOTAL MARKETINGS AND MINIMUM TEMPERATURES IN FEBRUARY EACH SEASON, 1952/53 to 1956/67

Season	*Acres*	*Total Output*	*February*	
			Mean of Daily Min.	*Absolute Minimum*
1952/53	4,500	27,650	39°	31°
1953/54	5,000	14,990	39°	21°
1954/55	4,500	21,660	35°	21°
1955/56	3,400	12,200	31°	20°
1956/57	3,700	23,640	42°	29°

Source: Horticultural Statistics, M.A.F.F. and Borough Meteorologist's Records, Penzance.

In 1952/53 and 1956/57, the seasons with more normal climate, approximately 75% of the total Cornish crop was marketed in the three months January to March. Nearly 75% of the six months winter cauliflower imports also entered the country during these three months. On the other hand, about 80% of supplies from the remaining counties of England and Wales were marketed in the three months November, December and April.

Table 9 shows the difference in the relative contribution to total supplies made from the three sources in the January to March period and in the whole six months in the two seasons with relatively normal climate.

TABLE 9

AVERAGE TONNAGES AND PROPORTION OF TOTAL BROCCOLI AND LATE AUTUMN AND WINTER CAULIFLOWER SUPPLIES CONTRIBUTED BY—1. CORNWALL. 2. OTHER COUNTIES IN ENGLAND AND WALES. 3. IMPORTS IN THE SEASONS 1952/53 and 1956/57

		Cornwall	*England and Wales excl. Cornwall*	*Imports*	*Total*
Jan. to Mar. ..	*Tons*	18,040	14,535	21,095	53,670
	%	34	27	39	100
Nov. to April ..	*Tons*	24,640	66,921	28,849	120,410
	%	20	56	24	100

Source: Horticultural Statistics M.A.F.F.

The effect of severe frost damage on home grown supplies and their relative contribution to total supplies is shown when the figures in Table 9 are compared with those in Table 10 giving the same data averaged over the five seasons.

TABLE 10

AVERAGE TONNAGES AND PROPORTION OF TOTAL BROCCOLI, AND LATE AUTUMN AND WINTER CAULIFLOWER SUPPLIES CONTRIBUTED BY—1. CORNWALL. 2. OTHER COUNTIES IN ENGLAND AND WALES. 3. IMPORTS IN THE SEASONS 1952/53 to 1956/57

		Cornwall	*England and Wales excl. Cornwall*	*Imports*	*Total*
	Tons	10,806	8,944	22,387	42,137
Jan. to Mar. ..	%	26	21	53	100
Nov. to April ..	*Tons*	19,314	52,725	31,574	103,613
	%	19	51	30	100

Source: Horticultural Statistics M.A.F.F.

TRENDS IN THE TOTAL AMOUNT OF OTHER HOME GROWN BRASSICA CROPS AND THEIR SIGNIFICANCE FOR THE CORNISH BROCCOLI CROP

To the consumer other brassicas such as sprouts, cabbages and greens are direct competitors with cauliflower and broccoli and in quantity the other brassicas far outweigh the supply of home-grown and imported cauliflower and broccoli together. The total annual output of the latter has accounted for only 20% to 30% of the total annual output of all brassicas, in and since the 1930's.

As with cauliflower there was a large decline in the acreage and output of other brassicas after the immediate post-war peak but in the most recent period, 1952/56, when the average cauliflower and broccoli acreage in England and Wales had dropped to 11% above the pre-war period, that of other brassica crops was still 18% above the pre-war average.

TABLE 11

ESTIMATED CROPPED AREA, TOTAL AMOUNT OF BRASSICA CROPS OTHER THAN CAULIFLOWER AND BROCCOLI PRODUCED AND MARKETED IN ENGLAND AND WALES, 1936/39 to 1952/56

Period	*Acres*	*Total Produced*	*Total Marketed*	*Total Marketed as % of Total Produced*
		Tons	*Tons*	
1936/39	102,691	656,500	616,250	94
1940/44	121,921	804,600	714,600	89
1945/49	144,725	841,200	725,400	86
1950/54	124,214	808,200	644,000	80
1952/56	121,219	756,200	637,200	84

Source: Horticultural Statistics, M.A.F.F.

A comparison between Table 1 and Table 11 shows that the total amount of cauliflower marketed has been a larger proportion of total cauliflower production than has been the case with other brassica crops. Moreover, the difference between the total amounts of other brassicas produced and marketed has been greater since than before the war, suggesting more frequent glut conditions and even a state of relative over production.

In view of the apparently new cycle of severer winters since 1940* one could argue that from the consumer's point of view a larger than needed brassica acreage is now a desirable insurance policy.

Since the cauliflower and broccoli supply is a relatively small part of the total brassica supply the preponderence of other brassicas in the market inevitably influences the level of market prices for broccoli. Broccoli prices have, therefore, tended to move around a level dictated

* See Appendix B.

by those ruling for other brassica crops. A general scarcity of other brassicas has tended to push up the price of all of them together and conversely a general glut of other brassicas has tended to depress all brassica prices, including those for broccoli.

Taking the two six month periods separately, in the five years 1952/53 to 1956/57, cauliflower and broccoli supplies formed an even smaller part of total brassica supplies from November to April than in the May to October period. Total cauliflower and broccoli supplies averaged only 22% of total brassicas in the winter months compared with 32% from May to October. This was due to the larger proportion of other brassicas (57%), but smaller proportion of cauliflower and broccoli* (45%), marketed during the winter than the summer months.

An indication of the relation between total supplies and average prices for Cornish broccoli, for sprouts, cabbage and savoys in the November to April season is given in the following table.

TABLE 12

CAULIFLOWER/BROCCOLI AND OTHER BRASSICA SUPPLIES AND AVERAGE PRICES FOR BROCCOLI, SPROUTS, CABBAGE AND SAVOYS

November to April Season 1952/53 to 1956/57

Season	*Broccoli (Home & Imports)* '000 tons	*Other Brassica Crops* '000 tons	*Total Brassicas* '000 tons	*Average Seasonal Price/ Cornish Broccoli Pack*	*Average Seasonal Price/cwt.* *Sprouts*	*Cabbage*	*Savoys*
1952/53	122	320	442	17/7	66/11	20/4	25/1
1953/54	109	366	475	13/1	38/9	11/10	15/-
1954/55	98	411	509	14/9	62/9	16/2	20/8
1955/56	68	339	407	22/10	68/1	30/2	35/1
1956/57	121	378	499	15/9	36/8	12/1	14/1

Source: Horticultural Statistics M.A.F.F. and Cornish Growers.

Average seasonal broccoli prices are of course modified by important secondary influences particularly the relative level of broccoli supplies and the general quality of the crop. These influences will be referred to again in the second part of the report.

TRENDS IN THE CONSUMPTION OF CAULIFLOWER, BROCCOLI AND OTHER BRASSICAS

For all brassicas taken together consumption per head in the mid 1950's has returned to the pre-war figure. However, in the twenty years since the mid-1930's the population of England and Wales has increased by about $3\frac{3}{4}$ millions or 9%. Hence the larger supply of cauliflower, broccoli and other brassicas in the 1950's, shown in the earlier sections, does not imply a higher consumption per head.

The consumption per head of cauliflower and broccoli, unlike that

* The fact that in the two relatively mild winter seasons 1952/53 and 1956/57 about 50% of the annual cauliflower supply was marketed in the November to April period suggests that the five year average proportion was "distorted" by losses in the other three abnormally severe winters.

of other brassicas, did not increase until the end of the war, but when it occurred it was a greater proportionate increase than in other brassica consumption and it is still a little higher than before the war.

TABLE 13

AVERAGE ANNUAL CONSUMPTION PER HEAD IN ENGLAND AND WALES OF CAULIFLOWER, BROCCOLI AND OTHER BRASSICAS, 1936/39 to 1952/56

Period	*Cauliflower and Broccoli*	*Other Brassicas*	*Total Brassicas*
	lb./Head	*lb./Head*	*lb./Head*
1936/39	10½	33½	44
1940/44	10¼	38	48¼
1945/49	13½	37½	51
1950/54	12¾	32¾	45½
1952/56	11½	32½	44

In the previous section reference was made to the larger supplies of other brassicas in the six winter months and of cauliflowers in the May to October six months. For the five years 1952/57 this is reflected in the respective consumption rates for the two periods.

TABLE 14

AVERAGE WINTER AND SUMMER CONSUMPTION PER HEAD OF CAULIFLOWER, BROCCOLI AND OTHER BRASSICAS 1952/53 to 1956/57

	November to April			*May to October*		
	Cauliflower Broccoli	*Other Brassicas*	*Total Brassicas*	*Cauliflower Broccoli*	*Other Brassicas*	*Total Brassicas*
	lb./Head	*lb./Head*	*lb./Head*	*lb./Head*	*lb./Head*	*lb./Head*
1952/53 to 1956/57	5¼	18½	23¾	6¼	14	20¼

There is insufficient data for the pre-war years to provide a useful comparison with the 1950's in Table 14 but an estimation of the pre-war consumption of cauliflower and broccoli from different sources has been made in Table 15.

TABLE 15

ESTIMATED PRE-WAR CONSUMPTION OF CAULIFLOWER AND BROCCOLI DURING THE NOVEMBER TO APRIL PERIOD COMPARED WITH THE AVERAGE FOR 1952/53 to 1956/57

Source of Supply	*1936/39 lb./Head*	*1952/56 lb./Head*
Cornwall	2	1
England and Wales excluding Cornwall ...	2¼	2¾
Imports	¼	1½
Total	4½	5¼

These figures illustrate from the consumption angle the same transformation in the relative importance of the three sources of supply in the two periods as that presented from the production aspect in Table 5, page 14.

