THE ECONOMIC GEOGRAPHY OF THE UNION'S CHICORY INDUSTRY: PAST AND PRESENT

BY

B.S. YOUNG, M.A. (Cantab.)

"Knowledge insufficient for prediction may be most valuable for guidance."

John Stuart Mill,
Logic, Book 6.

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C O N T E N T S

PREFACE

The motivating force behind this survey and study of a branch of the Union's agricultural industry has been the conviction that detailed case studies of economic activities and their influences on the map of the country are the essential foundation stones on which mature scholars may build a perceptive and valuable Economic Geography of the Union.

For whatever success has been achieved in mastering the facts and organisation of the Chicory Industry, I acknowledge the assistance of a host of persons. In particular, I wish to thank Mr G. Radloff, Secretary of the Banana Control Board and former Manager of the Chicory Control Board, for the benefit of frequent discussion on many of the Sections in the study. Other officials of the Chicory Control Board have also assisted in many ways.

In my peregrinations throughout the chicory regions I received nothing but kindness and co-operation from the chicory farmers. My only regret is that I did not budget for more time 'in the field'.

Grateful thanks are tendered to:

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I record my heartfelt thanks to my wife for her many long evenings at the typewriter with both the draft and the final copies, and for advice and criticism.

Department of Geography,
University of Natal (Pietermaritzburg),
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1. INTRODUCTION

BACKGROUND TO THE STUDY

During 1954 and 1955 the writer visited a number of farms in the Eastern Province in the course of his duty with the Agricultural Society of a Grahamstown school. On one such outing he visited the Central Drier of the Chicory Control Board at Alexandria; on other outings he visited farms which were producing, inter alia, chicory root. When appointed to a University Lectureship in 1956, the writer determined, as soon as time would permit, to undertake a survey of some local economic activity, and in August 1956 he decided to attempt some work on the Chicory Industry. The Chicory Control Board indicated its willingness to assist where possible and the National Council for Social Research granted a small sum for 1957 to cover certain expenses that such a survey would incur. The Economic Geography of crops was amongst the research projects that the Council felt "could be investigated to advantage".

PURPOSES OF THE STUDY

The primary purpose of the study was to establish the spatial pattern of chicory production in the Union and to analyse that pattern in terms of the significant factors.

Agricultural economic activity in general may be summed up in the one word 'profitability'. This, briefly, implies that alternative uses of land, labour and capital always exist on a farm and that the choice of use will be determined by the input/output ratio for any one crop, branch of farming, or combination of activities. Furthermore, when profit revenue from one use falls below that to be obtained from an alternative use, it is implied that the farmer will respond by turning to the best alternative use. Such concepts, which lack the uniform and invariable application of scientific laws, must be considered against the background of the farming system. The farmer's final concern is with the profit of the farm as a whole; he will study the contribution that each enterprise makes to that

profit and with that knowledge he will decide to change or not to change to an alternative use. When, economically, the differentiation between two or more uses is small (i.e. the economic bases of decision are tightly drawn), we can expect the decisions of farmers to be diverse. When one crop is an outstanding 'money-spinner', it is likely that many farmers will choose to produce it.

Chicory farming does not combine with other activities as, say, lucerne production does with dairying. Although it is not directly complementary, it is normally a part of the system on the farm, a supplementary part that is valuable as a contributor to the general overhead costs and profits. For this reason, chicory is likely to be produced only when it pays; there can be no economic reason for its production when the inputs exceed the outputs. There is a multiplicity of factors which influence the precise nett profit level at which a farmer will decide to cease or curtail production. The comparative profitability of alternative uses is a most significant factor; the guaranteed price for chicory is clearly a factor that militates against change.

The factors which determine 'profitability' may be grouped as 'natural' (soil, climate, etc.) and 'economic' (labour, transport, marketing, etc.). They may all express themselves in economic, mainly monetary, terms and they are more or less inter-related. This study attempts to analyse the pattern of production as far as is possible in monetary terms. From these remarks it is clear that the subject 'Economic Geography' concerns itself with the manner in which resources are utilised with particular reference to the variations in space and with especial regard to those factors influencing the spatial variations that are part of the physical environment.

In order to understand the pattern as it exists today, it is important to consider what has gone before, and so attention is given in this study to the growth of the Chicory Industry in the Union.

Whilst it is apparent from the following pages that further

research (in the historical, the agricultural and the economic fields) might permit more conclusive results, the tendencies indicated here may be of value to the Industry, and the analysis of interest to students of Economic Geography.

METHODS OF STUDY

The data here assembled and discussed were derived from a number of sources. The reports and records of the Chicory Control Board provided the greater part of the statistical skeleton for the period since 1940. The writer's questionnaire, which was sent to 450 producers who made deliveries of chicory to the Board in 1955, elicited some information, the value of which is discussed more fully in Appendix A. The published material consulted in connection with this study is listed in the Bibliography. Further facts and ideas were gleaned during visits to the Chicory Control Board at Alexandria and to chicory producers throughout the Eastern Cape. These journeys were spread intermittently over a period extending from February to October 1957. The study takes account of developments in the Industry up to and including May 1958.

It should be stressed that the farm-survey method usual in agro-economic surveys was not employed. This method attempts accurate costing and accounting at a number of farms; these farms are then grouped to stand as representative samples of the whole. Noethling and Spamer (1929) made such a survey of 23 farms out of a total producing force of 140. Today a survey of a seventh of the producing force would require far more time and money than was available to the present writer.

USE OF THE PLANT

The chicory plant (Cichorium intybus L.) belongs to the family Compositae. In its wild state the root is narrow and woody; by selection and breeding cultivated varieties have been developed.[1]

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[1] Sicera (1935) discussed the differences between wild and cultivated forms of Cichorium.

Another species of Cichorium that is frequently mentioned with C. intybus in the literature is C. endivia L.; this is used for salads and for culinary purposes as a pot herb; it is known as endive and was cultivated in the Union as long ago as 1652.[1]

Chicory may be grown for its use in salads, its value as a fodder crop (usually in conjunction with grasses as a pasture) and for the use of the root, when dried, roasted and ground, as a substitute for, an adulterant of or an addition to coffee. Burtt-Davy (1913) recorded that it had a part to play in confectionery and chutney making, and that there was some use of it medicinally and "to a limited extent perhaps in the preparation of porter and snuff". In the United States of America "in addition to meeting the demand as a coffee extender, chicory is now being employed by manufacturers of chocolate, soybean sauces and Worcestershire sauce", and following the "practice of Chefs of European background", it is being pushed as a "seasoning deserving a permanent place on the kitchen condiment shelf".[2]

The recipe books of most European nations include dishes based on the leaves or root of the chicory plant; indeed Witloof chicory (from the Magdeburg variety) has been described by Jackson (1952) as "one of the most important winter vegetables of Northern Europe". In France the blanched leaves form part of the winter salad "Barbe de capucin", the roots braised make up the dish "Endives Braisées", and the leaves chopped form "Salade D'Endives". This last salad is known in Italy as "Insolata D'Indivia". Favourite dishes in Belgium - where, according to Louis (1946), the head gardener at the Botanical Gardens in Brussels about 1850, was the first to force chicory - are the roots of the Witloof variety boiled and eaten with butter - "Chicorée de Bruxelles", and "Chicorée à la Croque-au-Sel" which is the root and inner leaves eaten with a little salt. Indeed, we find chicory dishes

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[1] "The endive is also growing so well that it is a pleasure to see" - part of the entry under 5th, 6th September (1652) of van Riebeeck's Journal.

[2] Quoted by Radloff (1950) from an article "Production, Processing and Uses of Chicory" by Lloyd Stouffer, Detroit, Michigan, U.S.A.

from Spain to Poland. In Britain it is by no means a common vegetable though a great future for vegetable chicory was predicted by Shaw (1883). Stamp (1948) remarked concerning Britain: "Other vegetables less well known but which deserve to be more widely cultivated are various salads such as chicory ... ". In South Africa the use of chicory as a vegetable is negligible though it has not gone entirely unnoticed. It can, apparently, be grown all over the Union as a vegetable if it is covered to keep the light out and blanched properly, and "healthy crowns", it is thought, would find a market in large centres and hotels.[1] The cultivation techniques have been briefly described by Smith (1956).

The value of chicory as a fodder crop was appreciated by Arthur Young on his 1788 journey in France, and he returned to his Bradfield (Suffolk, England) farm with some seed from Lyons and ultimately cultivated over a hundred acres of chicory. It thrived on the "poor barren, blowing sands" of East Anglia as well as on the "fen and bog lands and peat soil" of parts of the same region, and it yielded a "great quantity of sheep food". It is possible that chicory was more favoured as a fodder crop in the Union in the earlier decades of this century than it is now. Morsch (1889) wrote of the wholesome food provided by the leaves for milch cows and pigs at the Stellenbosch Agricultural School; Sawer (1910) recalled that in Natal "highly profitable crops of chicory for manufacturing purposes and stock food may be raised on lands too poor for the successful cultivation of other root crops", and McKee (1913) noted the suitability of the green food off chicory for cattle, sheep and ostrich. Leppan and Bosman (1928) commented: "In Holland and other European countries it is grown as a pasture plant, for which purpose it is excellent, being both palatable and hardy." Though Leppan and Bosman implied that chicory was not used as a fodder crop in the Union, there was some use in the early 'twenties of the leaves as a grazing feed for sheep and

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[1] Correspondence, Farmer's Weekly, 6th June 1956.

cattle; this was in the Bethal district of the Transvaal.[1]

Whilst a number of farmers in the more inland areas of the present Proclaimed Areas have found that their lambs and ewes thrive on chicory leaves, there are only one or two chicory producers who let cattle onto the chicory, for the milk is certainly tainted in such circumstances. The drawbacks of direct grazing include damage to the root (by hooves and teeth) and to the quality (as a result of induced sprouting). Nix (1964) has stated that the leaves of the chicory plant have no feeding value and no manurial value; after the root is removed, the leaves quickly rot away to nothing.

Erasmus (1953) stated: "Its use (in pastures) has up to the present not met with general approval", but it would appear that chicory is enjoying a little more approbation in 1967. The heavy intake of nitrogen-fixing legumes off some pasture-clover mixtures may lead to animals bloating and the addition of chicory to the sward helps to diversify the intake. Pienaar and Sim (1957) have recommended chicory in such mixtures under certain conditions; where these conditions are found in the Eastern Province, chicory seed is mixed at the rate of ½lb. per morgen (approximately ½ per cent of the mixture); in the winter rainfall areas the rate is 1 lb. per morgen or 3 per cent of the mixture.

This study is concerned with the production of chicory for its root to be worked into a coffee substitute. From the above comments it is clear that, in the Union, the other uses at present are negligible.

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[1] In response to a letter of enquiry from the present writer published in Die Echo of Bethal, Mnr A. Posthuma acquainted the writer with a number of points concerning chicory cultivation in the Bethal district in the years 1920-1921. These points have been included in the text wherever possible. In the district it was found that cows could not graze chicory as their milk was quickly tainted but that merino lambs thrived when the ewes grazed in chicory fields. If, however, the ewes were put on to chicory after they had begun to feed their lambs, the young would not accept the change of flavour.

ECONOMIC IMPORTANCE OF THE CHICORY INDUSTRY

Measured by the standards set by the 'giants' of South African agriculture - wool, maize, wheat, citrus, etc. - chicory is indeed of 'pygmy' proportions.[1] In 1955-1956 the value of locally-produced root was £399,002; in the years 1941-1956, during which the Industry has been subject to a Control Scheme, the total value of local root handled was £2,935,002. In 1955 (January-September) 440 farmers delivered chicory to the Board; whilst on the 29th November 1956 no more than 757 persons were on the Board's list of Registered Producers. The total morgenage planted at the time when chicory was last enumerated in a Union Agricultural Census was 5713,[2] and the total 1955-1956 crop came to a little under 18 million lbs. of dried chicory root. By comparison, pineapples in 1949-1950 were planted on over 14,000 morgen, and £246,500 was raised on the local market in 1952-1953; another million pounds normally comes to the farmer from the export of pineapples, raw and canned.

The significance of the chicory crop to farmers within the seven 'proclaimed' magisterial districts[3] which together produce practically the entire Union crop, and particularly within Alexandria district is, however, considerable. Nearly 3 per cent of the total number of farms in the Proclaimed Areas are registered with the Chicory Board whilst in the Alexandria district over 60 per cent of all farms are registered. Returns suggest that over half of the chicory producers depend for about 25 per cent of their cash income on the crop, whilst 44 per cent of the producers derive over half their income from chicory. For some 17 per cent of the growers chicory returns form over 90 per cent of their farms' income. It is clear that the root is more or less of great concern to the farmers within the relatively small production area. These Areas, in seasons of normal rainfall, meet fully the country's

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[1] Some idea of the relative sizes of the agricultural Control Boards in the Union has been given by Richards (1957).

[2] Agricultural Census No. 24, 1949-1950

[3] Throughout this study these districts, over which the Chicory Control Board exercises its authority, are referred to as the Proclaimed Areas.

requirements of dried chicory,[1] and in times when international trade is difficult do, indeed, form the only readily accessible source of supply for the Union.

THE GROWTH OF THE INDUSTRY

NINETEENTH CENTURY IMPORTATIONS

Allusions to the chicory plant may be found in the writings of the Greeks and the Romans.[2] Roman allusions convinced Stilgenbauer (1931) that "this plant was grown in the Roman Empire and has been consumed by man as a food for nearly 2,000 years". The industry processing chicory root for drying, roasting and grinding to be added to coffee began in the latter half of the eighteenth century in Europe. The first chicory factory in Holland was erected in 1773 and the oldest factory which is still in operation in Belgium was established in 1801.[3] The industry was firmly established in the early years of the nineteenth century when a great fillip to the production of chicory in Europe, and its utilisation as a substitute in coffee was afforded by the Napoleonic blockade. The blockade practically severed the lines of trade with the sources of coffee. This early stimulus was to have its counterpart in the growth of the Union's Industry; indeed, the two world wars have been major factors in the development of the Industry in South Africa.