SUMMARY

Similarities in Supply and Demand Between the Early 1950's and the Late 1930's

A superficial comparison of the overall brassica position between the early 1950's and the late 1930's suggests that most of the 75% increase in total brassica production in England and Wales, arising from the war and immediate post-war period, had contracted again in the 1950's to more normal peace time levels.

Annual consumption per head of all brassicas was the same as before the war. Slightly greater production in the 1950's was balanced by an increase in population.

Annual consumption per head of cauliflower was still 1 lb. per head higher and from an estimation of the pre-war consumption during the Cornish broccoli season the greater part of this increase seems to have occurred in the winter months.

Contrasts in the Supply Position Between the Early 1950's and the Late 1930's

A radical change occurred during the Cornish season. There has been an almost complete reversal in the relative importance of Cornish and Continental imports as sources of supply.

An estimation of pre-war Cornish supplies suggests that in the late 1930's they accounted for 80% to 90% of supplies from these two sources together. In the five years 1952/53 to 1956/57 Cornwall contributed only 38% to this total.

The Cornish acreage contractions, although apparently precipitated by relatively frequent severe winters resulted basically from the effects of two features of our war-time economy—(1) the deterioration in Roscoff broccoli seed, in crop quality and in grading and packing standards in Cornwall. (2) the ineffectiveness of the pre-war tariff which, because it was a specific rate per cwt., rather than an ad valorum duty, lost its protective power with the depreciation of the value of the £. As a result of these two factors a much larger tonnage of selected imports than before the war was received during the Cornish season from 1946/47, though their increasing quantity was checked, first by quotas, then by doubling the tariff rates.

Other brassica production has declined less from the immediate post-war peak than cauliflower production. Furthermore, the total marketed is now a smaller proportion of the total produced than pre-war. This suggests that a larger acreage than is normally required is being grown, thus increasing the risk of potential gluts.

Discouraging Features in the Overall Position Facing Cornish Broccoli Growers in the 1950's

1. The possibility of a continuation of relatively frequent severe winters. There is little growers can do about this except to confine production of the crop to the least frost susceptible areas.

2. That recent imports of winter cauliflower—the bulk of these entered the country in the three months January to March—have exceeded the total output from Cornwall.
   This competition in quantity with imported winter cauliflower adds to the problem of competition in quality.

3. A potentially excessive production of other brassica crops apparently encouraged by a greater degree of adverse climate than was experienced before the war. This is inevitably a threat to the general level of broccoli prices since, in the November to April period, the output of other brassicas has recently been more than three times the total supply of broccoli and cauliflower in those six months.

Encouraging Features in the Overall Position Facing Cornish Broccoli Growers in the 1950's

1. The annual consumption per head of cauliflower is now a little higher than before the war. The winter variety seems to have shared fully in this gain.

2. Tariffs have had a greater protective power since the rates were doubled in December, 1953.

3. Improvements have been and are still taking place in the quality of the broccoli seed.

4. Cornish grading and packing standards have steadily improved in the last few seasons and growers are becoming more quality minded.

II.

RESULTS OF THE INVESTIGATION IN WEST CORNWALL 1952/53 to 1956/57

THE SAMPLE OF GROWERS

In each of the five seasons about forty growers co-operated in the investigation. Seventeen of those included in the first year's sample co-operated continuously throughout the five seasons.

Inevitably a few growers ceased to co-operate after each year and replacements had to be found. Of the thirty-two who dropped out over the whole period thirteen of them did so because they were giving up growing the crop. This was due mainly to decisions to expand the live-stock enterprises and cut down on labour requirements or because the holding was not well sited for broccoli growing and suffered unduly in really severe frosts.

The majority of growers were located in the Penzance—Marazion—Hayle area and planted, on average, a rather larger acreage per holding than those in other areas.

TABLE 16

LOCATION OF HOLDINGS AND ACREAGES GROWN—FIVE YEAR AVERAGE

	Holdings		*Acres*		*Av. Acres per Holding*
	No.	%	No.	%	
Penzance—Marazion—Hayle	24	60	246	67	10·3
Helston—Falmouth	5	13	33	9	6·6
Camborne—Redruth	4	10	25	7	6·3
Truro—Newquay	7	17	63	17	9·0
	40	100	367	100	9·2

For the co-operators as a whole the average area per holding was about 9¼ acres. The range was from one acre to an average of 28 acres for the small number of farms in the over 20-acre size group.

TABLE 17

DISTRIBUTION OF HOLDINGS IN ACREAGE GROUP SIZES—FIVE YEAR AVERAGE

		Under 2 Acres	*2–10 Acres*	*10–20 Acres*	*Over 20 Acres*	*Total*
Co-operators	No.	1	27	9	3	40
	% ..	3	67	23	7	100
County in 1951	% ..	2	69	22	7	100

It should be noted that these groups tend to consist of growers whose standards of production, grading, packing and marketing may be rather above that of the average.

GROUP RESULTS AVERAGED OVER THE FIVE SEASONS

Taking the five years as a whole the broccoli crop yielded an average margin of nearly £44 an acre to cover the cost of management, interest on capital invested and risks involved in growing the crop. Compared with some horticultural crops in Cornwall, particularly flowers, this is a low margin, but would seem to be more in line with other vegetable crops. The early potato crop, costed on a group of holdings in West Cornwall over the three seasons 1952/54 yielded an average of only £25 per acre. Moreover, in view of the relatively low yield due to the severe winters and low estimated proportion of plants cut for market an even lower margin might have been expected.

TABLE 18

COSTS, RETURN, MARGIN, YIELD AND OTHER DATA—
FIVE YEAR AVERAGE

	Per Acre	*Per Pack*	*Total Cost*	*Production Cost*
	£ s.	s. d.	%	%
Seedbed	5 7	8	5	9
Growing	31 1	3 9	27	53
Cutting and Packing	11 3	1 3	10	19
Overheads	10 17	1 2	10	19
Production Cost	58 8	6 10	52	100
Marketing Cost*	52 18	5 9	48	
Total Cost	111 6	12 7	100	
Gross Return †	154 17	16 10		
Margin	43 11	4 3		
Yield in Packs per Acre	184			
Packs of 24's and larger counts	77%			
Packs of small counts	23%			
Est. proportion of plants cut for market	52%			
Average Size of Field or Lot	2¾ *Acres*			

* This cost includes containers and fastenings; transport from the farm; salesman's commission and market tolls and miscellaneous items such as telephone, labels, etc. Owing to the small number of statements received by growers showing gross returns and full marketing cost items, this cost has had to be constructed. Most of the items are based on averages of these small groups. The method of calculating the transport cost is set out in a footnote on page 34.

† The gross return per acre is arrived at by adding the estimated average marketing cost per pack to the group average net return per pack and multiplying the sum of these figures by the average group yield per acre.

Among the samples of about 40 growers included each season a few marketed only early varieties, a few only late ones while the remainder were sending consignments through the whole of the season or for the greater part of it. The figures in Table 18, therefore, reflect a five year average result that was applicable for a full season's marketing. The following percentages show the five year average monthly distribution of marketings for the samples costed.

TABLE 19

MONTHLY DISTRIBUTION OF MARKETINGS—FIVE YEAR AVERAGE

Month	%	*Month*	%
October	2	February	11
November	7	March	21
December	19	April	19
January	20	May	2

SEASONAL VARIATIONS IN THE GROUP AVERAGE RESULTS

(a) Margins

In this five year period there were very wide seasonal variations in the margin per acre. The two extremes showed a range of over £90 an acre and occurred in the first two seasons, 1952/53 and 1953/54. In the latter season no less than 26 growers, or two thirds of the whole group that year, sustained a loss and in none of the five did every grower cover his costs. In other seasons losses were fewer. There was one in 1952/53, there were twelve in 1954/55, five in 1955/56 and three in 1956/57.

In broccoli production a number of factors can influence the margin of return over cost. An attempt to summarise them diagramatically has been made in Appendix C, Figure 4. In the 1952/57 period and for the co-operators as a whole the major factors behind the seasonal variations in margins were on the side of yields and returns rather than on that of costs.

(b) Returns and Factors Influencing Them

The seasonal group average returns per acre were the product of the average yield and the average return, or price per pack. Both factors varied considerably from season to season. Variations in both of them were affected by climatic factors. During this five year period in Cornwall, climate would seem however to have had a greater influence on the size than on the quality of the crops.

Yields

Although yields were dramatically reduced by severe frosts they were also influenced in less obvious ways by the quality of the marketed crop, through the percentage of large and small sized counts, and through the size of the unmarketable or unmarketed portion of the crop.

The low average yields in the three successive seasons of 1953/54, 1954/55 and 1955/56 were evidence of the extensive damage caused by severe frosts and the cutting winds accompanying them. Severe frosts were almost absent in the other two seasons.

Since other climatic factors, in addition to frost, influenced the quality, stamina and maturing period of the half dozen varieties that were grown, a description of the apparently ideal season and short summaries of the climatic factors affecting the crops in each season will indicate the nature of their influence. It will also provide an introduction to the section on prices.

The graphs in Figure 2 illustrate the main results of climatic in-

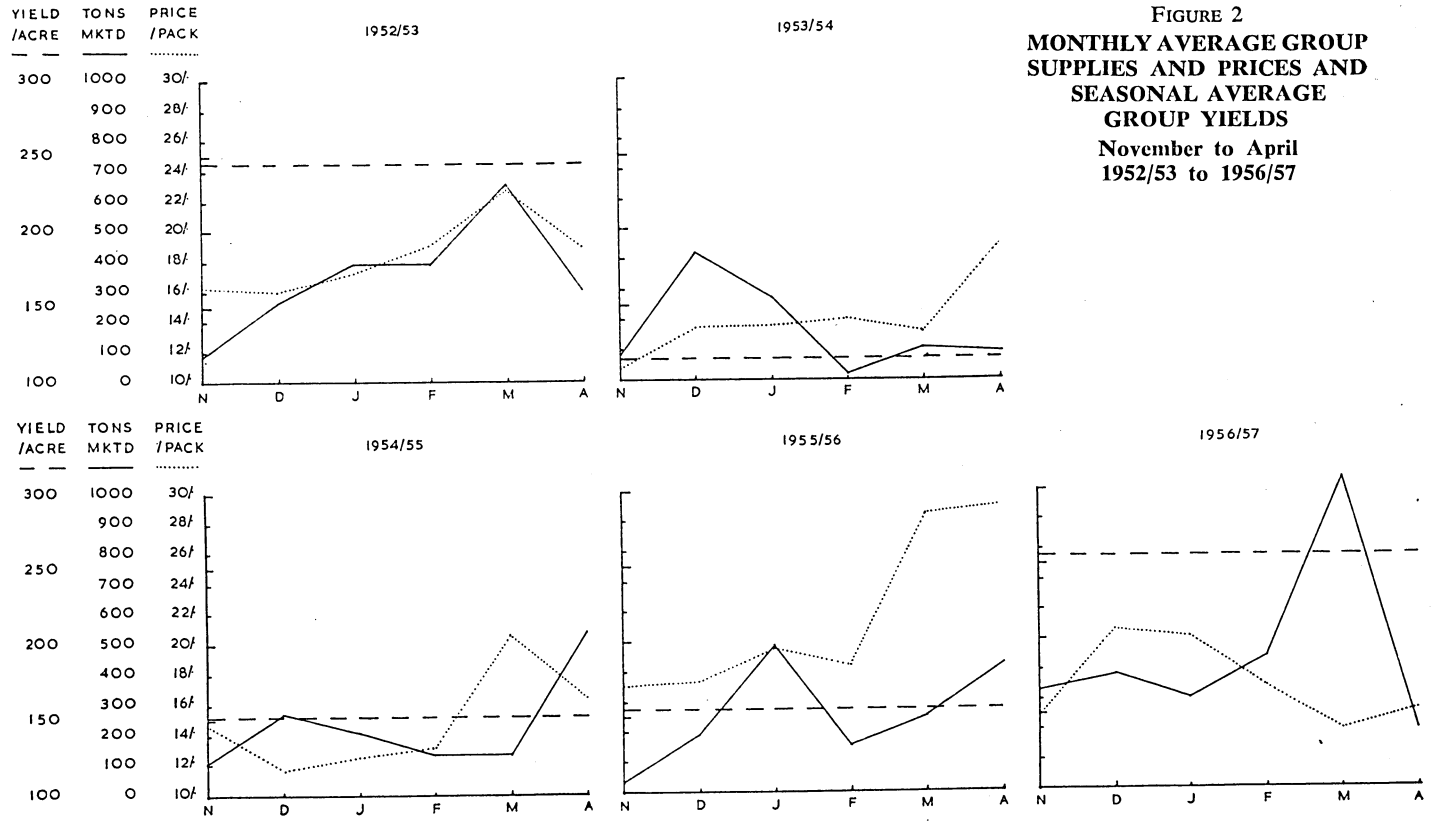


FIGURE 2

MONTHLY AVERAGE GROUP SUPPLIES AND PRICES AND SEASONAL AVERAGE GROUP YIELDS

November to April
1952/53 to 1956/57

TABLE 20

ANNUAL GROUP AVERAGE COSTS, RETURNS, MARGINS, YIELDS AND OTHER DATA—1952/53 to 1956/57

	1952/53		*1953/54*		*1954/55*		*1955/56*		*1956/57*	
Acres	358¾		337¼		363		366		410¾	
Number of Growers	41		39		38		41		41	
	Per Ac.	*Per Pack*	*Per Ac.*	*Per Pack*	*Per Ac.*	*Per Pack*	*Per Ac.*	*Per Pack*	*Per Ac.*	*Per Pack*
	£ s.	s. d.	£ s.	s. d.	£ s.	s. d.	£ s.	s. d.	£ s.	s. d.
Seedbed	5 16	6	5 4	11	5 12	9	5 7	9	4 16	5
Growing	32 18	2 8	29 8	5 2	29 19	3 11	33 16	4 4	29 4	2 3
Cutting and Packing	13 4	1 1	7 18	1 5	9 7	1 3	9 19	1 3	15 7	1 3
Overheads	10 12	11	10 4	1 10	10 8	1 4	11 6	1 5	11 16	11
Production Cost	62 10	5 2	52 14	9 4	55 6	7 3	60 8	7 9	61 3	4 10
Marketing Cost	67 2	5 6	29 13	5 3	40 11	5 4	50 14	6 6	77 11	6 1
Total Costs	129 12	10 8	82 7	14 7	95 17	12 7	111 2	14 3	138 14	10 11
Gross Return	214 10	17 7	73 18	13 1	112 2	14 9	178 2	22 10	200 16	15 9
Margin	84 18	6 11	− 8 9	− 1 6	16 5	2 2	67 0	8 7	62 2	4 10
Yield in Packs per Acre	244		113		152		156		255	
Packs of 24's and larger counts	79%		73%		66%		81%		87%	
Packs of small counts	21%		27%		34%		19%		13%	
Average Number of Heads per Pack	23		25		26		23		22	
Cutting and Packing Rate (Packs per Man Hour)	3½		2½		2¾		3		3¼	
Est. Proportion of Plants cut for market	68%		33%		51%		43%		67%	

fluence on yields and the distribution of supplies each season. The first season's graphs show that 1952/53 appeared to come as near the ideal as any of the five seasons from the point of view of yield and monthly distribution of supplies, both of them a reflection of nearly ideal climatic conditions.

The main features of the ideal season would appear to be a summer that is dry but free from cold spells for the early growth after transplanting in July, followed by a cool autumn for good transport conditions to market and a cold winter that is relatively free from very severe and prolonged frosts accompanied by icy winds. The last four seasons deviated considerably from the near ideal one in 1952/53, which had the further advantage, for the cutting and packing operation, of below average rainfall in the four months December to March. January and March were particularly dry.

In the 1953/54 season below average temperatures after planting, followed by a very mild November and December, brought the heads to maturity with a rush and large supplies of early broccoli reached markets that were already glutted with other greenstuff. Because of the unusually mild weather the early heads were soft and in a poor condition for travelling long distances. These and later varieties also suffered from the severe gales in November which disturbed the anchorage of the plants and damaged their foliage.

West Cornwall experienced some very severe frosts in February, 1954. Damage to the broccoli crop was extensive, affecting chiefly the No. 2 and No. 3 varieties and somewhat reducing the No. 4's. Of the costed area that season, some 337 acres, it was estimated that 45% was destroyed by frost.

In the exceptionally wet and rather mild early autumn of 1954 broccoli plants made very little root, they matured early and produced a large proportion of small sized heads, yielding in consequence, a reduced number of packs to the acre.

Average temperatures in February, 1955 were even lower than those in February, 1954. However, damage to the crop was lessened by a protective layer of snow which covered the ground for about a week. Supplies were reduced in February and March to a lesser degree than in the previous season and, unlike the previous season, they increased again in April.

The quality of the crop in the first half of the 1955/56 season was very good. However, air temperatures in February, 1956 reached the lowest minimum recorded in any February for over 30 years; the mean of the daily minimum temperature was as low as in the very severe February of 1947 and ground frost was recorded, at Gulval, on 25 days during the month.

In the exceptionally dry summer and autumn of 1955 the crop made good roots and hard growth so that frost damage, though considerable, was a little less extensive than in 1953/54. Much of the later varieties survived the ordeal and were of unexpectedly good quality.

For tonnage produced per acre the 1956/57 season was as good as that of 1952/53 but deviations from average temperatures in one or two months conspired to advanced the usual maturing period of the early and late varieties.

A cold August in 1956 gave the young plants a check and as a result the early varieties were maturing in October, November and December, at least a month too early. In consequence supplies in January were lower than in the two previous months.

From December to February temperatures were above average and in March they were exceptionally high with the result that late varieties matured then along with the (Roscoff) No. 4's. Nearly 10,000 tons, 38% of the season's output, left the county that month. Hence markets were glutted with broccoli, not only from Cornwall but from Kent as well. By April there was little left to be marketed from Cornwall.

Only one aspect of crop quality can be illustrated from the results of the investigation—that of the proportions of large and small sized counts. Presentation, or the standard of grading and packing by Cornish growers, is the aspect that has received the greatest amount of publicity but this depends on the quality of the crop in the field—depends, that is, on the average size of the heads and the absence of a number of defects that makes them unmarketable. If the crop is inherently poor in quality, either from poor quality seed or from adverse climate, no amount of skill in presenting it can replace what is lacking.