No doubt the use of chicory spread to South Africa in the decades following Waterloo (1815). The habit of coffee drinking was very strong in South Africa and early attempts to mix it in coffee may well have been regarded with disfavour. Theal (1877) wrote that coffee was

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1 In this survey chicory root that has in no way been processed is referred to as 'wet root' or 'undried chicory'; after drying the root is described as 'dry root' or 'dried chicory'. 'Manufactured chicory' denotes chicory root that has been dried, roasted and ground. Unless otherwise indicated all import figures refer to dried chicory root.

2 For instance, Aristophanes (450–385 B.C.) and Horace (65–8 B.C.) mentioned chicory. Translators, however, give the English as endive. We may quote a translation of Horace (Odes and Epodes, 1, 31,16): "My fare is the olive, the endive, and the wholesome mallow".

3 Information concerning chicory cultivation in Holland and Belgium was available to the writer in the form of an unpublished report by Bokma de Boer (1940).

a most popular drink from the earliest days of the Dutch East India Company, and beside the mistress of every home "stood a coffee kettle never empty". Pigott (1908) recorded that as late as 1908 and as early as 1820, when sections of the population in Albany had no money for coffee, barley was roasted and used as a substitute. There was no mention of chicory as a substitute. When, however, the Colony of the Cape of Good Hope enumerated individually, in 1857, for the first time, the imports to the Colony, we find chicory imports for that year recorded as 266 cwt. from the United Kingdom and 36 cwt. from the United States of America.[1] Not again until 1864 is chicory specifically mentioned. If there were no imports during the intervening years, then clearly the use of chicory in the Union had not been well established at that time; if there were, then the totals for 1857 and for 1864 (2,048 cwt.) seem to indicate that the processing of chicory was a minor but growing industry. The trend in importation to meet the Colony's requirements may be seen on Fig. 1. Certainly there are considerable unexplained variations from year to year in the early period. The general increase is apparent from the average figures for three quinquennial periods; 1865-1869: 376,971 lbs.; 1875-1879: 739,610 lbs.; 1885-1889: 755,602 lbs. Natal at least as early as 1864 imported the root from Europe for her own consumption; the figure for this year was 116,649 lbs.[2] and for 1885 164,102 lbs. By 1896 Natal imports of chicory root had risen to 371,416 lbs. (214,761 lbs. of which were for 'home' consumption). In the years 1900-1909 imports to Natal averaged 400,000 lbs.[3]

The Cape Colony's imports in the 1870's were overwhelmingly from the United Kingdom with, occasionally, small amounts from Germany and one even from St. Helena (1873 ; 112 lbs.). In the next decade Germany, Holland and Belgium entered the list of suppliers, by far the largest of which was still the U.K. Towards the end of the century,

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[1] Martin and Leonard (1949) have stated that chicory production in the United States started in Michigan in 1830 and that before that time dried root was imported from Europe. Ukers (1922) noted that Governor Dowdoin of Massachusetts introduced chicory into the states in 1785.

[2] A further 36,550 lbs. were imported into Natal from the Cape Colony.

[3] Blue Books and Statistical Year Books, Colony of Natal.

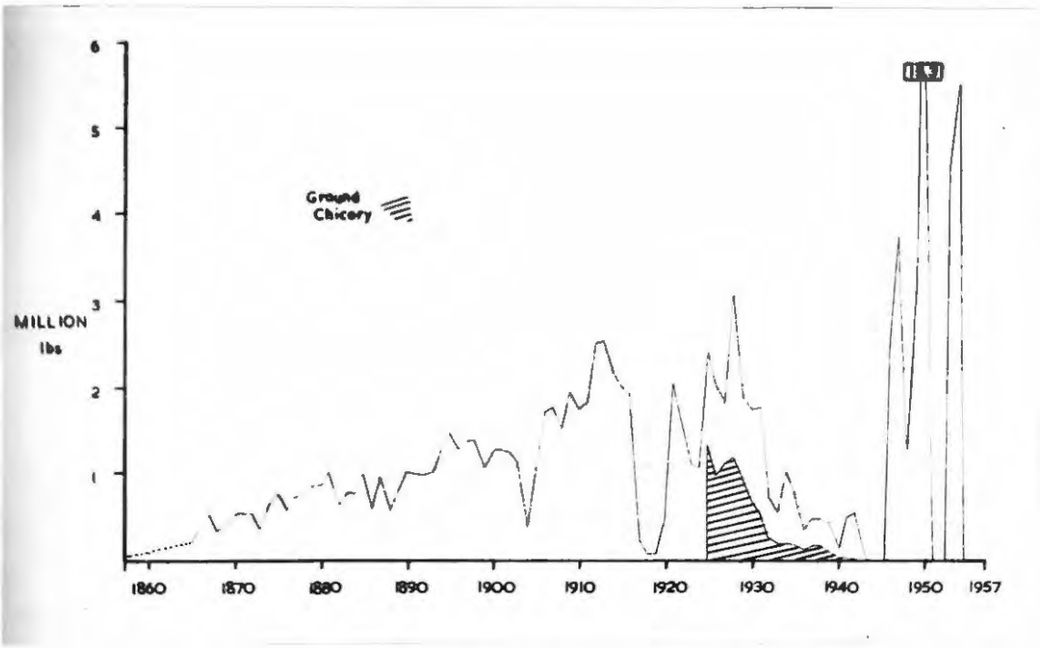

FIG. 1. CHICORY IMPORTS, 1857-1957

The gap between the first enumeration of chicory in 1857 and the next occasion on which the root is recorded is indicated on the graph by the dotted line.

Sources: The figures for the years 1857-1909 refer to the Cape Colony only and they are taken from the Colony's Statistical Registers. From 1910-1940 the Annual Statements of Trade and Shipping for the Union have been the source; for the period 1949-1957 the Annual Reports of the Chicory Control Board have been consulted.

Belgium's share increased to over 500,000 lbs. in 1898, which, added to the U.K.'s 665,000 lbs. and Germany's 122,000 lbs., made up the major proportion of the total of 1,034,415 lbs. During this decade small amounts came from Natal and occasionally Holland and the United States. In 1893 India and Burma sent 280 lbs.

The imports that were not re-exported were, of course, subject to tariff charges, though rebates of varying percentages were given from time to time, being as much as 11/8d. rebate on the 16/8d. tariff on 100 lbs. in 1891-1893.

Before 1836 the imports to the Cape Colony (i.e. in 1857 and 1865) were charged at 7½ per cent. There was no mention of chicory in the Customs Tariff Act, 1855. By Act No.1, 1866, the Colony's customs tariff was amended and, inter alia, provided specifically for chicory, on which the duty payable was 13/6d. per 100 lbs. An increase to 16/8d. per 100 lbs. (2d. per lb.) in 1884 preceded the start of South African cultivation by a few seasons. It would seem that these early tariffs were levied for revenue and not for protective purposes.

THE START OF LOCAL PRODUCTION

During the 1890's chicory was grown in South Africa for the first time on a commercial scale. It seems impossible to be specific about the date and the place. Hiersch (1889) described the methods of cultivation which had met with success at Stellenbosch Agricultural School, and Smith (1945) has recorded that his father, H.T. Smith, was the first to grow chicory commercially in South Africa when he grew it in 1895 on the farm 'Hollowdene', then part of the farm 'Groote Vlei', in Alexandria. Prior to this time chicory had been grown in garden plots but was regarded more or less as a curiosity. The root appears to have been grown in the nineties in many parts of the Eastern Province. The Editor of the Agricultural Journal of the Cape of Good Hope (1898) quoted the Cape Mercury as having reported: "The roots are now grown by the farmers round the districts of Kingwilliamstown and East London and, in fact, all the Eastern

Province." Burton (1903) noted that a new factory had been erected in King William's Town in 1895 and that the root was grown by farmers "in the neighbourhood". Some farmers in the Izeli valley a few miles north of King William's Town supplied the root to the factory, which closed down on the death of the owner in 1910.[1]

The Cape Government Railway Rates included "Colonial Chicory" as early as 1892 and in 1899 made provision for "Roots, South Africa". Production was almost entirely located, however, in the Cape Colony. By 1906 chicory had been successfully grown in parts as far apart as the Paarl Division, Alexandria, Queenstown and East London while the chief district, we read, was King William's Town. Burtt-Davy (1906) also reported that "chicory does not appear to have been grown commercially in the Transvaal". He did, however, note that experiments at Skinners Court showed that good roots could be grown in the Transvaal "even with a light rainfall", and according to Mundy (1906), several farmers in the Transvaal were making experiments with chicory. A few years later Burtt-Davy (1913) again noted that there was still no commercial chicory production in the Transvaal; experiments during the years 1905-1909 had been made difficult by the tendency of the local soils to dry out and crack. In Natal Sawer (1910) recalled experiments at Cedara and Winkle Spruit in 1904-1905 season.

The early years of production in the Cape Colony were, however, not ones of steady output and many farmers were reluctant to grow the crop. The Cape Mercury (1898) stated that it was difficult to get farmers to grow chicory "to comply with large orders from all parts of South Africa". Burtt-Davy (1906) declared that "none appears to be grown at the present time", although according to the Editor of the Agricultural Journal of the Cape of Good Hope (1906), manufacturers were "ready and willing to take it if they can obtain a steady supply in sufficient quantity" whilst "factories have for months past been idle" for want of the constant supply. The first hints of marketing

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[1] Personal communication from Mr O. Ginsberg, King William's Town, 25th July 1957.

problems arose in the same article: the Editor recommended discussion between prospective growers and manufacturers and that a "number of growers combine so as to furnish the necessary amount and to distribute the supply over a longer time". The sun-dried product was not suitable for the manufacturers' purposes; the process was better carried out in the large brick and iron kilns specially erected for the purpose. Perhaps the paucity of entries in the "Best 50 lbs. of prepared Chicory" class of the Albany Agricultural Show during most of these years was another indication of the lack of interest in the crop; in 1896 the prize was, however, taken by the Sun Steam Manufacturing Company of Port Elizabeth.[1]

Other evidence indicates that in some seasons there were surpluses of chicory produced in the Cape Colony: certainly there was some export of Colonial root. In 1899, 231 lbs. valued at £4 were exported; in 1901, 5,600 lbs. valued at £100 and in 1903, 336 lbs. worth £7. Over the period 1906-1909 the Transvaal, Natal and the Cape Colony were recorded as exporting colonial chicory to the other states in the Customs Union.[2] In the case of the Transvaal, however, it is not certain that the colonial chicory exported was cultivated in the Colony.

TABLE I

COLONIAL CHICORY EXPORTED TO OTHER STATES IN THE CUSTOMS UNION, 1906-1909
(lbs.)

	1906	1907	1908	1909
Cape	43,510 (£348)	66,763 (£532)	82,269 (£668)	220,167 (£1636)
Natal	14 (£1)	182 (£7)	17,258 (£334)	9,877 (£194)
Transvaal	310 (£4)	7 -	393 (£8)	- -

Source: Annual Statements of Trade and Shipping of the Colonies and Territories forming the South African Customs Union.

[1] The Journal, Grahamstown, 2nd April 1896.

[2] The Customs Union comprised the Cape Colony, Natal, the Transvaal, the Orange River Colony, Southern Rhodesia, North West Rhodesia, Basutoland, the Bechuanaland Protectorate and Swaziland.

Home production of the root appears to have suffered in the years immediately prior to the First World War, though in 1910 a Port Elizabeth firm bought some chicory for confectionery purposes, paying 12/6d. per 100 lbs.

EXPANSION IN WARTIME

The war interrupted the importation of chicory and, thereby, acted as a stimulus to local producers. For the combined years 1911 and 1912 the major percentage contributions to the supply of chicory were Belgium 34 per cent, Holland 20 per cent, United Kingdom and Germany 16 per cent each.[1] In 1915 Germany, of course, dropped out; Belgium supplied only 21,868 lbs. (out of the total of 2.1 million lbs.), Holland 1.1 million lbs., the U.K. .7 million and the United States over a quarter of a million lbs. In 1916 Holland, the U.K. and the U.S.A. again supplied the bulk of the 1.9 million lbs. imported. In the years of lowest import figures the U.K. and the U.S.A. alone could send small quantities. In 1920, Holland was back as a major supplier.

The trends in the value of imported chicory, coffee and tea per 100 lbs. can be seen from Table II.

TABLE II

TRENDS IN THE VALUE OF IMPORTED CHICORY, COFFEE AND TEA, 1912-1920
(per 100 lbs.)

	1912	1916	1920	% increase 1912-1920
Chicory:	£1.933	£2.152	£4.292	210.3
Coffee :	3.112	1.9	4.003	128.5
Tea :	4.745	4.635	7.456	165.8

Source: Annual Statement of Trade and Shipping of the Union of South Africa.

Note: a) These figures are based on the value of the annual imports as given in the Annual Statement. The value is presumably that of the total at Union ports. It will be realised that the one figure for the year includes quantities of raw root as well as ground chicory and clearly the proportions of each might change from year to year. The values for coffee are overwhelmingly for the raw product.

The heavy increase in the value of imported chicory would, one might suppose, lead manufacturers to look to home producers, and to an

[1] Annual Statements of Trade and Shipping of the Union of South Africa.

increase in the market price of Union chicory. The slightly greater relative increase in the value of tea imports vis à vis coffee would, perhaps, lower consumer resistance to coffee and coffee and chicory mixtures.

Hitherto reluctant to grow chicory, producers now had a protected market and prices that were booming and even reached 40/- per 100 lbs. of dried root. Two chicory factories were opened during the war years. R.T. Smith and Sons opened a roasting and grinding factory in 1917 in the Kabe area near Alexandria and produced in 1917, 142,000 lbs., in 1918 194,000 lbs. and in 1919 254,000 lbs. - quantities which must be increased by 25 per cent if we wish to know the amount of root handled. A few months later up-to-date machinery was installed in Port Elizabeth and chicory of "uniform and superior quality" was produced.[1]

Unfortunately the very trade interruptions which assisted the Union's Industry during the war also prevented the importation of high quality seed; growers were obliged until 1919 to use locally grown seed which produced root of poor quality.