The seasonal average proportion of large sized counts ranged from 66% in 1954/55 to 87% in 1956/57. That this proportion has a minor influence on the yield can be shown by a simple calculation. Because of the low proportion of large sized counts in 1954/55 there was an average of as many as 26 heads per pack marketed. Had this average been a more normal 23 heads, the crop would have yielded another 19 packs, of 24 size, to the acre. Conversely in 1956/57 there was a high percentage of the larger counts with an average of 22 heads per pack and although a similar percentage of heads was cut for market as in 1952/53 there were rather more packs to the acre (Table 20).

The size of the unmarketed portion of the crop, arising from factors other than frost damage, could be studied in only two out of the five seasons.

Co-operating growers were questioned as to the extent of crop losses due to specific causes. The estimated proportion of the crops wasted for various reasons in 1952/53 and 1956/57 are summarised in Table 21.

TABLE 21

ACCOUNTED AND UNACCOUNTED CROP LOSSES IN 1952/53 and 1956/57

Causes	*% of Costed Acreage*	
	1952/53	*1956/57*
Frost	2	—
Wet land and season	—	1
Matured too fast to cut	—	1
Club root	½	1
Mice	1	1
Total Accounted for	3½	4
Unaccounted losses	28½	29
Total losses	32	33
Marketed	68	67
	100	100

The greater part of the unmarketed proportion was not attributed to any particular cause. A few could have been discarded because of post cutting defects such as mechanical damage or poor trimming but most of it would result from defects in the field. These could include the odd gap, the button hearts, the few that went to seed soon after planting, disease and poor types such as bracted, woolly or ricey curds. In 1956/57 growers estimated that in addition to the 3½% loss that could be accounted for, approximately another 4% was due to poor quality plants, *i.e.*, to field defects. In fact this was a gross under-estimation of the position.

Some field defects were doubtless due to climatic factors but it seems likely that the quality of the seed also influenced the size of the unmarketed portion of the crop. Improved strains were first introduced commercially in 1955/56 but even in the following year they were grown on only about 30% of the costed acreage. It is not, therefore, possible to judge whether the crop wastage was any less with these varieties. However, in view of the fact that recently even in a good season, growers could apparently count on marketing only two thirds of the crop, this aspect of yield seems to merit further observation and study.

Market Prices

The main factors influencing the general seasonal level of broccoli prices, it was pointed out in Part I (pages 18 and 19), was the general level of other brassica supplies in the market since they constituted nearly 80% of the total supply of brassicas.

The seasonal level of broccoli prices, so largely determined by those of other brassicas in the market, was however, modified by variations in in broccoli supplies and by the quality of the broccoli crop.

These secondary influences can be shown more clearly from a comparison of monthly than of seasonal figures. Those for March over the five seasons will indicate in particular the influence of varying broccoli supplies on broccoli prices in that month.

TABLE 22

MARCH SUPPLIES OF BROCCOLI AND OTHER BRASSICAS WITH AVERAGE CORNISH BROCCOLI PRICES PER PACK 1953/57

Year	*Broccoli from Cornwall Tons*	*Total Broccoli (incl. Imports) '000 tons*	*Other Brassicas '000 tons*	*Total Brassicas '000 tons*	*Average Price per Cornish Broccoli Pack*
1953	7,990	21	27	48	22/8
1954	600	15	36	51	13/1
1955	1,350	10	49	59	20/7
1956	780	6	29	35	28/6
1957	9,860	33	49	82	13/10

In 1954 broccoli supplies from Cornwall were the lowest for any March in this period. Prices for Cornish broccoli were also depressed to the lowest level for any March by three adverse influences— a relatively large supply of other brassicas, a large tonnage of broccoli imports and the poor quality of the Cornish crops following the very severe frosts in February.

March, 1956, on the other hand, showed the reverse situation. Broccoli supplies from Cornwall were relatively low, again following February frosts but were of superior quality to those in March, 1954, the imported tonnage was only one third of the amount reaching the markets in 1954 and other brassicas were in relatively short supply.

In March, 1957 broccoli prices were depressed by an abundance of other brassicas and a glut of broccoli in Cornwall, in other counties of England and Wales and a large tonnage from imported sources.

That quality can have an independent influence on broccoli prices would seem to be evidenced by a comparison of variations in the January figures.

January prices have been chosen to illustrate this influence because no January crops were materially damaged by frost during these five seasons and there happened to be two years, 1954 and 1956, in which supplies in the two months were fairly similar. There was a little less broccoli but a little more of other brassicas in 1956 and similar prices might have been expected in the two years. However, in 1954, when crop quality was rather poor, the average price was only 13/6; in 1956, when quality was markedly better, the average price was 19/8.

TABLE 23

JANUARY SUPPLIES OF BROCCOLI AND OTHER BRASSICAS WITH AVERAGE CORNISH BROCCOLI PRICES PER PACK 1953/57

Year	*Broccoli (incl. Imports) '000 Tons*	*Other Brassicas '000 Tons*	*Total Brassicas '000 Tons*	*Average Price per Cornish Broccoli Pack*	*% 24's and Larger Counts—Cornish Group Averages*
1953	13	56	69	17/3	79
1954	15	66	81	13/6	73
1955	14	80	94	12/5	66
1956	13	74	87	19/8	81
1957	8	67	75	20/1	87

Table 24 sets out the five year average price per pack for each month, together with the annual ranges.

TABLE 24

FIVE YEAR AVERAGE AND RANGE OF MONTHLY BROCCOLI PRICES FOR THE GROUPS

Month	*5 Year Monthly Average Price/Pack*	*Monthly Average Highest Price*	*Highest Year*	*Lowest Price*	*Lowest Year*
November	14/9	17/2	1955	10/9	1953
December	15/10	20/7	1956	11/8	1954
January	16/7	20/1	1957	12/5	1955
February	16/3	19/-	1953	13/1	1955
March	19/9	28/6	1956	13/1	1954
April	19/7	29/1	1956	15/2	1957

Nearly all the lowest prices occurred in 1953/54 and 1954/55. Growers of mainly early varieties had one very favourable season in 1956/57, compared with those producing mainly the later varieties, whose returns were high in 1952/53 and in 1955/56.

Taking the five year period as a whole, average monthly prices favoured growers of the later, rather than the early varieties. On the other hand the early varieties could be cleared in time for an early potato crop and the growers could follow this again with a fodder crop such as kale. Later varieties may mature in time to sow a crop of barley otherwise the land remains fallow until the late summer or autumn.

(c) Costs—Growing

Despite the cost increases that occurred in the five years, particularly in wages, variations in the production cost per acre were relatively small,

TABLE 25

SEASONAL GROUP AVERAGE GROWING COST ITEMS PER ACRE 1952/57

	1952/53	*1953/54*	*1954/55*	*1955/56*	*1956/57*	*5 Year Average*
	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Manual Labour	9 1	9 7	10 6	11 10	9 19	10 1
Horse, Trac. & Contract	4 0	4 3	4 9	4 13	4 9	4 7
Net Manures	19 7	15 3	14 13	16 10	14 7	16 0
Miscellaneous	10	15	11	1 3	9	13
Total	32 18	29 8	29 19	33 16	29 4	31 1
Man. Labour Hours/Ac.	68	70	71	73	61	69
Av. Manual Labour Cost/Hr.	2/8	2/9	2/11	3/1½	3/3	2/11

especially in the "growing" item, since cutting and packing fluctuated with changes in yield. Table 25 indicates that on average a fall in the net expenditure per acre on manures counteracted the increase in wages while in 1956/57 hours per acre were rather lower than in the previous seasons.

In 1955/56 the additional manual hours were attributable in general to the very dry summer of 1955. The need, in many cases, to water the seed-bed before planting and to water the plants in the field increased the pulling and planting hours. The sustained drought and high temperatures also brought a plague of caterpillars and measures to deal with them meant additional hours per acre. Finally because of the drought conditions the plants made very big root systems and although the hard, sturdy plants that resulted withstood the severe frosts far better than softer grown ones would have done, considerably more labour was involved in removing the stumps after marketing the crop. By contrast the labour hours in 1956/57 were the lowest of the five seasons, due to small reductions in nearly all the field operations, except in stump clearing.

Cutting and Packing

The effect of increased wages was more marked in the cutting and packing costs per acre when the 1952/53 and 1956/57 seasons are compared, for 90% of this cost represents manual labour. The crop yielded only 11 more packs to the acre in the latter season but the cost was over £2 greater. Ten shillings of this increase can be attributed to other costs such as hampers, knives and protective clothing.

The speed of cutting and packing also varied slightly from season to season. It was at its highest, 3¼ packs per hour, in the two seasons when there was little frost and yields were high. It varied from 2¼ to 3 an hour in the remaining seasons, the pace was reduced when there was a larger proportion of smaller curds and time had to be spent examining them more carefully for marketability after the severe frosts.

Marketing

The large variations in the estimated average marketing costs per acre were mainly a reflection of the large variations in yields. There were also variations in two constituent marketing cost items—in salesman's charges including market tolls and in transport costs. Charges varied with the market price since most salesmen deducted 10% commission from it. Transport costs have been estimated to represent the distribution of the groups' consignments to the different wholesale markets at almost annually increasing British Railway rates and an estimated average weight per pack*.