THE INTER-WAR YEARS

The extraordinary marketing conditions created by the interruptions to normal trade disappeared, with the return to 'normalcy', in the 1919-1920 season. In 1920 the import figure moved up to 489,628 lbs. and in 1921 topped the 2 million lbs. mark. Union producers were faced with the competition of, mainly, Holland and Belgium and by 1924 the value of imported chicory had dropped to approximately £1·308 per 100 lbs. as against the 1920 figure of £4·292. Parish (1921) stated that the imported chicory came at the "comparatively low price of a surplus accumulated during the war". The market prices of chicory root per 100 lbs. dropped to the 1924 'low' of 12/6d. In this year the Smith's factory closed down; the decline in the output of roasted and ground chicory from this factory is shown by Table III.

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[1] "The Manufactures of Port Elizabeth." The South African Journal of Industries, Vol. 1 No. 7. 1918.

TABLE III

OUTPUT OF ROASTED AND GROUND CHICORY -
R.T. SMITH & SONS, 1920-1924

(lbs.)

1920	165,000	1923	156,000
1921	252,000	1924	108,000
1922	155,000		

Source: Smith (1945)

The producers' response to the lower market prices may in some measure be gauged from the Agricultural Census returns. Hitherto, chicory had not been enumerated in any Census of the Cape Colony or the Colony of Natal and did not appear in the first Agricultural Census of the Union in 1918. From Table V it is clear that after a slight fall in 1920-1921 the morgenage planted in 1921-1922 just exceeded the 1919-1920 figure (404 to 378) whilst the crop of over 950,000 lbs. was 25 per cent greater than that for 1920-1921, the average yield increasing from 720 lbs. per morgen to over 2,300. In 1922-1923 farmers had planted 647 morgen and the crop was nearly 1·7 million lbs. The response, then, was to plant more. The producers who had invested in drying kilns (kiln drying was introduced in 1917 and generally replaced sun-drying in 1924) and had profited from the wartime prices were clearly reluctant to retreat. They sought the protection of the Government, which, in 1924, increased the duty on ground or manufactured chicory from 2d. to 4d. per lb.

Competitive selling, during favourable seasons particularly, led to chicory being sold at very low prices. The manufacturers' agents started buying chicory from the producers during the harvest season with the result, according to Neethling and Spamer (1929), that in favourable seasons the competition amongst producers became so keen that chicory was sold at ridiculously low prices. Soon a movement was afoot to deal with the fears of being stranded with root and to take advantage of the limited numbers of buyers and the geographical

pattern of producers. The 1926 suggestion concerning co-operative marketing (see page II) was acted upon, and on the 29th September 1926 the Alexandria Co-operative Chicory Growers' Society was registered as an unlimited Company. The Society was to set prices for the season and so reduce competition among producers. Details of production by members of the Society appear in Table IV.

TABLE IV

MEMBERSHIP PRODUCTION AND AVERAGE SELLING PRICE - ALEXANDRIA CO-OPERATIVE CHICORY GROWERS' SOCIETY 1927-1932.

	No. of members	Chicory received[a]	Average Selling Price[b]
1927	105	883,550	not available
1928	103	812,095	19/3
1929	153	1,138,102	16/4
1930	146	3,579,974	14/6
1931	139	703,037	12/-
1932	139	not available	not available

Source: Commission (1934)

Notes a) lbs.
b) per 100 lbs. dried root

Membership of the Society was never compulsory, and, although in 1929-1930 nearly every grower was a member, generally up to forty producers were not members. The 1934 Commission appointed to inquire into co-operatives and agricultural credit found that the high membership of 1929-1930 had been gained as a result of the efforts of some "misguided individual" who promised a) compulsory membership, b) an embargo on imports, and who, furthermore, stated that only 12 per cent of the total Union consumption was grown locally (i.e. in Alexandria). As a result of the use by the Co-operative of its almost monopolistic powers to raise the price to £1 per 100 lbs. of root in 1926 (which was two to three times greater than the 8/- per bag cost of production), producers planted heavily (see Table V). Favoured by climatic conditions, annual production rose to over 3 million lbs.[1] This was in excess of the demand and the accumulated

[1] Alexandria's rainfall was only 11.8" in 1927; but it was 25.73" in 1928, 21.78" in 1929 and 24.14" in 1930.

stocks led to a fall in price, demands for further protection and delay in closing the chicory pool. The Society had changed to the pool system of selling, and the 1930 pool could be closed only during 1933 when the final payment was made. The appeals for added protection against imported chicory resulted in the duty on chicory root being increased , by Act No.44, to 3d. per lb. and the duty on manufactured root being raised to 5d. per lb. The Commission described these duties as "almost prohibitive" when it declined to support further pleas in June 1933. Imported chicory root with a duty of 25/- per 100 lbs. already cost about 17/- more than the local article.

The Society had no powers to curtail production and the increase in non-members, as a result of resignations and disloyalty following the failure of the promises, further aggravated the difficulty of effectively marketing chicory. The 1934 Commission felt that a Society proposal that existing growers should have quotas would be impracticable and against the best interests of the producers of chicory. They thought that fixation of price could not be successful unless the supply could be artificially limited to the demand, and, furthermore, the Commission was not satisfied that "under favourable price relationships chicory growing will not prove possible in other areas of the country". The Commission accordingly recommended that no control of the Industry should be granted and that the Society should concentrate on quality, grading and plant provision (for the washing, cutting, drying and general preparation of the root).

It is not surprising to find that the Society ceased commercial operations in 1935. Fig. 2 makes it clear that there were sufficient non-members to ruin any policy that was aimed at the general good.

The Marketing Act in 1937 opened the way for the renewal of the plea for effective control, and in 1935 the Alexandria Co-operative Chicory Growers' Society presented a draft control scheme to the

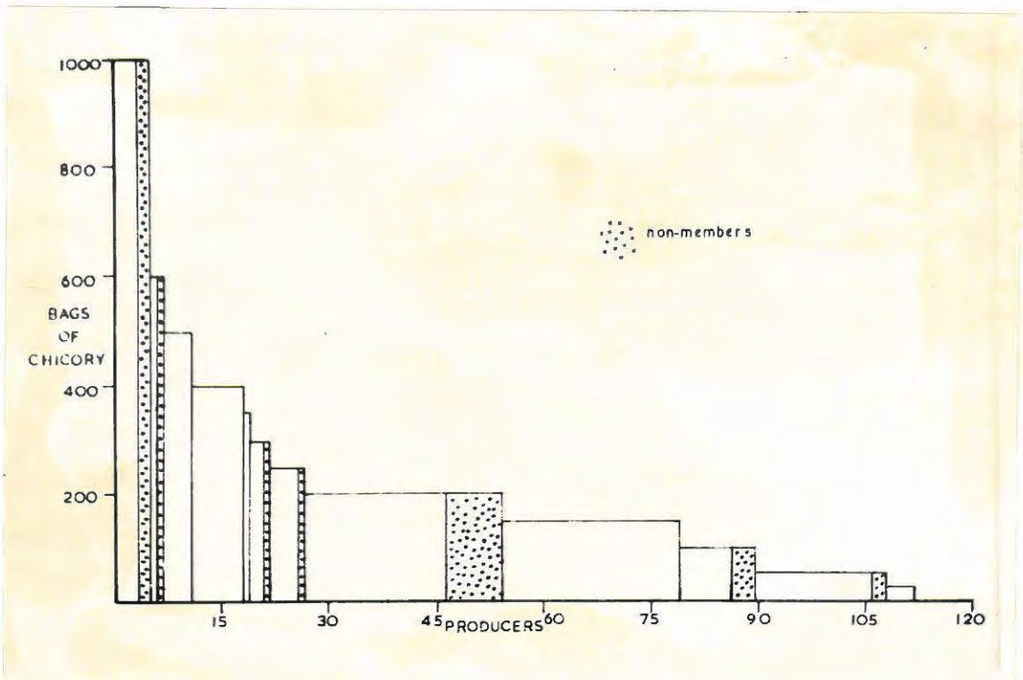

FIG. 2. CHICORY PRODUCERS - MEMBERS AND NON-MEMBERS OF THE ALEXANDRIA CO-OPERATIVE CHICORY GROWERS SOCIETY, 1934

Source: Commission on Co-operation and Agricultural Credit, 1934.

Minister of Agriculture.[1] In terms of Section 17 of the Marketing Act, the draft was referred to the National Marketing Council; the Council completed its Report on the Proposed Chicory Scheme in 1939. Estimates in the N.M.C. Report of the local production showed clearly that the Union was fast approaching self-sufficiency in chicory. From providing 51 per cent of the total chicory available in 1926, local producers provided 83 per cent in 1936 and 91 per cent in 1938. The Report pointed out that maladjustments in demand and supply, whereby slight variations in the annual output were accompanied by disproportionate fluctuations in price, had caused the price to vary from 21/- per bag to 7/-.

As the local producers were able to meet more and more of the demand for chicory, so the proportion of each annual consumption that derived from imports became less and less. In 1926 imports were 49 per cent of the total consumption, in 1936 only 7 per cent and in 1938 9 per cent. Worthy of note are the marked fall off after 1929 in the importation of the manufactured chicory and the variable quantities of root imported - the amount depending on the local crop. In 1925 the ground article was some 54 per cent of the total 2.4 million lbs. imported; in 1928 it was a little under 50 per cent. Neethling and Spamer (1929), from an analysis of the years 1925-1928, stated that it appeared there was a constant demand for imported ground chicory and that probably most of the imported ground was used by the housewife, who mixed her own coffee with chicory, and not by the manufacturer. The next twelve years proved the 1928 forecast wrong. In 1930 ground chicory was less than 40 per cent of the total imports and in 1939 was only 85,882 lbs. (worth £895) or 10 per cent of the total. In 1928 the abnormal root imports (1·87 million lbs.) followed a lean year for local production as did the 1934 imports (·834 million lbs.).

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[1] The draft was published for general information by Government Notice No. 1892 of 4th November 1938.

By the late thirties there was actually some export of locally produced chicory; in the years 1936-1938 the exports of South African root averaged 7,000 lbs. per annum. In 1939, over 9,000 lbs. were sold to Southern Rhodesia and 56 lbs. to Portuguese East Africa.

THE SPATIAL PATTERN IS MOULDED

The economic factors sketched in the previous pages were responsible for the increase of chicory cultivation in the Union. Though producers felt that they were exposed to unnecessary and unkind economic winds, it was comparatively profitable for them to produce for the heavily-protected internal market. Attention is now directed to the location of the Union production, to the location of the expanded production, and to the features of the locational pattern as it formed and dissolved and finally moulded itself during the inter-war years.

Prior to 1920 no statistical data were available regarding the geographical distribution of chicory cultivation. Evidence quoted earlier indicates that the crop was produced in several parts of the Eastern Province before 1914 and that King William's Town was probably the principal producing district. During the First World War Canham (1917) reported that large areas in the Eastern Province were under chicory; in 1918 Alexandria "seemed to be the chief source of supply of root for the Rand"[1] Later Parish (1921) wrote: "The crop has been grown successfully without irrigation by farmers at Alexandria, Bathurst, Peddie and George in the Cape and at Bethal in the Transvaal; with irrigation by farmers at Pretoria and Piet Retief in the Transvaal, at Cantoon in the Cape and in Swaziland."

Before 1920 there was some production occasionally in both the Transvaal and Natal (p.11); in 1918 "very good" chicory was grown on a farm in the Bethal district.[2]

These early areas satisfied the climatic and soil requirements of the crop to a greater or lesser degree. Within the climatically

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1 "Notes from Witwatersrand" The South African Journal of Industries. Vol. 1 No. 10 1918.

2 "Transvaal Grown Chicory" The South African Journal of Industries. Vol. 1 No. 6 1918.

feasible areas, then, cultivation occurred whenever a farmer or factory proprietor started it; other more profitable crops excluded cultivation (e.g. vines and wheat in the Western Province) from some such areas. During the inter-war period, climate and alternative uses, together with a measure of producer co-operation, ensured that the pattern was less widely dispersed.

The years 1918-1937 saw sixteen Agricultural Censuses of the Union. Chicory root was enumerated in seven of these. The details from these seven are given in Table V. Six of the seven returns are for the twenties, whilst the thirties have only the 1936-1937 figures.

From an examination of the data it appears that many districts scattered over the country planted chicory. Some planted on one or two occasions only; a few, probably, planted every season. In some instances the crop was never harvested; in other districts the yield was small and in other districts the yield was at least average. For instance, Pinetown's 3 morgen (in 1922-1923) apparently yielded no root; Smithfield's 5 morgen (1920-1921) gave only 100 lbs., and Port Elizabeth's 4 morgen (1919-1920) averaged 1,050 lbs. per morgen. These erratic plantings must surely have been experimental and were made, presumably, by a few farmers who had contact with producers in the more regular chicory-producing districts.