TABLE 26

ANALYSIS OF ESTIMATED SEASONAL AVERAGE MARKETING COSTS

	1952/53	*1953/54*	*1954/55*	*1955/56*	*1956/57*	*5 Year Average*
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Charges	2 0	1 7	1 9	2 6	1 10	1 11
Container	1 0	1 0	1 0	1 0	1 0	1 0
Transport from the farm*	2 5	2 7	2 6	2 11	3 2	2 9
Miscellaneous	1	1	1	1	1	1
	5 6	5 3	5 4	6 6	6 1	5 9

ANNUAL VARIATIONS IN THE INDIVIDUAL RESULTS

The range in individual grower's results each season was considerable not only in margins, returns and yields, but in growing and cutting and packing costs as well.

(a) Net Returns per Acre and per Pack†

Large variations in returns per acre were due more to large differences in yields than to comparatively smaller differences in returns per pack, as evidenced in Table 27.

* The number of packs sent to each of the main markets or areas (Bristol, S. Wales, Southampton and Bath, London and Birmingham, N. Midlands and Lancashire, Hull, Newcastle, Glasgow) was multiplied by the estimated cost per pack to those markets and the total cost divided by the total number of packs each season. The following average weights per pack and transport "Rates" were used in the calculation:—

	1952/53	*1953/54*	*1954/55*	*1955/56*	*1956/57*
Est. Av. Weight per pack	60 lb.	60 lb.	56 lb.	60 lb.	60 lb.
Tonnage Rate used ...	2 ton	2 ton	2 ton	Av. 2-3 ton	Av. 2-3 ton

B.R. charges for the 2 ton rate increased by about 40% during the five seasons. In 1955, however, they introduced a new 3 ton rate.

The quantity estimated to have been carried by road transport rose from 13% to 37% of the county output over the five year period.

† Returns from which all marketing costs, charges, containers, transport from the farms, etc., have been deducted.

TABLE 27

AVERAGES OF 10 HIGHEST AND 10 LOWEST NET RETURNS PER ACRE WITH CORRESPONDING YIELDS AND NET RETURNS PER PACK EACH SEASON

	Net Return per Acre	*Yield per Acre*	*Net Return per Pack*
	£ s.		s. d.
1952/53	213 1	311	13 9
	100 2	175	11 5
1953/54	78 9	190	8 6
	12 6	35	7 5
1954/55	109 8	212	10 6
	28 15	80	6 11
1955/56	213 3	236	18 1
	46 16	68	13 8
1956/57	154 15	289	10 9
	71 13	193	7 10
5 Year Average	153 15	248	12 6
	51 18	110	9 3

The price graphs in Figure 2 indicate that returns per pack, averaged over the season, were influenced very much by the proportions of the grower's total output that were marketed in different parts of the season. In addition they were influenced by the quality of the crops togther with the standard of grading and packing. It is difficult to measure grading standards on any average basis. However, the proportion of large and small count sizes marketed by growers and the main marketing periods are analysed in Table 28 for the highest and lowest groups of net returns per pack.

TABLE 28

AVERAGES OF 10 HIGHEST AND 10 LOWEST NET RETURNS PER PACK WITH PROPORTIONS OF CROPS MARKETED, BEFORE AND AFTER MARCH 1st AND THOSE OF 24's AND LARGER COUNTS EACH SEASON

	Net Return per Pack	*Marketed*		*24's and Larger Counts*
		before Mar. 1st	*after Mar. 1st*	
	s. d.	%	%	%
1952/53	15 2	34	66	88
	9 11	73	27	74
1953/54	9 10	70	30	88
	6 1	92	8	66
1954/55	11 6	46	54	74
	7 2	59	41	56
1955/56	21 1	26	74	91
	12 8	69	31	72
1956/57	10 8	62	38	91
	7 2	43	57	83
5 Year Av.	13 8	48	52	86
	8 7	67	33	70

It is impossible to determine how much of the differences in return per pack is due to the marketing period and how much to the variations in the proportions of large and small sized counts. The general level of market prices at any period is determined by supply and demand but whether the grower receives a return in the higher or lower range round about the general level depends on the quality of the crop—the quality of the curds, the proportions of large and small sized counts and the standard of grading and packing.

(b) Yields

Within the groups, there were large variations in yields in all seasons and a number of growers marketed proportions that were well above the group average.

It is known that good broccoli crops can be grown on ploughed ley land and that it is undesirable to grow brassica crops too frequently on the same ground. The advantage of applying bulky organic manures for the production of brassica crops is also common knowledge. In Table 29 the highest and lowest yield groups demonstrate the validity of these theories.

TABLE 29

ANALYSIS OF CROPPING AND BULKY ORGANIC MANURING FOR THE HIGHEST AND LOWEST YIELD GROUPS* IN 1952/53 AND 1956/57

	1952/53		*1956/57*	
	Highest Yields (over 80% of crop marketed)	*Lowest Yields (less than 200 packs/Ac.)*	*Highest Yields (over 80% of crop marketed)*	*Lowest Yields (less than 200 Packs/Ac.)*
Total Acres	46	96¼	44	62½
†Proportion of Acres receiving—				
Bulky Organic Man. Direct	66%	10%	52%	6%
„ „ to Prev. Crop	25% } 91%	47% } 57%	38% } 90%	14% } 20%
†Proportion of Acres after Ley & Ley followed by Early Potatoes ..	83%	54%	61%	32%
†Proportion of Acres after Brassica Crops ..	1%	5%	22%	38%

* For purposes of a cropping and manuring analysis yields are, in many cases, approximations since only an average yield for all the fields grown is available and in many instances parts of the broccoli acreage followed different previous crops and received different manurial treatment.

† Some of the acres following a ley or brassica crop also received bulky organic manure—similarly a few acres did not fit into any of these three categories.

In each season, among the highest yield groups, a larger proportion of the acreage received bulky organic manure, followed a ley or a ley ploughed for early potatoes and a smaller proportion followed a brassica crop.

Plant spacing varied both in the rows and between them, 2′ 3″ × 2′ 3″ was that most commonly adopted. An analysis of the relations between spacing and yield is not sufficiently conclusive to be set out but there is a tendency for the wider spacings, such as 2′ 4″ × 2′ 4″ or its equivalent, to yield more packs, a higher proportion of 24's and large counts and a higher percentage of heads marketed to the acre, than the narrower ones.

(c) Cost—Seedbed

On average the seedbed accounted for about 9% of the production cost.

The majority of growers grew their own plants from purchased seed* and the seedbed costs per acre did not vary significantly from the average, except for a few rather high costs each season where a considerable number of plants were bought to replace failures in the seedbed.

Growing

Growing costs accounted for rather more than half the production cost per acre and although the seasonal group averages were relatively similar they conceal some wide individual variations within the groups. These variations occurred in both of the main items, *i.e.,* in manual labour and in net manures.

TABLE 30

AVERAGES OF 10 HIGHEST AND 10 LOWEST GROWING COSTS PER ACRE EACH SEASON

	Manual Labour	*Net Manures*	*Other*	*Total*
	£ s.	£ s.	£ s.	£ s.
1952/53	12 4	27 10	5 11	45 5
	5 19	10 10	4 2	20 11
1953/54	11 15	20 16	5 11	38 2
	7 9	9 8	4 8	21 5
1954/55	13 17	21 8	6 2	41 7
	6 16	8 10	4 4	19 10
1955/56	14 11	26 19	7 5	48 15
	7 15	9 6	4 3	21 4
1956/57	12 14	23 7	5 11	41 12
	6 15	8 11	4 5	19 11
5 Year Average	13 0	24 0	6 0	43 0
	6 19	9 5	4 4	20 8

In most seasons the major differences between these two groups in manual labour hours occurred in four field operations—in applying

* Seed cost £5 per lb. for the established varieties and £5 10s. per lb. for the new strains that came on the market during the last two seasons.

manures, in pulling and planting, in inter-row cultivations and in clearing the fields of stumps.

Regarding the pulling and planting operation the highest cost groups generally contained a larger proportion of hand planted than of machine planted crops. Although hand planting increased the manual hours per acre, on average it did not add to the cost per acre of the operation when tractor charges and depreciation on the planter were included.

Taking the five seasons' groups as a whole rather more than half the growers mended gaps after planting the crop and about half did some hand weeding, except in the dry summer of 1955 when both operations were less frequent. Although banking the crop was not a universal operation it was carried out by about 85% of the growers.

TABLE 31

ANALYSIS OF MANUAL LABOUR HOURS RELATING TO THE 10 HIGHEST AND 10 LOWEST GROWING COST GROUPS EACH SEASON

	Plough-ing and working	*Apply-ing Manures*	*Pulling and Planting*	*Mend-ing*	*Inter-Row Cults*	*Clear-ing Stumps*	*Other*	*Total*
1952/53	8	11	33	6	18	11	2	89
	6	3	23	2	6	4	3	47
1953/54	10	11	29	5	17	9	4	85
	7	3	28	4	7	6	1	56
1954/55	9	20	27	4	20	7	3	90
	9	2	22	2	7	4	1	47
1955/56	12	7	40	1	11	16	6	93
	6	3	28	—	7	6	—	50
1956/57	8	6	34	3	12	13	1	77
	8	2	20	1	5	5	—	41
5 Year	9	11	33	4	16	11	3	87
Average	7	3	24	2	6	5	1	48

The highest cost groups applied more fertilisers and more bulky organic manure directly to the broccoli crop and generally to the preceding crops as well, Table 32.

Broadly speaking the high labour costs and high manurial costs were associated with intensive market garden production and the lower costs with broccoli growing on the general farm. On many holdings, however, these two forms of production merged into each other. The groups can therefore be said to represent varying degrees of intensity rather than two clearly defined types.