A second feature of the data is the variation of yield from season to season in the same district. Alexandria, for instance, had a yield of 175,000 lbs. on 271 morgen in 1919-1920, which, assuming all the morgenage sown was harvested for the root, was a yield of a little over 600 lbs. per morgen. In 1920-1921 the yield was 340 lbs., and in 1921-1922 some 2,331 lbs. per morgen, 3,080 lbs. in 1922-1923, over 4,000 lbs. in 1929-1930 and down in 1936-1937 to just over 2,500 lbs. The variations in other districts, however, are just as great: Pietersburg managed over 1,000 lbs. per morgen in 1919-1920, about 860 lbs. in 1920-1921, only 70 lbs. in 1921-1922

TABLE V

CHICORY PLANTINGS AND CHICORY YIELDS BY MAGISTERIAL DISTRICTS, 1919-1937

(lbs. dried root)

Magisterial Districts	1919-1920		1920-1921		1921-1922		1922-1923		1925-1926		1929-1930		1936-1937	
	Morgen	Yield	Morgen	Yield	Morgen	Yield	Morgen	Yield	Morgen	Yield	Morgen	Yield	Morgen	Yield
Albany	29	43,100	18	4,000	26	19,000	24	37,250	5	9,048	30	156,133	75	141,511
Alexandria	271	175,900	187	64,300	291	678,307	525	1,620,351	618	1,766,873	776	3,146,311	937	2,372,847
Bathurst	22	300	17	1,000	4	3,300	7	120	2	3,000	4	10,000	81	20,800
Port Elizabeth	4	8,200	-	-	-	-	2	-	-	-	-	-	-	-
Uitenhage	-	-	-	-	1	200	1	425	-	-	-	-	3	-
CAPE TOTAL	326	227,500	224	70,500	322	700,807	560	1,668,146	625	1,778,921	812	3,313,844	1102	2,560,158
Barberton	5	-	-	-	1	528	-	-	-	-	1	-	-	-
Bethal	6	7,800	12	60,000	18	241,000	-	-	-	-	-	-	-	-
Ermelo	8	7,800	-	-	-	-	-	-	-	-	-	-	-	-
Lydenburg	-	-	1	100	-	-	1	80	-	-	-	-	-	-
Pietersburg	13	15,100	3	2,600	44	3,017	8	9,295	-	-	-	-	-	-
Potchefstroom	-	-	-	-	1	1,050	-	-	-	-	4	4,000	-	-
Rustenburg	-	-	5	4,000	10	-	18	18,120	-	-	-	-	1	560
TRANSVAAL TOTAL	32	30,700	21	66,700	80	245,646	49	28,035	-	-	5	4,000	1	560
Lower Umfolozi	-	-	-	-	2	12,000	18	1,200	-	-	-	-	-	-
NATAL TOTAL	19	18,300	6	7,300	2	12,000	21	1,200	11	-	61	3,240	1	400
UNION TOTAL	377	276,700	256	144,600	404	958,543	647	1,691,441	636	1,778,921	878	3,320,684	1104	2,561,118

SINGLE SEASON PLANTINGS (included in totals above):

Natal — Klip River: 19 morgen, 18,300 lbs. 1919-1920; Lower Tugela: 11 morgen 1925-1926, 14 morgen 1929-1930; Pinetown: 3 morgen, 2,100 lbs. 1920-1921; 5 morgen 1922-1923; Polela: 45 morgen, 240 lbs. 1929-1930; Richmond: 1 morgen, 3,000 lbs. 1929-1930; Umzinto: 3 morgen, 5,200 lbs. 1920-1921; Umvoti: 1 morgen, 400 lbs. 1936-1937; Vryheid: 1 morgen, 1929-1930.

O.F.S. — Kroonstad: 1 morgen 1922-1923; Smithfield: 5 morgen, 100 lbs. 1920-1921; Vredefort: 16 morgen, 4,000 lbs. 1922-1923.

Cape — Vryburg: 1 morgen, 1,000 lbs. 1929-1930; Middelburg: 1 morgen 1929-1930; Humansdorp: 6 morgen, 25,000 lbs. 1936-1937; Bredasdorp: 1 morgen, 500 lbs. 1920-1921; Victoria East: 1 morgen, 200 lbs. 1920-1921.

Transvaal — Middelburg: 20 morgen, 600 lbs. 1922-1923; Pretoria: 2 morgen, 21 lbs. 1921-1922; Waterberg: 4 morgen, 30 lbs. 1921-1922.

Source: Union Agricultural Census Reports.

and nearly 1,200 lbs. in 1922-1923. These variations of yield may be correlated with rainfall, though, no doubt, during the inter-war years methods of cultivation were generally raising the yields. The monthly rainfall during 1919, 1920 and the first six months of 1921 in Rainfall District Eight[1] (Eastern Cape coastal areas) was consistently below average, and in 1920 was for most months less than 75 per cent of the normal. The higher yields of 1922-1923 and 1929-1930 followed periods of above-normal rainfall in that District.

One cannot overlook the position of Bethal in the early returns. In that district only 6 morgen were planted in 1919-1920 and the yield was 1,300 lbs. per morgen. When all the Cape districts were experiencing poor yields in 1920-1921, Bethal, according to our data, grew 60,000 lbs. of chicory root on 12 morgen, a yield of 5,000 lbs. per morgen. The following season when Cape yields were considerably better, over 13,000 lbs. of root were harvested on each morgen of the 18 that were planted in the Bethal district. The Rainfall of the District (Twenty-two A) averages 20·24" compared with District Eight's 23·7", and both seasons were somewhat above normal.

The heavy labour demand formed the principal factor leading to the suspension of chicory cultivation in Bethal. The root was sun-dried and sent on contract to a Pretoria manufacturer. It seems likely that only one or two farmers in Bethal grew chicory during this period.

The significance of Alexandria that we postulated had established itself during the First World War was certainly confirmed by the 1919-1920 Census. Producing 63 per cent of the total crop that season, Alexandria harvested four times as much root as the second largest producing district: Albany, with 15·6 per cent of the crop. The dominating position of Alexandria increased throughout the inter-war years to a remarkable degree; so that in 1926 the Census reported: "The production of chicory root is now almost solely confined to the

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[1] This coincides approximately with the present (1958) Proclaimed Areas; see Fig. 7.

district of Alexandria."

The early challenge of Bethal was a very real one, and Alexandria was in some respects a poor second. In 1920-1921 the district produced 45 per cent of the crop on 73 per cent of the morgenage planted whilst Bethal on under 5 per cent contributed 80,000 lbs. or 41 per cent of the total crop. In 1921-1922 Bethal's position was even more clearly underlined: less than 5 per cent of the total morgenage planted in the Union yielded 25 per cent of the Union's chicory production. Alexandria with 72 per cent of the morgenage planted that season produced 71 per cent of the crop.

With Bethal out of the running, Alexandria increased its proportion to over 81 per cent in 1922-1923, to almost 100 per cent in 1925-1926, and in 1929-1930 to nearly 89 per cent and to over 93 per cent in 1936-1937. The Cape, of course, became overwhelmingly the chicory Province, having in both 1929-1930 and 1936-1937 practically 100 per cent of the morgenage planted. Table VI indicates the strong localisation of chicory production that had developed by 1938.

TABLE VI

STATIONS AND INTERMEDIATE SIDINGS FROM WHICH THE LOCAL ROOT WAS RAILED, 1933-1938

(Tons)

	Alexandria		Barkly Bridge & sidings on the Alex. line		Sandflats		Grahams-town		Martin-dale		TOTAL	
	Raw	Ground	R.G	G.	R.	G.	R.	G.	R.	G.	R.	G.
1933	1702	86	not available		n.a.		n.a.		-	-	1702	86
1934	1699	44	—		—		—		-	-	1699	44
1935	1672	75	—		—		45	-	—		1017	75
1936	1651	40	1169	-	48	-	66	-	3	-	2037	40
1937	1925	22	615	-	58	-	54	-	-	-	1750	22
1938	1952	65	652	-	50	-	59	-	2	-	2715	65
TOTAL	9901	332	2436	-	154	-	224	-	5		12720	332

Source: Natural Marketing Council Report (1939)

Though the 1934 Commission considered that efforts in Albany and Bathurst at establishing commercial production had not proved successful, those two districts, and particularly Albany, had always planted some chicory. They were subject to the same variations of yield as Alexandria itself (e.g. Albany 1920-1921: 330 lbs. per morgen; 1929-1930: 5,200 lbs.). By 1936-1937 both were planting over 70 morgen of chicory, contributing together 5-6 per cent of the total Union production.

3. THE INDUSTRY UNDER THE CHICORY CONTROL BOARD

THE MARKETING ACT NO. 26 OF 1937

The very low prices received by farmers during the depression years of the thirties added voices to the clamour for Government interference in marketing and price control of agricultural produce. Parliament passed a series of Control Acts aimed at increasing the return to producers by raising the internal price for farm products above overseas values. van Waasdijk (1954) considered these Acts "primitive and not very effective". They met with varying degrees of success in raising producers' prices for the commodities they covered - industrial dairy produce, maize, tobacco, livestock and wheat[1] - but many farmers pressed insistently for compulsory co-operation of producers. The 1934 Commission, however, reported against compulsory co-operation and supported the principle of competitive marketing and price formulation without state intervention.

The next few years witnessed wide price fluctuation, and the various Control Acts in force exhibited serious defects. In particular it was found that as the circumstances of each product altered, different problems arose which could not be met without amending legislation in view of the strictly limited powers of the Boards. Following the examples of Britain,[2] Canada, Australia and New Zealand, and after investigations by the then Secretary for Agriculture and Forestry into the control arrangements overseas, particularly in the Netherlands and the United Kingdom, the Union Parliament passed a Marketing Act in 1937. The Act made it possible to super-impose a system of regulated marketing and price control

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[1] The Control Acts were, respectively -
Act No. 25 of 1930;
Acts No. 39 of 1931 and No. 50 of 1935;
Acts No. 19 of 1932 and No. 17 of 1935;
Acts No. 29 of 1932 and No. 48 of 1934;
Act No. 58 of 1935.

[2] The inability of agriculturalists to establish effective collective bargaining by voluntary means culminated, in Britain, in the passing of the Agricultural Marketing Acts of 1931 and 1933 which gave farmers the power to create monopolies by law.

on the prevailing competitive system by providing for the introduction and amendment of marketing schemes by the issue of proclamations instead of by specific parliamentary enactment for each product and for every subsequent amendment.

Both in Parliament, though in the House there was a large measure of agreement,[1] and outside the Bill was criticised by those who were not prepared to interfere with the free market pricing mechanism.[2]

After promulgation of the Act in 1937, the following marketing schemes (original schemes only) were introduced in the years stated:-

(i) The Dairy Products Marketing Scheme, 1938,
(ii) The Maize Control Scheme, 1938,
(iii) The Wheat Control Scheme, 1938,
(iv) The S.A. Dried Fruit Scheme, 1938,
(v) The Tobacco Control Scheme, 1939,
(vi) The S.A. Deciduous Fruit Regulatory Scheme, 1939,
(vii) The S.A. Citrus Scheme, 1939.

THE CHICORY CONTROL SCHEME

The National Marketing Council Report (1939) considered the scheme proposed by chicory producers whereby the root could be marketed under the Marketing Act. After a Control Scheme, published under Proclamation No. 335 of 1939 (later amended No. 339, 1939), had been voted for and accepted by producers, it came into operation on 1st January 1940.

The original Control Scheme has been extended territorially since 1940. Fig. 3 shows this expansion. The districts of Albany, Alexandria and Bathurst were the areas proclaimed on the 1st January 1940 as the areas over which the newly-created Control Board was to exercise its authority. By subsequent proclamations four more

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[1] When the motion on the 3rd reading of the Bill was put on the 16th March 1937 and a division called, only six members of the House voted against the Bill (House of Assembly Debates. Cape Town, No. 10, Column 3372).

[2] See, for instance, Richards (1936) and McLoughlin (1938).

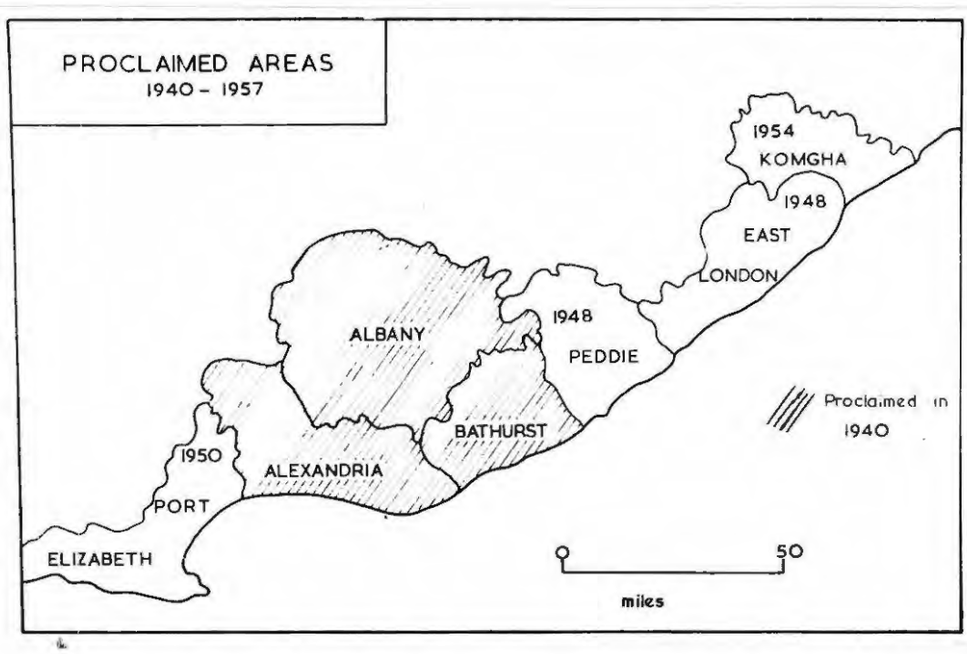

FIG. 3. THE PROCLAIMED AREA - TERRITORIAL GROWTH, 1940-1957

districts have been included in the Proclaimed Areas of the Scheme. Fig. 3 shows that these additions were effected during the period 1948-1954 and that the Proclaimed Areas form a continuous belt of country.

From time to time, amendments affecting other aspects of the Scheme have been promulgated. The present powers and functions of the Chicory Control Board, as stated in the Board's Annual Report for the year ending 30th September 1956, are:-

a) to undertake the marketing of all chicory grown in the Proclaimed Areas through one channel, viz. the Chicory Board;

b) to act as sole importer of raw dried chicory root in times when local production does not meet with the country's requirements;

c) to assist in supplying chicory seed and bags to registered growers in the Proclaimed Areas;

d) to fix the maximum prices subject to the Minister's approval of the different grades of dried root, wherein the prices of undried root are included;

e) to conduct pools for the proceeds of all raw dried root and undried root sold by producers in the Proclaimed Areas in order to ensure an equitable distribution of such proceeds;

f) to impose levies on such purchases to finance its operations;

g) to assist by grant or loan or otherwise, any research work relating to the improvement, production, processing or marketing of chicory root;

h) to buy chicory outside the Union;

i) to treat in such manner as it may deem fit; to grade, pack, store, process, adapt for sale, insure, advertise, transport and sell chicory which it has bought.

THE TRADING POSITION, 1940-1957

From Fig. 4, which attempts to show graphically the main facts in the demand and supply position of the Industry, it appears that since 1940 three periods may be recognised with different outstanding demand/supply characteristics:-

a) The years 1940-1945, when normal trade relations with the Continent were seriously interrupted by virtue of the lack of shipping space and the German occupation of the Continent, are characterised by the total absence of imports of chicory from the Continent. In 1941, however, the Union was able to obtain 487,712 lbs. of root from

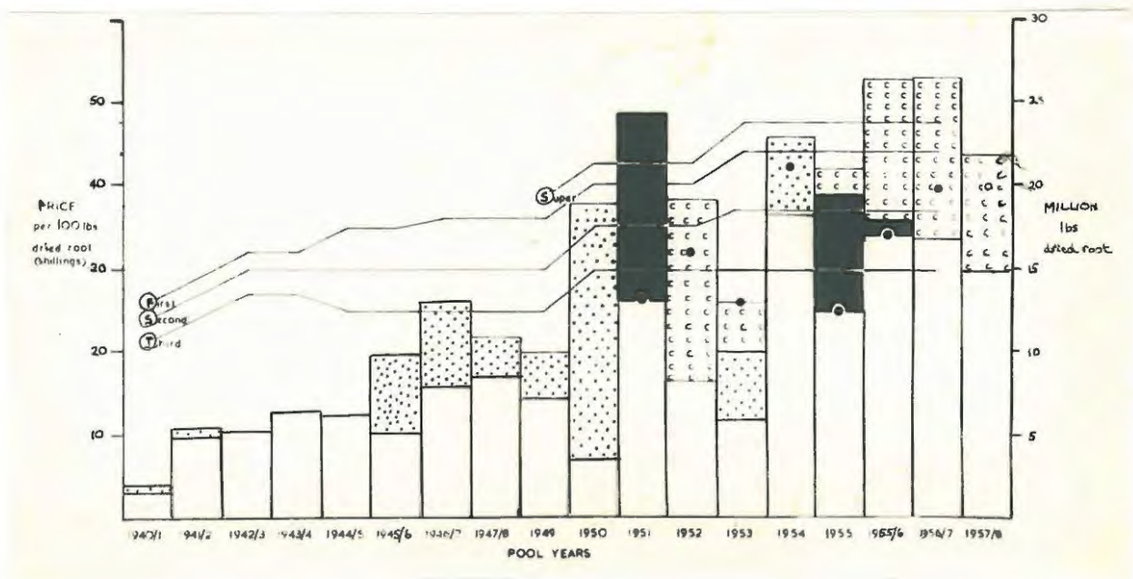

FIG. 4. DEMAND AND SUPPLY IN THE CHICORY INDUSTRY, 1940–1958

The annual columns are subdivided into:

blank : local crop,

: imports,

: surpluses derived from the crop of the year,

: surpluses derived from previous years i.e. carry-over stocks.

The large black dots indicate the annual demand level. The prices paid to the producers for the different grades are shown by the straight lines, read against the left-hand vertical scale. Both the local crop and the demand level for the pool year 1957–1958 are as estimated at January 1958. The pool year 1955 was in fact nine months – from January – September.

Sources: Annual Reports, Chicory Control Board
Annual Statements of Trade and Shipping of the Union.

the United States and Canada and nearly 13,000 lbs. of ground root were sent from the United States. The following year saw imports of root from the same countries and Portuguese East Africa totalling 534,694 lbs. and a further 13,520 lbs. ground from America. From 1943-1945 no imports whatsoever were received.

b) The five years following the cessation of hostilities in 1945 were years when the Union's demand for chicory was met by supplementing the local production with imported chicory. Chicory root imports came principally from the Netherlands, the United Kingdom and Belgium; in 1950 the import total was over 15 million lbs., four times as great as the total root supplied by Union producers. Ground or prepared chicory imports in 1946, coming mainly from the Netherlands, amounted to only 15,022 lbs. or less than 2 per cent of the root imports; by 1949 only 12 lbs. valued at £1 were received.

c) Since 1951 the Industry has seen a period when local production has been, from season to season, either in excess of the demand or below the level of the country's requirements.[1] It is clear from Fig. 4 that in the years when supply has exceeded demand the surpluses of chicory have formed carry-overs for sale during the following seasons whilst, generally, imports have met the local shortfalls in supply. During the past three seasons, the local crop has yielded a surplus which has been carried forward.

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[1] It is pertinent to note that an excess, or an over-supply, is at the artificial price set by the Board.

4. THE PROCLAIMED CHICORY AREAS

The Union's production of commercial chicory root comes almost entirely from the seven magisterial districts which together form the Proclaimed Areas (see Fig. 3.). Though the cultivation of the root is strongly localised even within the districts proclaimed, the ebb and flow of production bring in from time to time other parts of the Areas. This Section presents briefly the different aspects of the physical environment of the Areas; much of this background is presented cartographically whilst in the text attention is paid to the influence in general of certain aspects of the physical background on the distribution pattern of chicory cultivation. A concise statement of the localising factors concludes the Section.

PHYSICAL BACKGROUND

The Proclaimed Areas lie between 25° and 28° 30' East Longitude and between 24° and 33° 30' South Latitude (see Fig. 5, inside back cover). The total area of the districts is 5,306 square miles.[1] From the south-west (in the Port Elizabeth magisterial district) to the north-east (in Kongha) is a distance of some 200 miles as the crow flies; the greatest distance of the Areas from the coast is 60 miles. All but one (Albany) of the component magisterial are contiguous with the coastline of the Indian Ocean which trends, approximately, south-west to north-east.

The Areas form portions of two major structural and topographical regions: west of the Great Fish River is the Cape Fold Belt, and east of the Fish there is the south-western extremity of the Coast Belt. The Coast Belt is a sub-division of what Rennie (1945) called "the composite 'extra-plateau' region that passes westwards between the Fold Belt and the Great Escarpment, but reaches the coast east of the Great Fish River".

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[1] This is about 1·2 per cent of the total area of the Union; the farm area of the Areas is less than 1 per cent of the Union farm area.

Geologically the Areas are quite diverse though largely the rock type is sedimentary. The main geological formations[1] encountered in the area are:-

Wind blown sand Alluvium Older sand, fixed dunes and dune rock	Recent
Alexandria beds	Tertiary
Uitenhage beds	Cretaceous
Stormberg series Beaufort series Ecca series Dwyka series	Karroo System
Witteberg series Bokkeveld series Table Mountain series	Cape System

Whilst the members of the Cape and Karroo Systems together represent a conformable sequence from the Table Mountain series to the Beaufort and are all - apart from the Beaufort - associated with the Cape folding, the Cretaceous and Recent Tertiary formations, which overlie these older beds to the south, present greater difficulties of interpretation. Mountain (1946) has stated that the relationship between them is by no means clear.

The unfolded, massive Beaufort sediments, striking approximately east-west, extend southwards into the northern parts of the Proclaimed Areas. They do, in fact, occupy all parts of the Areas lying to the east of the Begha River and to the north of about 33° South Latitude. The Beaufort series and the upper part of the Ecca series are in places invaded by Karroo dolerite. In the country east of the Keiskama River, according to Mountain (1946), intrusions, forming narrow outcrops and following the general direction of strike, can be traced well into the East London area.[2] Topographically the Coast Belt (i.e. east of the Fish River) is similar to that part of the Fold Belt which is south of the Fold Ranges and the topography is described later.

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[1] The pre-Cape formations that crop out along the shore west of Port Elizabeth at Seaview and Bushy Park and in a narrow patch just north of the Uitenhage Fault on Klip River are omitted from this Table.

[2] The doleritic intrusions in the East London and Komgha areas are at present being mapped for eventual publication.

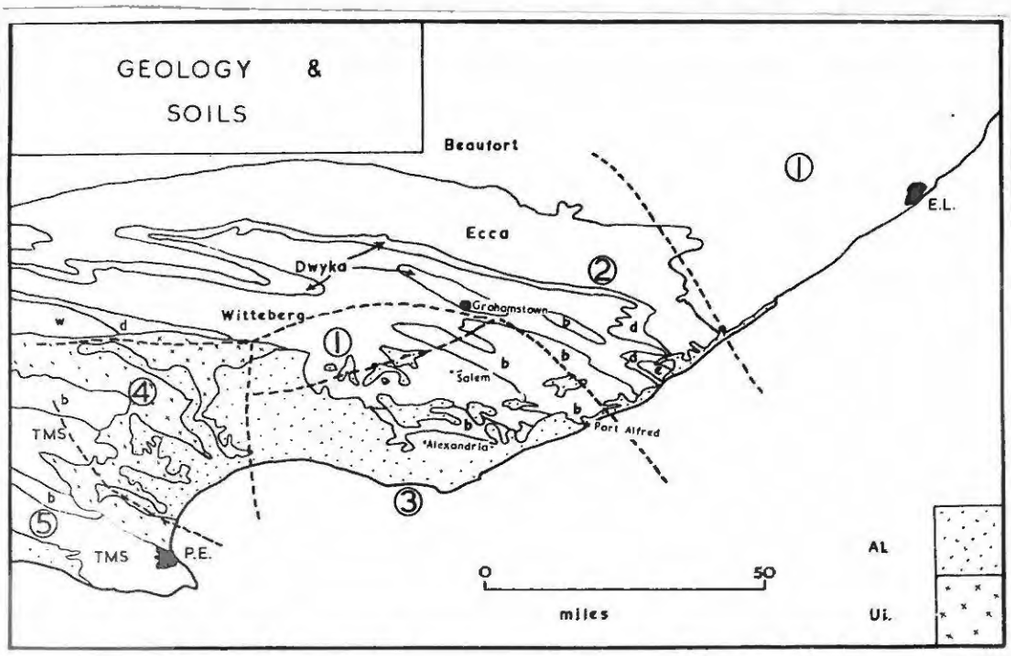

FIG. 6. GEOLOGY AND SOILS OF THE PROCLAIMED AREAS

Geology: Al. : Alexandria beds
Ui. : Uitenhage beds
d : Dwyka
e : Ecca
b : Boldkoveld
w : Witteberg
TMS : Table Mountain Series

Based on Geological Map of the Union (1:), 1955.

Soils: (Soil Regions are bounded by the dashed lines)

1. Semi-Coastal Belt Soils
2. Desert Soils
3. Reddish Brown Sandy Loam on Limestone and deep Sandy Loams
4. Sandy Loam on Lime and Clays
5. Grey Sandy Soils on Table Mountain Series

Based on van der Merwe (1941).

The Beaufort is succeeded by the older Ecca shales and sandstones. Further southwards the Ecca and the underlying Dwyka shales and tillite get caught up in the Triassic age folds of the Cape Fold Belt. The Cape Fold Belt projects into the Areas from the west as a series of prominent parallel ranges trending east-south-east directed obliquely towards the curving coastline; they persist as far east as the lower reaches of the Fish. Around Grahamstown the range (the Grahamstown Hills) reaches an altitude of over 2,700'; further west (the Suurberg) elevations of over 3,000' are attained. As a result of the denudation of the roughly east-west trending anticlines and synclines, southwards from the area of Grahamstown there are alternating zones of older and younger rock: south of the Ecca the Dwyka is replaced by the older Witteberg, which in turn gives way to Dwyka again in a synclinal formation and then itself reappears on the southern limb of the fold.[1] Bokkeveld is exposed in the area in two main regions: as a large inlier, south and south-west of Grahamstown, which inlier divides into two in the neighbourhood of Bathurst - the western arm running to the coast at Port Alfred and the eastern at the Kleinmonde - and in the west of the Areas where it succeeds the Witteberg and is itself succeeded by the older Table Mountain series to the west of Port Elizabeth.

The fold ranges of the Cape and Karroo systems in the area south of Grahamstown towards the coast have been peneplained and are overlain by Cretaceous, Tertiary and Recent deposits. In the west of the Areas the Table Mountain series and the Bokkeveld series are overlain eastwards by the Lower Cretaceous sediments of the Uitenhage fault-basin. The Cretaceous sediments underlying this basin outcrop in the valleys of the Zwartkops, Coega and Sundays River; Haughton (1928) noted that there was a further patch of Cretaceous in the Bushmans River valley. The heights between these valleys are capped by Tertiary beds; these Alexandria beds of limestone - mainly hard,

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[1] A thin zone of post-Beaufort Karroo (Stormberg series) occurs below the Suurberg and on both sides of the Bushmans River along the northern boundary of the Uitenhage basin.

white and cream coloured - also cover the Addo Heights and most of the Alexandria district. In the valleys of the De Dega and Bushmans Rivers they give way, however, to outcrops of Bokkeveld. Alexandria beds also occur in small patches on the main Bokkeveld inlier (mentioned above).

The topography of this area, and the Coast Belt to the north-east, is that of a continuously rising zone that reaches 2,000' on the inner margins; the surface is trenched with rivers and streams many of which follow deeply entrenched meandering courses often in confused hilly country. Mention may be made of two rivers in the chicory-producing regions: the Bushmans, which trends north-west south-east across the upland country known as the Alexandria Plain, and the Kowie, flowing from Grahamstown to the sea.

Along the coast the underlying rocks are largely covered by drift sand and sand dunes of considerable depth. Streams of inland drainage are blocked by dunes - consolidated by bush and forest - in a number of north-south valleys on the Alexandria coast. Amongst these valleys are Deep Kloof, Groenfwater Valley, Bosch Hock and Kabo Kloof with areas of high ground of over 1,000' altitude separating them.