In addition to the variations in production intensity, there were variations in individual grower's conceptions as to the treatment and particularly the manurial requirements of the broccoli crop. Inevitably the higher labour costs tended to occur on those holdings with a larger regular labour staff relative to a given acreage and these in turn were generally of the more intensive type. The figures in Table 33 indicate,

TABLE 32

ANALYSIS OF MANURIAL COSTS RELATING TO THE 10 HIGHEST AND 10 LOWEST GROWING COST GROUPS EACH SEASON

	Purchased Manures	*Bulky Organics*	*R.M.V. Balances*	*Total*	*Cost B/F.*
	£ s.	£ s.	£ s.	£ s.	£ s.
1952/52 ..	10 14	3 12	13 4	27 10	17 18
	4 13	1 13	4 4	10 10	6 9
1953/54 ..	12 13	4 11	3 12	20 16	9 17
	7 12	17	19	9 8	4 0
1954/55 ..	11 15	10 0	— 1 7	20 8	7 2
	4 12	11	3 7	8 10	5 14
1955/56 ..	9 19	8 1	8 19	26 19	14 16
	4 4	1 0	4 2	9 6	6 2
1956/57 ..	10 10	7 14	5 3	23 7	11 1
	4 11	1 7	2 13	8 11	4 17
5 Year Av.	11 2	7 0	5 18	24 0	12 3
	5 2	1 2	3 1	9 5	5 8

however, that there were also quantitative differences in manurial application among the less intensive growers. The highest average net manurial costs did not always coincide with the highest average manual labour costs.

TABLE 33

FIVE YEAR AVERAGE MANUAL LABOUR AND NET MANURIAL COSTS PER ACRE FOR THE HIGHEST MANUAL LABOUR, GROWING COST AND NET MANURIAL COST GROUPS

	Manual Labour	*Net Manures*
	£ s.	£ s.
10 Highest Man. Lab. Groups	15 0	18 4
10 Highest Growing Cost Groups	13 0	24 0
10 Highest Net Man. Cost Groups ...	11 10	24 16

A statistical analysis of the relation between manurial intensity, and yield from these five seasons' groups is inconclusive since other factors sometimes intervened to affect the yield in an adverse way. However, the very wide range in manurial costs suggests that a technical investigation is needed to find out whether some of the very high rates of manurial application are justified by higher yields and a higher proportion of larger sized counts.

Cutting and Packing

Much of the variation in cutting and packing cost per acre in any season was due to the variation in yield per acre. In addition there were variations between individual growers in the average number of packs

that were handled per hour. A five year average of the ten highest and ten lowest rates gave a range of $1\frac{3}{4}$ to 4 packs an hour. It was not generally possible to separate the cutting from the grading and packing operations. These rates refer, therefore, to the number of packs that were cut, graded and packed per man hour. A five year average of the ten highest and ten lowest costs gave a range of 10d. to 2/1 per pack.

Overheads

Variations in overhead costs arose from conditions relating to each farm as a whole rather than to features connected with the broccoli crop. Rent, hedge upkeep and depreciation of implements and machinery accounted on average for a little over 50% of the overhead costs. The remainder was a share of the general farm overheads.

CONCLUSIONS

For the Cornish broccoli industry as a whole the most striking feature of the period 1952/57 was the remarkable lack of uniformity between the seasons in average yields, in the distribution of supplies from Cornwall, in average price levels and price movements and even in the quality of the crops.

Climate was the major factor affecting the size of the yields, reducing them severely in three of the five seasons, affecting also the distribution of supplies and the crop quality, while the fact that there was generally a preponderance of other brassicas in the market meant that broccoli price levels were influenced by other brassica prices.

In producing and marketing their crops, therefore, Cornish broccoli growers appear to be severely hampered by external forces over which they have little control. This suggests that efforts should be concentrated on improving those aspects of broccoli production that promise to increase growers returns, without increasing and perhaps by reducing their costs.

The results of the investigation show that high returns per acre were associated with high yields. In the two climatically favourable seasons crops tended to produce higher yields when grown on ploughed ley land or where there was a liberal application of bulky organic manure, *i.e.,* where the level of soil fertility was high. Broccoli grown after a previous brassica crop tended to give lower yields.

From another angle it would be advantageous if some means could be found of reducing the size of the unmarketable proportion of the crops, estimated at about 30% for the groups as a whole in the two high yield seasons. It is possible, however, that a higher proportion of marketable heads will be obtained from the improved seed strains now coming into wider commercial use.

Again the wider plant spacings tended to produce bigger proportions of the larger sized counts and more of the larger counts resulted in more packs to the acre. Furthermore, a bigger proportion of the larger counts would raise the average return received per pack and thus increase the returns per acre.

On the cost side of the account variations in group average growing costs between seasons were relatively small but large variations occurred among individual growing costs each season. The widest ranges were in

the two largest cost items, manual labour and net manurial cost, accounting for 31% and 45% respectively of the total cost of seedbed and growing together.

It appears that much of the variation in labour input reflects differences of intensity of production on the holding as a whole—where cropping is intensive, more weeding and inter-row cultivation and more thorough stump clearing are likely to be necessary. Moreover, the very small size and often the quite steep gradient of many of the fields inevitably increases the time taken over some of the operations. This is particularly noticeable when comparisons are made with similar operations in other parts of the country.

That manurial costs should be higher where the system is more intensive is understandable but some very high manurial costs also occurred where production was less intensive. Although above and below average yields, rather than marked variations in count size proportions, tended to follow the highest and lowest manurial costs, the relation between the level of manuring and the yield is by no means a direct one. It seems questionable, therefore, whether some of the exceptionally high manurial costs were really justified. The criterion is higher yields, better quality curds and more large sized counts.

By the time the broccoli crop is being marketed the whole of the growing cost has been incurred and has assumed the nature of an overhead cost. Not unnaturally most growers regard low returns for their packs as uneconomic. However, it is worth remembering that any return, net of all marketing costs, that exceeds the cutting and packing cost—and for the period under review this did not in many cases exceed 2/- per pack and was usually considerably less—is helping to meet the already incurred growing costs and also the general overhead costs of the farm.

To say this is not to suggest that growers should market poor quality curds or poorly graded packs. For every grower's aim should be to obtain the highest total return compatible with achieving a high standard product through every season.

The purpose of this report has been not so much to provide the final answers to grower's problems as to try to put them into perspective and to pin-point some of the main factors or aspects to which further thought and possibly research might usefully be directed. It is suggested, therefore, that investigations and trials aimed at increasing the proportion of good quality curds for market and the percentage of larger sized counts, including some attention to the level of manuring required by the crop, would be of real benefit to growers.

Postscript

Growers are probably aware that a number of experiments relating to broccoli production have been conducted at the Rosewarne Experimental Horticultural Station at Camborne since its inception in 1952. A number of them cover the same period as the economic investigation and the results should amplify some of the aspects touched on in this report. I am informed that a report on these experiments will be published after the 1958/59 season.

APPENDIX A.

WINTER CAULIFLOWER IMPORTS AND IMPORT RESTRICTIONS

In the 1920's France, from whom we then received the bulk of our cauliflower imports, was sending us over 30,000 tons a year.

After the imposition of protective tariffs in 1932 the annual total fell to between 10,000 and 20,000 tons.

Following the outbreak of war in September, 1939 imports ceased and were not re-admitted in any quantity until 1946/47. There were no restrictions, apart from the pre-war tariff, then of negligible protective value, until the introduction of quotas towards the end of the 1949/50 Cornish season—in which the highest post-war tonnage of 52,000 tons passed through our markets.

Changes in import restrictions, the imported tonnages received during the Cornish season together with the percentages coming from France and Italy are set out for the period of this five year investigation in Tables 34 and 35.

TABLE 34

CHANGES IN QUOTA AND TARIFF RESTRICTIONS, 1952/57

Year	*Period*	*Quota*	*Tariff (per cwt.)*
1952/53	1st July—15th Feb.	Nil	3/-
	16th Feb.—31st Mar.	7,500 tons	3/- to 28th Feb. then 4/-
	1st April—30th June	2,500 tons	4/-
1953/54	1st July—15th Nov.	Nil	3/-
	16th Nov.—31st Dec.	4,000 tons	3/-
	Quota cancelled and tariff rates doubled		
	1st Dec.—28th Feb.		6/-
	1st Mar.—30th June		8/-
1954/55, 1955/56, 1956/57	1st July—28th Feb.		6/-
	1st Mar.—30th June		8/-

Source: Horticultural Statistics, M.A.F.F.

TABLE 35

SEASONAL TONNAGES (NOVEMBER-APRIL) OF IMPORTED WINTER CAULIFLOWER WITH PROPORTIONS RECEIVED FROM FRANCE AND ITALY, 1952/57

Season	*Total*	*France*	*Italy*	*Other*
	tons	%	%	%
1952/53	29,152	71	29	—
1953/54	37,561	77	21	2
1954/55	36,273	61	36	3
1955/56	26,333	54	40	6
1956/57	28,545	68	24	8

Source: Horticultural Statistics, M.A.F.F.

Since France and Italy, the main source of our imported winter cauliflower, also export to other Continental markets, seasonal variations in the tonnages coming to the U.K., are inevitably influenced by the relative market price levels ruling in the different countries, after allowing for transport costs and tariff charges. This applies particularly to imports from Italy because of the very high cost of transport from that country to the U.K.

Broccoli production in Jersey increased considerably during the period 1952/57 and by 1957/58 the island was growing nearly half the acreage grown in Cornwall. The significance of this development of Cornish growers is twofold. Unlike imports from the Continent those from Jersey are free from import duty and are not supplied to any other market; in addition much of the trimming, grading and packing into non-returnable containers there, is undertaken by the merchants, ensuring relative uniformity in grading. The fact that imports from Jersey in 1957/58 accounted for 15% of the total from November to April indicates that the Jersey packs have become a new challenge to Cornish growers. Imports from Jersey for the seasons 1952/57 are shown in Table 36.

TABLE 36

SEASONAL TONNAGES (NOVEMBER to APRIL) OF BROCCOLI IMPORTED FROM JERSEY, 1952/57

	1952/53	*1953/54*	*1954/55*	*1955/56*	*1956/57*
Tons	27	212	256	597	1653

Source: Fruit Intelligence, C.E.C.

APPENDIX B.

WINTER TEMPERATURES IN PENZANCE, 1897 to 1957

A series of daily minimum and absolute minimum temperatures for January and February in Penzance since 1897, obtained through the courtesy of the Borough Meteorologist, reveals what appears to be quite a marked change from relatively "moderate" winters during the period 1897 to 1939 to severe ones from 1940 to 1957. The average January and February minimum temperatures for each period are set out in Table 37.

TABLE 37

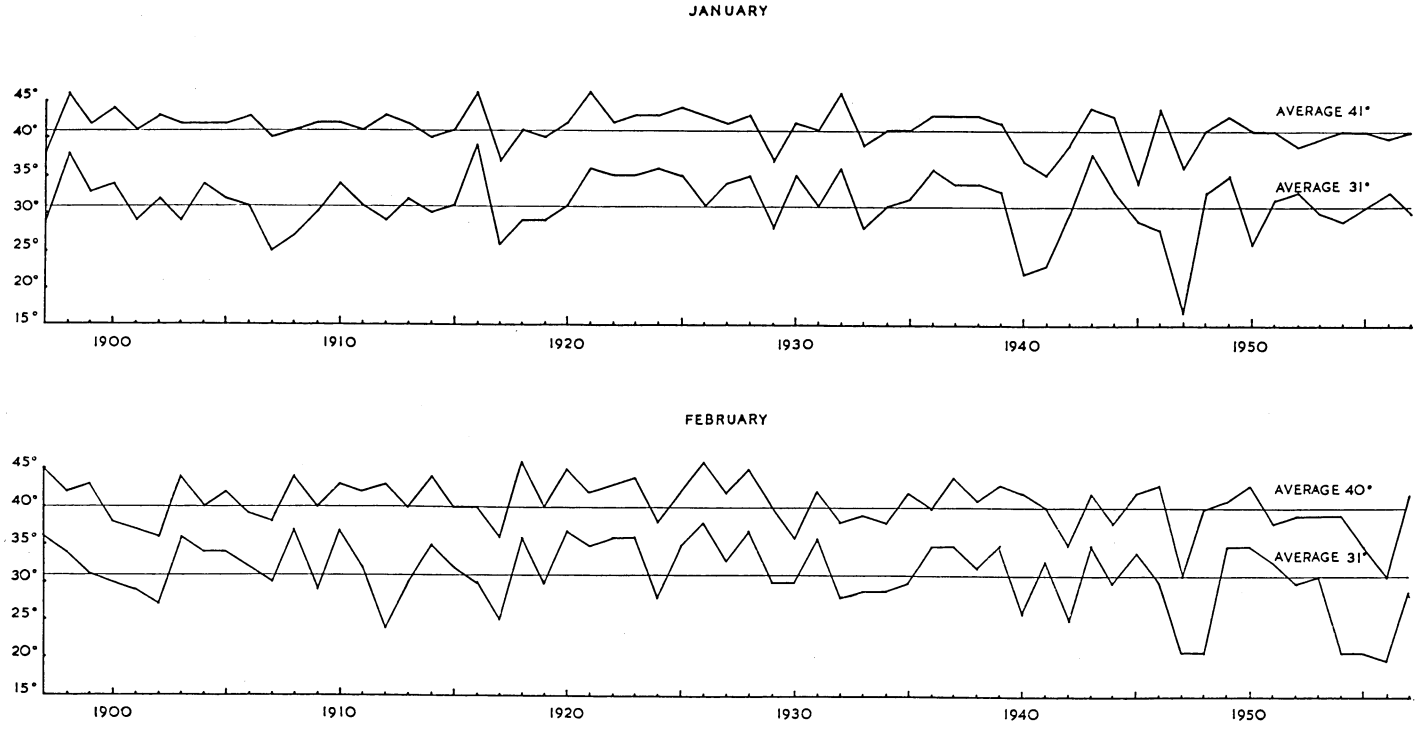
AVERAGE MINIMUM TEMPERATURES FOR JANUARY AND FEBRUARY IN PENZANCE 1897 to 1939 and 1940 to 1957

	January		*February*	
	Mean of Daily Min.	*Absolute Minimum*	*Mean of Daily Min.*	*Absolute Minimum*
1897 to 1939	46°	35°	41°	32°
1940 to 1957	40°	30°	39°	28°

Source: Borough Meteorologist's Records, Penzance

FIGURE 3

A SERIES OF TEMPERATURE GRAPHS, SHOWING THE MEAN OF THE DAILY MINIMUM AND ABSOLUTE MINIMUM READINGS IN PENZANCE DURING JANUARY AND FEBRUARY FROM 1897 TO 1957



APPENDIX C.

FIGURE 4

DIAGRAMATIC SUMMARY OF THE MAIN FACTORS INFLUENCING THE MARGIN OF RETURN OVER COST DATA RELATING TO THE COSTED GROUPS—November to April, 1952/53 to 1956/57

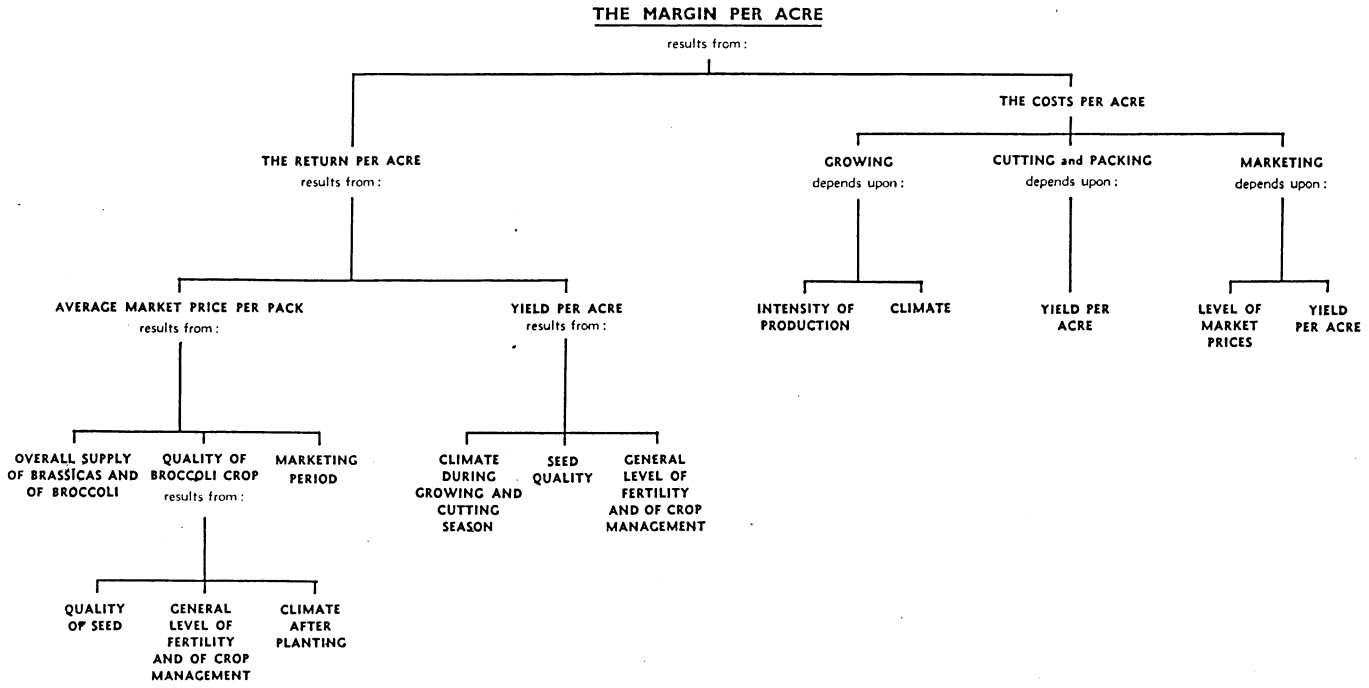


TABLE 38

SEASONAL GROUP AVERAGE DISTRIBUTIONS OF PACKS THROUGH MARKETING CHANNELS AND AREAS 1952/53 to 1956/57

Area or Market	*1952/3*	*1953/4*	*1954/5*	*1955/6*	*1956/7*	*5 Year Average*
	%	%	%	%	%	%
Local Sales	4	2	5	9	2	4
Sale through Merchants..	8	16	10	7	13	11
*Plymouth	7	6	3	3	5	5
*Bristol	16	13	14	15	13	14
*S. Wales, Southampton, Bath	16	27	27	18	16	21
*London	19	12	7	16	16	14
*Birmingham	7	7	7	16	11	10
*North Midlands ..	19	16	26	15	21	19
Hull, Newcastle, Glasgow	4	1	1	1	3	2
	100	100	100	100	100	100

*Through Commission Salesmen.