The distribution of chicory production within the Proclaimed Areas (see Fig. 10) is clearly related to the facts of geology and topography noted above. Production is almost entirely on the Alexandria beds of the Alexandria Plain. Some producers are located on the Table Mountain series on the low-lying country to the west of Port Elizabeth whilst there are a few on the Witteberg south and west of Grahamstown. The dots that appear to be on Bokkeveld are revealed after further investigation as generally being on patches of Alexandria beds in the areas of Clumber, Bathurst and Trappes Valley. Coastal sandy soils account for a number of other dots. The beds that develop sandy soils are obviously those suited to chicory.

Little material on the soils of the Proclaimed Areas has been published. van der Merwe's (1940) generalised distribution of soil types is shown on Fig. 6. From the point of view of chicory cultivation the deep sandy loams, mainly reddish-brown, are important. The A horizons are seldom less than 9 inches deep and they are frequently as much as 36 inches. Such soils are formed on parts of the area shown as Alexandria beds. Particularly deep sandy soils are found near the coast.

The Proclaimed Areas fall within a homogeneous rainfall District as delimited by Schumann and others (1940). The near coincidence of the boundaries of this District and those of the Proclaimed Areas is shown on Fig. 7. The data collected and analysed for the District are of greater value than might have been the case, for of the sixteen stations used in the analysis no less than thirteen are in regions producing chicory. Seven of the stations are in areas of considerable chicory cultivation.

From a glance at Tables VII and VIII, it is clear that the Proclaimed Areas in general experience an all-seasons rainfall régime.

TABLE VII

MEAN MONTHLY RAINFALL OF RAINFALL DISTRICT EIGHT AS PERCENTAGE OF MEAN ANNUAL RAINFALL

Months:	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
%	7·5	8·2	10·8	8·3	8·2	6·6	5·9	6·6	9·2	10·4	10·2	8·7

Source: District Rainfall W.B. 3/40
Note: The months 1-12 are January-December.

TABLE VIII

AVERAGE MONTHLY RAINFALL OF RAINFALL DISTRICT EIGHT

Months:	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12
Inches:	1·77	1·94	2·55	1·96	1·94	1·41	1·38	1·55	2·16	2·46	2·39	2·06

Source: District Rainfall W.B. 3/40
Note: The months 1-12 are January-December.

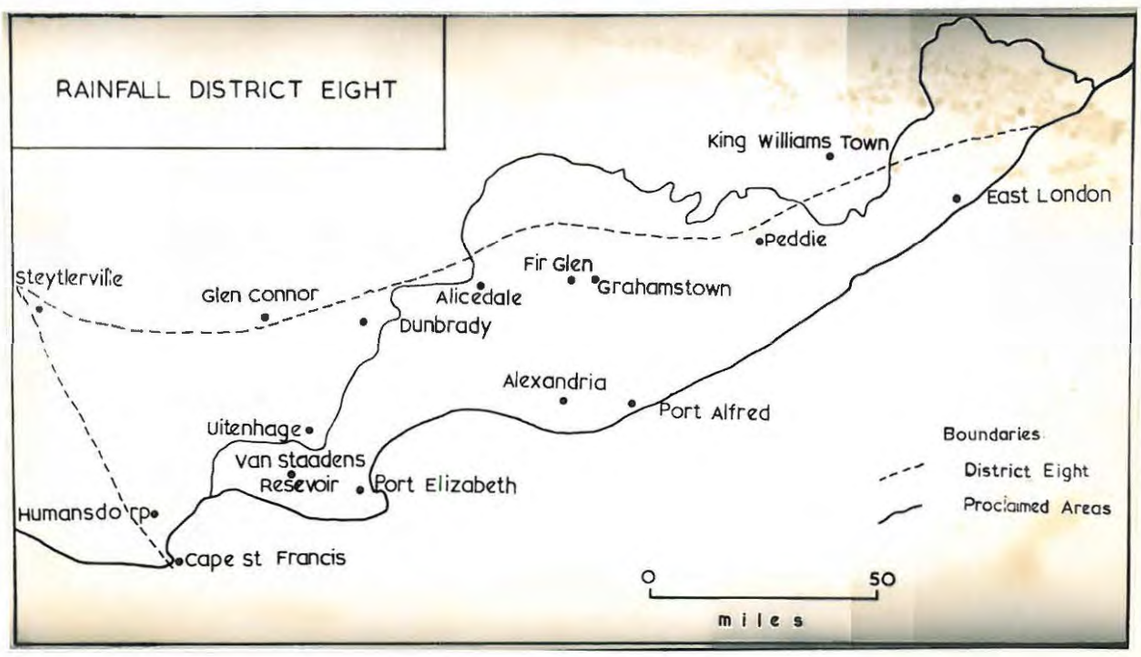

FIG. 7. THE EXTENT OF THE PROCLAIMED AREAS AND OF RAINFALL DISTRICT EIGHT

Stations used in compiling the data for Rainfall District Eight are shown on the map.

The tendency towards a dry winter is seen in the figures for June-August, and two wetter seasons occur - in October and November and in March and April. The average annual rainfall is 23·57".

The distribution of the total rainfall within the Proclaimed Areas is shown on Fig. 8. The regions producing chicory have, in general, a rainfall greater than 20"; the bulk of the production comes from areas with a rainfall of over 25". A general feature of the isohyets is their south-west north-east trend, paralleling the coast-line. The inland areas clearly have lower rainfall totals. In isolated spots the altitude gives rise to somewhat higher totals than in the general area around them.

Iso-evaps., indicating the evaporation rates, similarly trend with the coastline. The 50" iso-evaporation line is within some 10 miles of the coast in the wetter areas; further inland, in the areas of lower annual rainfall, evaporation exceeds 50", approaching 60" north of Grahamstown.

Of outstanding significance as a climatic factor affecting agricultural production, particularly in the Union, is the variability of the rainfall. The lower the total rainfall normally received, the greater is the variability from the expected average. The Proclaimed Areas, by no means the driest in the Union, have a variability which is in keeping with their moderate rainfall. Schumann (1940) analysed the variability of rainfall in the Union, and the reliability of the annual rainfall in the Proclaimed Areas is between 85 and 90 per cent.

The seasonal variability is of more significance for farming. In January the Proclaimed Areas have a reliability of 60-65 per cent; thus the summer rainfall is likely to vary considerably more than the annual. At this season reliability in the Union is highest in the Transkei and the south and west of Natal (75 per cent); westwards from the Proclaimed Areas it falls to 55 per cent at the Cape and 30 per cent in the N.W. Cape.

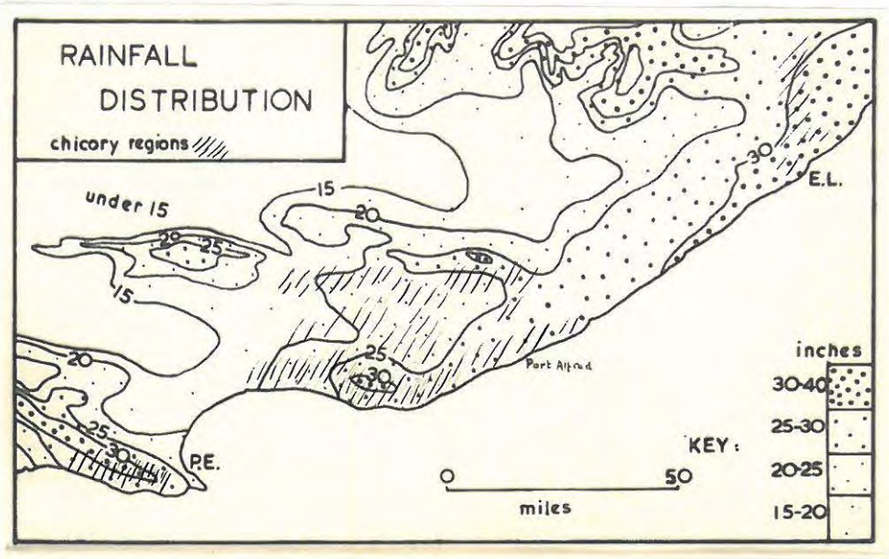

FIG. 8. THE DISTRIBUTION OF RAINFALL OVER THE PROCLAIMED AREAS

Based on the Rainfall Map (1945) compiled by the Weather Bureau,

The June rainfall reliability is lowest on the High Veld and greatest around George whence it decreases eastwards, being 60–65 per cent at the western end of the chicory areas (Port Elizabeth district) and only 35–40 per cent in the Transkei. Generally, therefore, reliability is a little less in the winter than in the summer in the Proclaimed Areas.

A further indication of the climatic conditions in the Areas is the tendency to experience 'drought' conditions.[1] Schumann (1943) calculated that District Eight had a percentage of 6·24 drought months over a 50-year period. Eighteen of the twenty-seven Union Rainfall Districts in his analysis had a figure in excess of this. District Eight had seven droughts of one month duration, one of two, one of three, one of five, one of fourteen and one of seventeen months duration. Prolonged droughts in the District occurred in 1899–1900, 1920–1921 and 1927–1928. In 1927–1928 the total rainfall was 13·59", which was only 58 per cent of the average 23·57".

Levinkind (1941) considered the eight greatest drought years that occurred in the period ending 1938. The Proclaimed Areas as a whole escaped half of these Union-wide droughts, including 1933 when 52 per cent of the area of the Union was affected. For the other years the percentages of the Union affected were: 1903 – 68 per cent, 1932 – 61 per cent and 1912 – 56 per cent.

The Proclaimed Areas have mean temperatures of between 65°F (near the coast) and 55°F (further inland) in the winter months. The mean summer temperatures vary from 65°–70°F.

The mean duration of the frost period (the period between the first and last frost of the winter) is less than thirty days in the coastal areas and between thirty and sixty days in the inland parts of the Areas.

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[1] Drought is defined here as 85 per cent or less of the normal rainfall.

The contrast between the coastal areas and the inland parts is emphasised by the temperature statistics for representative stations. Port Elizabeth has only one month with a mean minimum temperature under 50°F (July, 49·7°F); the absolute minimum recorded is 36°F. Grahamstown has seven months with mean temperatures of less than 50°F (April-October), and June and July are less than 40°F; the mean absolute minimum temperatures for June and July are 31·4°F and 31·5°F respectively whilst six months of the year (May-October) have recorded absolute temperatures of less than 32°F. The significance of these facts in the cultivation of chicory is discussed later.

The natural vegetation of the Areas is shown on Fig. 9. Influenced primarily by rainfall, the type of vegetation shows further variations reflecting the significance of altitude and soils. Three points are relevant to this thesis as far as the natural vegetation is concerned. The costs involved in clearing for cultivation are very high in the case of the short but very dense Alexandria Forest, and the Thornveld is almost as thick and costly to clear. Secondly, in the earlier days of the Chicory Industry the fuel for drying kilns came from these forests. Thirdly, the connection between agricultural practices and the vegetation is an intimate one. The Alexandria Forest, for example, has been considerably denuded in the past two hundred years and now, in fact, only occurs in patches. Acocks (1953) considered the effects certain practices are having on the vegetation and placed the Areas in that category where the soil was still adequately protected by the vegetation and where it would recover when rested.

LOCALISATION OF PRODUCTION

The pronounced localisation of chicory production in the coastal areas of the Eastern Province has been noted elsewhere as a feature of the Industry that developed in the inter-war period.

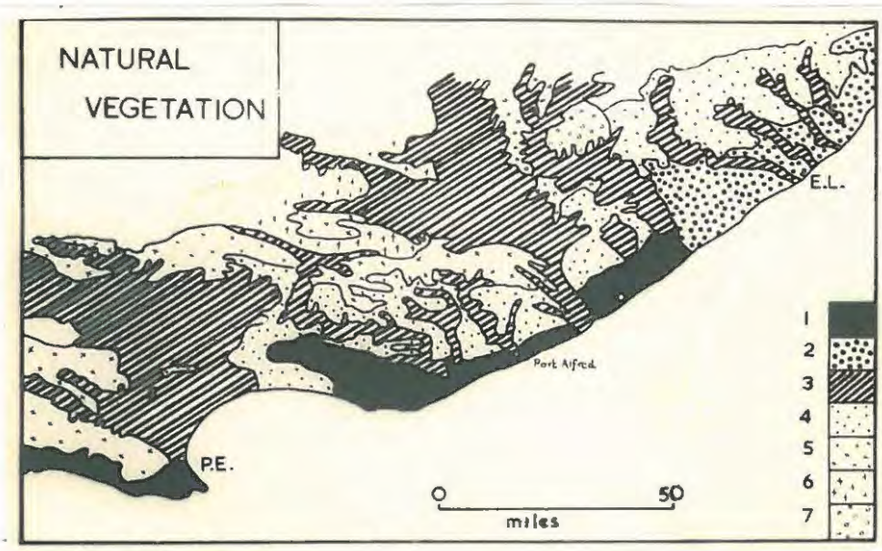

FIG. 9. THE NATURAL VEGETATION OF THE PROCLAIMED AREAS

1 : Alexandria Forest
2 : Coastal Forest and Thornveld
3 : Valley Bushveld
4 : Eastern Province Thornveld
5 : False Macchia
6 : False Karroid Broken Veld
7 : False Thornveld

Based on the map of Veld Types by Acocks (1953).

Climatic conditions were primarily responsible for the localisation. The all-seasons rainfall and the mild to warm winters (the favoured growing season) are basic to good yields (and so good returns on cultivation) in quantity and quality and their occurrence in the coastal areas has encouraged production whenever the price has been stimulating. Within the Areas it is impossible to overlook the significance of the isohyets in locating production. The influence of the Tertiary Alexandria beds and the coastal margins with their sandy loamy soils is equally striking. The optimum natural conditions for chicory cultivation are considered in more detail later. The variations of conditions within the Proclaimed Areas (affecting regional input/output ratios), which are largely responsible for the structure of production within the Areas, are also evaluated in their turn.

To the overwhelming influence of natural conditions one must add the importance of commercial factors: in the inter-war period the efforts of the Co-operative Society went some way to giving Alexandria a considerable organisational advantage for chicory cultivation over its rivals.[1] Since the inception of the Control Scheme, the pattern of distribution in the coastal Areas has been consolidated. Put another way, should producers elsewhere decide to plant, though they would be, in most parts of the Union, hampered, more or less, by some aspect or aspects of the weather or soil, they would reap a crop of chicory root. Lacking the organisational and technical benefits of the established areas - for instance, grading, storage and drying facilities - such producers would find that their relatively 'poor' crop would scarcely pay.[2] That only a fraction of the commercial chicory supply comes from outside the Proclaimed Areas[3]

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[1] See The Spatial Pattern is Moulded p. 19.

[2] Whitmore (1957) has recently observed: "The regions where a crop is grown by no means invariably coincide with the limits within which the crops could be grown - for within those limits economic expediency even more than climatic feasibility may determine the extent of production".

[3] The fraction was put at .05 per cent in the Annual Report, C.C.B. 1951.

is attributable to the climatic and commercial difficulties away from the Areas. These render the cultivation of chicory barely profitable or, at least, comparatively unprofitable.[1]

[1] It is interesting to note that a Natal enquirer was told: "It is not advisable to grow chicory anywhere outside the Proclaimed Areas in view of the Eastern Cape potential ..." Farmer's Weekly, 1st September 1954.

5. THE CHICORY REGIONS (i)

The year 1955 was perhaps the season when chicory production within the limits of the Proclaimed Areas was most widespread. Factors discussed elsewhere induced cultivation of the root in areas nearly 300 miles apart and at points more than 200 miles from the Chicory Control Board at Alexandria. Though circumstances have changed since 1955 and have altered the form of this spatial pattern, at any rate in the peripheral regions, this distribution is the one most likely to recur should production be tempted to increase again.

Following remarks on the compilation of the production map, the Proclaimed Areas are divided into seven chicory regions each of which is accurately delimited and has its chicory production precisely stated.

THE MAP OF CHICORY PRODUCTION

Fig. 10 shows the distribution of production. The uniform dots represent producers,[1] regardless of the size of the output of each producer, and have been placed at the location of the homestead or as near to it as possible. All the producers who made deliveries in the 1955 season (January-September inclusive), whenever it has been possible to locate their farms on the map, are shown, with the exception of those who were omitted because dotting for them as well as their neighbours would have led to practical difficulties in the cartography.

Some dots, then, are missing because the writer did not know the location of the farm and because he could not discover it, even with cross reference to the official Producers' List and the telephone book. The Topo-Cadastral Series of maps, 1 : 250,000 and the normal topographical sheets on 1 : 250,000 were occasionally of no assistance

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[1] Throughout the survey 'producers', 'farms' and 'farmers' all denote registered producers, although, of course, one registered producer may grow chicory on more than one farm.

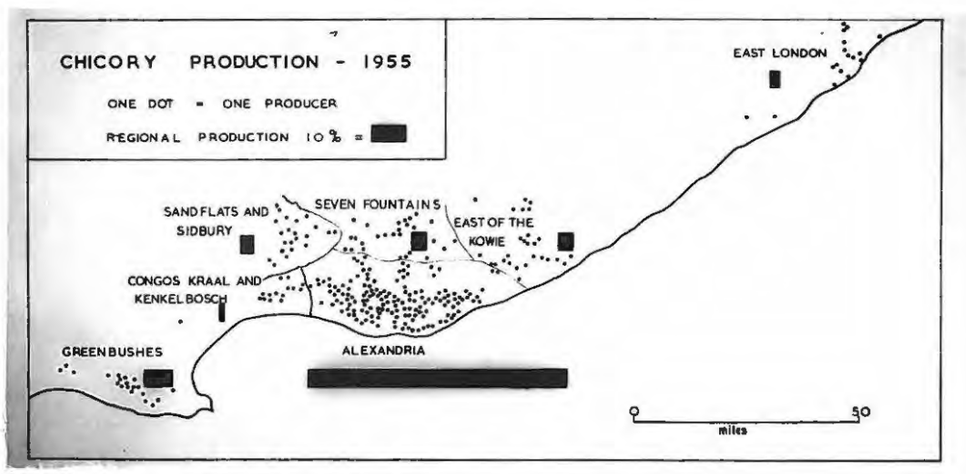

FIG. 10. THE DISTRIBUTION OF CHICORY PRODUCERS AND REGIONAL PRODUCTION

The boundaries between the central chicory regions, as defined in this study, are also shown on the map.

in establishing the whereabouts of a farm. Other dots are missing because their inclusion would have added nothing of value to the map but would rather have caused excessive crowding of the dots. The only region affected by the latter omission is that of Alexandria and particularly to the south and west of the town towards De Kol and Zuney. The omissions through ignorance of locations were (it is reasonably established) largely producers located within this same Alexandria region. Bearing these points in mind, it is clear that, as over 60 per cent of the producers are represented by dots, the pattern that emerges is a fairly faithful and workable substitute for a map with 440 dots on it. In actual fact, the total number of dots would be nearer 400 because a number of registrations made are for the same farm, in some cases worked in partnership by two or more registered producers.

THE REGIONAL PATTERN OF CHICORY PRODUCTION

Computing regional production, shown on the map by the bars proportional in length to each region's contribution to the 1955 output, has necessarily entailed some arbitrary regional delimitation. The main considerations here have been a) to keep the sub-divisions of the producing areas down to the minimum, and yet b) to show that there are grouping of dots, which groups have in common i) distance from the Central Drier at Alexandria (and all that distance means in production costs etc.), ii) the geographic background of their setting and iii) similar farming systems (not in all cases, however, is the background or farming system distinctive from that of another group). The delimitation of the regions is more precisely dealt with in the following paragraphs, treating the regions from west to east across the Proclaimed Areas.

I. Greenbushes (Port Elizabeth)

The situation of this chicory region is to the west of Port Elizabeth; most of the farms are at least 12 miles and no more than 25 miles westwards from Port Elizabeth (with the exception of a Thornhill pair over 30 miles from Port Elizabeth) and are within 8 or 9 miles of

the coast. The Greenbushes area is about 85 miles from the Control Board at Alexandria.

Some 8·5 per cent of the 1955 production of dried chicory root came from the Greenbushes region, a figure including contributions from two farms further westwards at Thornhill. Thirty-two farms in all produced the 1,596,984 lbs. from the region; seven producers, averaging 110,000 lbs. each, produced 50 per cent of the total. The largest producer sent in over 122,000 lbs., and the remaining twenty-five farmers averaged 45,000 lbs. each. There were five producers under 5,000 lbs.

II. Sandflats and Sidbury

To the north of Port Elizabeth - Grahamstown National Road and westwards from Seven Fountains, there are some twenty-two producers, mainly in the Sandflats area with a few farms around Sidbury. Most farms are about 45 miles from Alexandria.

The Sandflats-Sidbury producers grew nearly 700,000 lbs. of chicory root in 1955, some 3·6 per cent of the total crop. The largest individual contribution was over 135,000 lbs. and this together with a second farm's output of over 100,000 lbs. made up 45 per cent of the regional production. The remaining twenty producers averaged 18,000 lbs. each; five of them were under 5,000 lbs.

III. Congos Kraal and Kenkelbosch

The separation of these areas from the Alexandria region is worthwhile because of the thinning out of chicory farms from Zuney westwards and the distance and space relations of this region relative to Alexandria and Port Elizabeth. The Deep Kloof (a north-south valley, in part below 250' altitude, blocked seawards by fixed dunes rising to 300', and some 25 miles from Alexandria to the east of Hopewell (1,074') forms the chosen divide between the Alexandria region and Congos Kraal and Kenkelbosch; to the north we go as far as the

Grahamstown - Port Elizabeth National Road; the western limit is easily selected for there are virtually no chicory producers west of the Sundays River (at any rate until Port Elizabeth is reached). The farms in this small region are some 35 miles from the Chicory Control Board at Alexandria and all within 10 miles of the coast.

Most of the nine farms lie to the east of Kenkelbosch railway station and within 5 miles of the coast. Only 1·1 per cent of the 1955 production came from this area; the largest producer was a little over 51,000 lbs. and the average for the remainder was 21,000 lbs.; two producers were less than 10,000 lbs. and one some 1,200 lbs.

IV. Alexandria

This chicory region is that area enclosed between the coast and the boundaries of the other regions as stated, viz. to the north, the east-west course of the Bushmans River plus the continuation in the same direction of an imaginary line to about Curries Drift on the Kowie; to the west, the Deep Kloof; and to the east, the Kowie River flowing for 15 miles in a north-westerly direction. As the crow flies this region is some 45 miles from west to east, and at its widest about 15 miles inland from the coast. All the farms are within 30 miles of the Central Drier.

Within the region so delimited some 76·1 per cent of the 1955 crop was grown on over three hundred farms. Sixty-eight producers delivered less than 10,000 lbs. each and twenty-eight others each produced over 100,000 lbs. These 'big' producers accounted for 20 per cent of all the chicory from the Proclaimed Areas and 30 per cent of that grown in this region; ten of these twenty-eight produced over 200,000 lbs. a piece; the total for the ten was over 3 million lbs., and the largest single producer delivered over 550,000 lbs. (nearly 3 per cent of the entire crop of the Proclaimed Areas). Leaving out of account the twenty-eight big farmers, the remainder in the Alexandria area each averaged about 32,000 lbs.

V. Seven Fountains

Some 4·5 per cent of the 1955 crop was produced on farms situated over a large area here denoted as the Seven Fountains region. The southern boundary of this region is taken as that part of the Bushmans River that trends in the general direction east-west, and these producers, numbering about twenty, are found north of this section of the River to the immediate area of the Grahamstown - Port Elizabeth road and, mostly, west of a north-south line running through Grahamstown and Salem, with one or two farms east of Salem and west of the Kowie. The area from north to south in a straight line is 15 miles at its widest and about 30 miles from east to west. Farms in the vicinity of Seven Fountains itself are about 25 miles from Alexandria.

The largest individual crop was over 225,000 lbs.; four other producers delivered over 500,000 lbs.; in other words, five producers in this region accounted for about 75 per cent of the one million lbs. grown. The remaining producers averaged some 17,000 lbs. each, only one producer being under 10,000 lbs.

VI. East of the Kowie

The Kowie River, rising at the head of Featherstones Kloof a mile or two south of Grahamstown, flows in a general direction of south-east to the sea at Port Alfred. The chicory producers thin out east of the Kowie River and there are, in fact, relatively few between the Kariega and the Kowie (15 miles in a direct line). The Kowie is thus a convenient boundary for consideration of the producers situated in the Port Alfred-Bathurst-Clumber-Troppes Valley-Coombes sections. It is clear from the map that these farms are widespread; those to the east and north-east of the region (that is, near the Fish River mouth, and in the Coombes Valley-Claypits areas respectively) are some 50 miles from the Chicory Control Board at Alexandria.

Twenty-eight farms east of the Kowie produced three quarters of a million lbs. of root or 4·1 per cent of the crop. The largest

producer delivered some 84,000 lbs.; there were three others each of whose crop was in excess of 50,000 lbs., and the remaining twenty-four farms averaged 22,000 lbs. each; eight were under 10,000 lbs. and one less than 1,000 lbs.

VII. East London

Twenty farms made deliveries from the East London region. They are largely located to the north of East London and between the north-south National Road (East London to Durban) and the north-easterly trending coast. A number of the farms are situated in the Kwelegha Valley and a few are strung out to the north towards Mooiplaats, 25 miles from East London. The farms are mostly within 10 miles of the coast, though the farms nearer Kenggha (only one or two made deliveries in 1955) are somewhat further from the coast. The average distance of producers from the central depot in this region is about 150 miles; a few farms are nearly 200 miles away.

The total production was about 400,000 lbs. or 2·1 per cent of the total from the Proclaimed Areas. The largest producer despatched over 73,000 lbs., two others were over 55,000 lbs. each and the remaining 5 per cent of the regional production was received from seventeen farms averaging 12,000 lbs. each, four of these produced under 2,000 lbs.

6. THE COSTS OF PRODUCTION (i)

The explanation of the pattern of chicory production as described in the previous Section lies largely in the input/output ratios as they vary regionally within the Proclaimed Areas. In Sections 6 and 7 of this report attention is focused on the costs of inputs and the factors that influence them.

The operations in chicory farming have been split into two groups for analysis: this Section deals with the production of chicory root as far as the completion of the stage where it is removed from the soil, topped and placed in bags; the next Section is concerned with the costs of the operations involved in the drying and transporting of the dried root to the Central Drier at Alexandria, or, as one alternative, the transport of the wet root to Alexandria and the drying of it there.

It should be borne in mind that there are, of course, as many different costs of production as there are producers. Generalisations based on averages do, however, permit some conclusions regarding costs and particularly costs in the regions, and hence throw light on the spatial pattern of production.

NATURAL FACTORS AND CHICORY CULTIVATION

Geographic factors are of significance in production costs whenever they manifest themselves in monetary terms. Thus climate, topography, and soil determine the inputs of capital, land and labour necessary to ensure a given yield. Unfavourable natural or geographic conditions either will produce a low yield under normal inputs or will mean that inputs must be greater, and thus more costly, to achieve the yield that with normal inputs would materialise under more favourable natural conditions. In both instances costs of production may be said to be high - in the former because output is low, in the latter case because inputs have been relatively high. The terms high and low refer, then, to costs per unit output. The optimum natural conditions for the production of chicory root are now examined.

Climate, soil, topography and winds are discussed with reference not only to the chicory regions in the Union but to chicory areas elsewhere. It is apparent that no narrow statistical limits should be stated as the optimum conditions but rather that broadly expressed favourable conditions and combinations of conditions should be drawn from the evidence available.