TABLE 39

PERCENTAGES OF VARIOUS CONTAINERS USED BY THE GROUPS EACH SEASON 1952/53 to 1956/57

Container	*1952/53*	*1953/54*	*1954/55*	*1955/56*	*1956/57*
	%	%	%	%	%
Standard Crates ..	67	81	90	91	89
Non-Returnable Crates	8	7	2	3	2
Lettuce Crates ..	3	3	1	—	—
Mats	22	9	7	6	9
	100	100	100	100	100

The variations are due partly to changes in the groups, this applies particularly to the reduction in mats and non-returnable crates. The lettuce crates were replaced by standard crates. The increase in mats in 1956/57 can be attributed mainly to a shortage of standard crates during the glut period in March.

The standard (collapsable) returnable crate is the container traditionally used in Cornwall. In the 1930's, when wages and transport costs were relatively low, it served well enough. To-day it has a number of drawbacks. It is heavy, it weighs 7 lb. or 8 lb. when empty and not only contributes to the high transport cost but incurs a further transport cost as a returnable empty. It adds to the handling costs and clerical responsibility of the salesman and the retailer. Apart from its high initial cost it involves its owner, either the grower or the salesman, in heavy repair costs in labour and material.

From the early 1950's experiments have been made with non-returnable crates of varying strengths, size and price but the ideal one that is collapsable for storage, strong enough for packing in the field and loading on a lorry and also cheap enough for universal use had not appeared by the end of the 1956/57 season. Other alternative containers such as mats and lettuce crates have only a limited usefulness.

TABLE 40

SEASONAL GROUP AVERAGE COSTS AND NET RETURNS PER PACK BEFORE AND AFTER MARCH 1st 1952/53 to 1956/57

	1952/53		*1953/54*		*1954/55*		*1955/56*		*1956/57*		*5 Year Average*	
Acres	358¾		337¼		363		366		410¾			
Number of Growers ...	41		39		38		41		41			
	s. d.		s. d.		s. d.		s. d.		s. d.		s. d.	
Seedbed	6		11		9		9		5		8	
Growing	2 8		5 2		3 11		4 4		2 3		3 9	
Cutting and Packing ..	1 1		1 5		1 3		1 3		1 3		1 3	
Overheads	11		1 10		1 4		1 5		11		1 2	
Production Cost ..	5 2		9 4		7 3		7 9		4 10		6 10	
	Pre-Mar. 1st.	*Post Mar. 1st.*	*Pre-Mar. 1st.*	*Post Mar. 1st.*	*Pre-Mar. 1st.*	*Post Mar. 1st.*	*Pre-Mar. 1st.*	*Post Mar. 1st.*	*Pre-Mar. 1st.*	*Post Mar. 1st.*	*Pre-Mar. 1st.*	*Post Mar. 1st.*
Proportion Marketed ..	55%	45%	81%	19%	50%	50%	55%	45%	55%	45%	59%	41%
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Net Return*	11 2	14 2	7 5	9 11	7 3	11 7	12 7	20 3	11 1	8 0	9 11	12 9
Margin	6 0	9 0	−1 11	7	—	4 4	4 10	12 6	6 3	3 2	3 1	5 11
Yield in Packs per Acre† ..	244		113		152		156		255		184	

* Return received after all marketing costs have been deducted.

† It is unfortunately not possible to give the yield per acre and, therefore, the costs per pack for each period, but it is generally accepted that yields of the earlier varieties are lower than those of the later ones. This would mean a higher growing cost per pack before March 1st. As the earlier varieties are also marketed in smaller consignments over a longer period the cutting and packing cost would probably be a little higher too.

TABLE 41

SEASONAL GROUP AVERAGE PROPORTIONS OF MAIN CROPS PRECEDING BROCCOLI

	1952/3	*1953/4*	*1954/5*	*1955/6*	*1956/7*	*5 Yr. Av.*
Total Acres Costed ..	358¾	337¼	363	366	410¾	
	%	%	%	%	%	%
Ley	27	36	25	23	26	27
Ley—Early Potatoes ..	19	1	14	10	14	12
Brassicas	13	21	23	29	23	22
Early Potatoes	26	26	16	15	20	21
Corn	3	6	10	13	8	8
Flowers	7	6	6	8	6	6
Roots	2	2	3	1	1	2
Others	3	2	3	1	2	2
	100	100	100	100	100	100

TABLE 42

SEASONAL GROUP AVERAGE MANUAL HOURS (GROWING) PER ACRE

	1952/3	*1953/4*	*1954/5*	*1955/6*	*1956/7*	*5 Yr. Av.*
Ploughing and Working..	8	9	9	9	8	9
Handling Bulky Organic Manures	3	4	7	4	3	4
Sowing Artificials ..	3	3	3	3	2	3
Marking	2	1	1	1	1	1
Pulling and Planting ..	29	29	27	31	26	28
Mending	4	4	2	2	2	3
Horse Hoeing	5	5	5	3	4	4
Weeding	5	5	7	3	4	5
Banking	2	3	3	3	2	3
Stump Clearing	6	6	6	11	9	8
Netting for rabbits ..	1	1	—	—	—	—
Dusting for Caterpillars	—	—	—	3	—	1
Other	—	—	1	—	—	—
Total	68	70	71	73	61	69
Proportion of Acreage Hand Planted ..	39%	42%	39%	12%	7%	
Proportion of Acreage Mended	65%	70%	73%	54%	63%	

APPENDIX D.

COSTING METHODS AND DEFINITIONS

Seedbed—The cost of labour involved in raising and weeding the plants in the seedbed, together with that of seed and insecticides, the net cost of manures, lime or sand and the erection of netting, where necessary, was charged to the broccoli crop. Where additional plants had to be acquired the cost of these was included. Where plants were also grown specifically for sale, only the appropriate proportion of the seedbed cost has been charged to the broccoli.

Labour—*Manual:* Where the National Minimum Wage Rate was paid, an overall rate per hour including an allowance for perquisites, employers' share of National Insurance and paid holidays was charged. Where higher than minimum rates were paid the hourly rate was adjusted accordingly. Youths and girls were charged at rates appropriate to their age.

Horse: 1s. 3d. per hour.

Tractor: Light @ 4s. 2d. per hour.
Medium @ 4s. 6d. per hour.
Heavy @ 4s. 10d. per hour.

Manures—The net cost to the grower of artificials, F.Y.M. (charged at 15s. 0d. per ton until 1956 when it was increased to 20s. 0d.), lime and sand has been adjusted to allow for residual manurial values in the following way:—

Proportions brought forward after Early Potatoes:—

1/2 Cost of F.Y.M. + 1/2 estimated cost of application.
1/2 Cost of compound, phosphatic and potassic fertilizers.
1/3 Cost of nitrogenous top dressings.
1/5 Cost of lime and sand applied during the prevous 4 years.

Proportions brought forward after all other crops:—

1/3 Cost of F.Y.M. + 1/3 estimated cost of application.
1/3 Cost of compound, phosphatic and potassic fertilizers.
Nil from nitrogenous fertilizers.
1/5 Cost of lime and sand applied during the previous 4 years.

Proportions carried forward after Broccoli:—

1/3 Cost of F.Y.M. + 1/3 cost of application.
1/3 Cost of compound, phosphatic and potassic fertilizers.
Nil from nitrogenous fertilizers.
4/5 Cost of lime and sand.

Cultural Residues—Accepted rates for cultural benefits accruing from various previous crops have been brought forward and charged to the broccoli crop. Similarly benefits accruing from the broccoli crop have been carried forward as a charge to the succeeding crop.

Overhead Charges—Where the broccoli crop is one of three crops harvested in two years, one-third of two years' full charge per acre for Rent, Depreciation of Implements (estimated charge per acre) and Boundary Upkeep has been entered. Where only two crops have been harvested in two years the full charge per acre for these items is included.

Depreciation—*Muck Spreaders, Planters, Motor Hoes:* Charged at 25% of written down value, spread over the total acreage covered, planted or hoed in the year.

An estimated charge of 20s. 0d. per acre has been made to cover the depreciation of all other implements used for the broccoli crop.

Boundary Upkeep—At a cost per acre agreed with the farmer.

Other Overhead Expenses. Of the items:—Office expenses, telephone, car, farm insurances, accountant's fees, road upkeep, vermin destruction—a proportion, represented by the percentage of the estimated total gross returns from sale crops plus livestock contributed by the broccoli crop, has been charged to the costed crop on each farm. The items—interest charges on borrowed capital and labour hours occupied in a managerial capacity apart from physical work in connection with the crop—have not been included in overhead expenses.

Containers—Where containers, other than standard crates and mats were used, the number has been adjusted to an equivalent figure as follows:—1 standard crate or pack = 3 lettuce crates or $1\frac{1}{2}$ small non-returnable crates.

"Counts" refer to the number of broccoli heads in the container. The most sought after size is the 24 and generally the greater part of the crop consists of heads of the 24 size. In addition there are usually some larger ones packed as 16's or 18's and 12's and small ones packed as 30's.

Averages—The simple average has been used throughout the report.

The Northgate Press,
(Exeter) Ltd.
9, North Street, Exeter.