The chicory plant is indigenous to Western Europe. The countries cultivating the root in Europe experience the Cool Temperate West Margin Climate, the chief characteristics of which are: summer temperatures of 50°-70°F, with the warmest month's average temperature under 71·6°F (22°C), mild to cold winters with temperatures 30°-50°F and the likelihood of a month or two under freezing as one moves into continental Europe; rainfall all the year round with, generally, a light maximum in the winter months; a total rainfall of 20-40", falling mainly as drizzle and on a third of the days of each year. Theevaporation rate is low and the 'effectiveness' of the rainfall for plant growth is thus high, as is, particularly in winter, the relative humidity. Chicory is grown behind the "Iron Curtain" in a more rigorous climate which shows 'continental' features.

Rainfall statistics for selected stations in Western Europe are plotted on Fig. 11. Cambridge is representative of the most important United Kingdom chicory areas. These are found northwards from the Thames Estuary through Suffolk, Norfolk, Fenland (Cambridgeshire), and Lincolnshire. The French, Belgian and Dutch chicory areas lie, in general, in a coastal belt, extending inland 30-50 miles, along the North Sea coast from about Calais north-eastwards to the Frisian Islands. The rainfall of Ostend (Belgium) is typical of the area. Chicory root is cultivated in the Magdeburg Börde area on the northern border of the Central Uplands of Germany and the rainfall figures for Magdeburg itself are representative of the Börde, which, like the English, French, Belgian and Dutch areas, is a sugar beet region. In the United States of America the crop is heavily

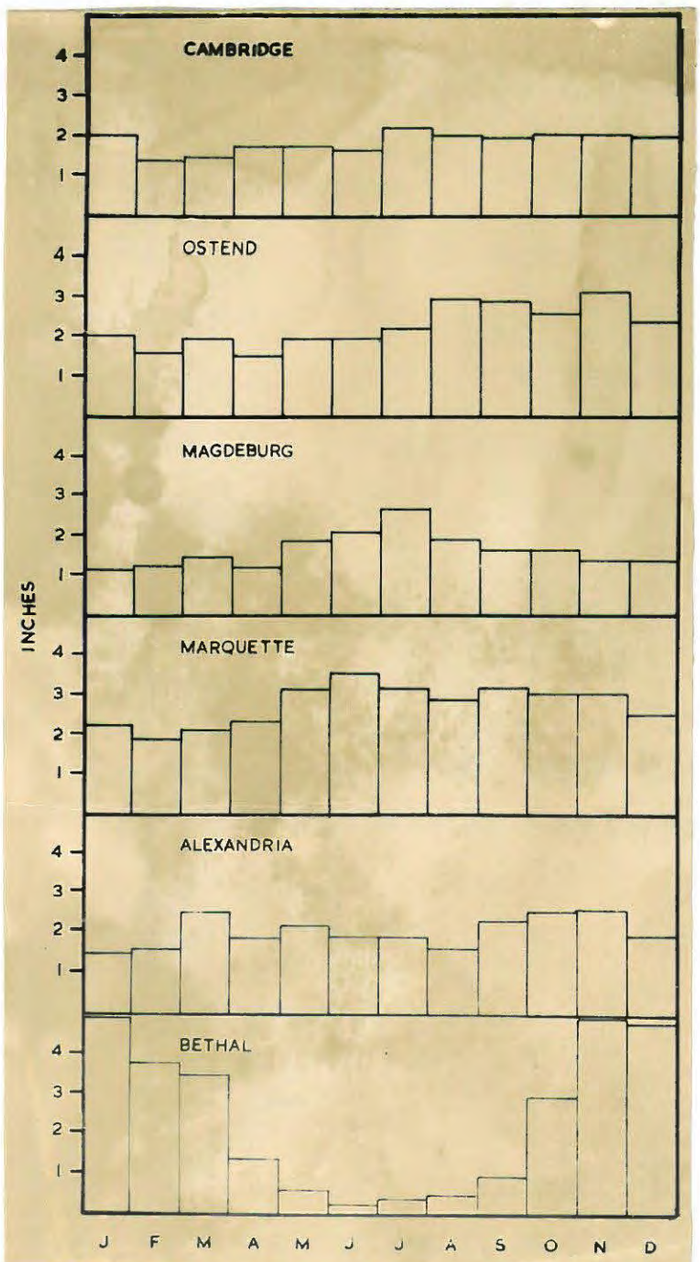

FIG. 11. MEAN MONTHLY RAINFALL FOR SIX STATIONS IN CHICORY-PRODUCING REGIONS

Sources: various

localised in the state of Michigan. It was first planted there in 1880; in 1939 all but two of the 3,331 acres planted to chicory in the U.S.A. were to be found in Michigan. The rainfall total is 30" and on Fig. 11 the data for Marquette, on the shores of Lake Superior in the extreme north of the state, are plotted to show the distribution of the rainfall and particularly the growing season rainfall (approximately May-September). Stilgenbauer (1931) showed that the heaviest chicory production was located in regions where the average annual rainfall was from 25-40".

In the Union chicory in significant quantities and of high yield has been cultivated without irrigation in both the all-seasons rainfall area (Alexandria) and the summer rainfall area (Bethal); the figures for these stations are plotted also on Fig. 11.

The High Veld crop is, of course, a spring and early summer one linked to the months of rainfall. The Bethal district produced magnificent yields in the 1920-1921, 1921-1922 seasons (see p.23) and, in fact, the rainfall of the area is some 5" or 6" higher than that experienced in the Proclaimed Areas. Furthermore, whereas the present chicory Areas have 18" from April to October (the normal growing season), around Bethal (5,300') 23" are received in the course of some seven months. The evaporation factor, however, must be taken into account in this comparison. In the winter season in the south-east Cape, evaporation is much reduced and little incontributed to the gross annual average evaporation of 50"-60". On the High Veld the summer temperatures increase evaporation and over 65 per cent of the gross annual average of 60-70" occurs during six summer months. Recent experiments at Carolina, near Bethal, gave a yield of five ton per morgen dried root, but in this instance the dry periods from November planting onwards necessitated irrigation.[1]

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[1] Farmer's Weekly, 31st October 1951

The above considerations lead to the conclusion that, during the growing season, chicory in South Africa needs some 3-3" rainfall per month, making in all 18-25" over the growing season. Producers' returns (from the all-seasons rainfall area) to the questionnaire may be summed up thus: "Chicory requires 20" from March to September for a good crop".

Though a prolonged drought at any period of growth may seriously affect the yield, there are at least three critical periods during the growing season: the initial ploughing and planting wants rainfall, the following six weeks need moisture to ensure germination of the seed,[1] and the yield will be high if the monthly totals are as indicated above during the final stages of growth.

If autumn planting is delayed, germination is not likely to be so successful during the cooler months of the winter and the development of the small plants not so rapid. This effect was observed at Alexandria during experimental work. (If the summer rains are somewhat later than normal on the High Veld, the hot months adversely affect germination and survival of the seedlings.) If drought is experienced after planting, the entire crop may not germinate, in which case re-planting is necessary. The 1949 sales of seed reflect, in part, the drought conditions that wiped out the winter crop and encouraged late plantings. In the all-seasons rainfall area seed may be planted in the spring if the weather is unfavourable in March, April, May; on the High Veld, the limited rainfall season is not so accommodating.

The absence of effective rainfall before and at normal harvesting time may delay harvesting. This was the case with the Alexandria experimental work in 1945-1946. Instead of the crop being harvested

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[1] Producers state that chicory requires 3" in the first six weeks after planting.

in November or December 1945 (after a delayed planting), the first opportunity came only with the rains in April of 1946. Some 50 per cent of the plants bolted (went to seed), and in spite of repeated removal of seed-heads the quality of the root was very poor at the time of harvesting, being fibrous and excessively forked. Short spells of drought, once the roots are established, may not affect the final crop.

The chicory crop, then, is virtually dependent on the rainfall: the years of high yield have all been ones of above average rainfalls and vice versa. Furthermore, the chicory produced in drought years is of relatively poor quality. The 1946-1947 crop was 47 per cent greater than that of the previous season; this may be attributed partly to disappointing results from imported seed but primarily to the drought conditions - in 1945 (and in January and February 1946) Alexandria had less than 1" in each of six consecutive months. The dry 1949 season - "the severest drought in living memory" - and the normal planting period in 1950 were followed by good winter rains: from July to December 1950, 22·04" fell at Alexandria, and a further 3·72" fell in January 1951. The crop delivered to the Board exceeded the preliminary crop estimate of 14 million lbs. by over 10 million. In 1952 and 1953 the rainfall was abnormal; in the earlier year floods resulted in a poor crop, and in 1953 low rainfall produced a crop of only 5·6 million lbs.[1] The yield of 30-40 tons green root per morgen that is general overseas is in part due to the effectiveness of the rainfall and in part to the excellent cultivation of the chicory.[2]

Temperature influences chicory production in a number of ways. In Holland, though chicory drying starts in the autumn, the work is

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[1] Other correlations of yield and rainfall will be found throughout the survey.

[2] The average yield in the Alexandria region is 7 tons green root per morgen - see Table XXII.

always arranged in such a way that all drying is finished before the frost sets in, for severe frosts are harmful to the roots. Stilgenbauer (1931) stated that in Michigan the coming of the frost stimulated the plant to ripen, and that harvesting was frequently carried out after the ground was slightly frozen - but before thawing and freezing could begin. Though the plant is not affected by other than severe frosts, should temperatures be low at planting time, germination is retarded and the successive stages of growth are held back during the cooler winter months. Frosts during the growing season would, of course, also delay the normal development of the plant.

Very high temperatures are adverse to cultivation: they promote evaporation from the soil and induce excessive transpiration from the plant. Delayed planting in hot districts may mean that the plant has difficulty in surviving the early stages of growth. A rainless and hot harvesting period may result in difficulties in lifting the crop. Should the soil become so baked that the root can not be lifted with the plough, the roots must either be left in the ground or be forked out. In the latter case, labour costs increase and the roots are likely to suffer through forking or breaking off. If the lifting is delayed, the roots become woody and suffer in quality, possibly actually rotting. An estimated 3 million lbs. of dried root were lost in 1949 when drought conditions prevented ploughing "for months on end" and the root was left to rot in the ground.[1] Occasional small showers during the unprecedented drought only assisted the rotting. Advice on this point given by Noethling and Spaner (1929) ran: "It is much better to harvest at the right time than to save money on plough shares."[2]

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[1] Annual Report of the Department of Agriculture, 1949.

[2] Evidence to the 1934 Commission included the comment: "The time of lifting is of the utmost importance as the degree of maturity of the roots is undoubtedly the biggest factor in determining quality."

Temperatures are of significance even when the actual growing of the chicory has finished: in the period between the removal of the chicory from the ground and its drying, quality may be adversely affected by high temperatures. Unless properly handled the root may commence fermenting anyway, but during hot and humid weather especial care in timing of the various operations is necessary to guard against fermentation and mould development, which, according to Neethling and Spencer (1952), lead to the loss of sugar, an undesirable flavour and smell and a general loss of quality.

Cormony (1927) considered that average growing season temperatures not exceeding 70°F were best, and Stilgenbauer (1931) revealed that the Michigan plantings were heaviest in regions where the mean summer isotherm was between 67 and 70°F. The mean monthly temperatures for selected stations are given in Table IX.

TABLE IX

MEAN MONTHLY TEMPERATURES FOR SELECTED CHICORY STATIONS
(°F)

Months:	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Bethal (Tvl.)	66·9	65·7	63·7	58·4	51·8	45·9	45·5	50·9	56·7	62·5	63·7	65·9
Bathurst (Cape)	70·7	71·0	69·0	66·3	62·5	59·7	59·1	60·4	60·9	62·3	65·3	68·1
Cambridge (U.K.)	37·6	39·1	41·8	46·7	52·8	58·5	61·9	61·1	56·9	49·4	42·1	38·9

Sources: various

The soils that suit a root crop, in general suit chicory. There is the same need for root development in bulk and in depth, for avoidance of either water logging (conducive to rotting) or excessive drying out, and for a soil that will assist lifting (i.e. one not too heavy and not likely to harden in hot dry weather). The Fenland peat soils when improved with marl are light, friable and easily worked and other United Kingdom chicory areas have sandy loams. Nix (1954) stated that the plant grew well on a variety of soils and that 'Good Fen' have the heaviest yields. In Holland the soils intermediate between the high sandy soil (in which crops suffer in dry seasons) and

heavy clay ground (where there is difficulty in drying) are favoured; such soils must be sufficiently drained and contain at the same time enough moisture. The Michigan crop is grown on fertile well-drained loams and clay loams, which, according to Stilgenbauer (1921), are loose, medium to fine and friable; they are, in the main, neutral with a high nutrient content.

Burtt-Davy (1913) referred to the difficulties in the Transvaal resulting from soils that dried out easily. Parish (1921) stated that "no other soil than a deep loam is really suitable" and that it should be neither too sandy (lowering the quality of the root) nor too clayey (making lifting difficult) and preferably not under two feet in depth. The sub-soil should be open and friable. Johnsen (1921) reported that in Alexandria with favourable conditions the best results were obtained from the "somewhat heavy red soil" whilst in dry seasons "the sandy soil proved the best as this could be cultivated, consequently keeping its moisture better". Orchard and van Rooyen (1953) stressed the necessity for soil above the average in fertility in order to produce high yields of good quality root. They emphasised that, apart from the virgin forest and grassland soils, whose fertility rapidly diminished under cultivation, the organic matter or humus in the sandy soils was the main seat of fertility. The advantages of a light loose soil at lifting time have already been mentioned.

An analysis of questionnaires returned indicates that, rainfall conditions being satisfactory, high yields are obtained on black sandy ('swart sanderig') and black turf soil.[1] This soil has an abundance of vegetative matter in it and is friable; in most instances its 'body' is replenished by the washing down of material from the surrounding slopes. Yields of over 100 bags (of 100 lbs. dried

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[1] These soils have a pH of between 7.2 and 7.5.

chicory each, i.e. five tons dried root per morgen) are not uncommon on such soils and on small lands in particularly fertile spots considerably heavier yields are claimed. Individual roots of over two lbs. in weight and up to 2'6" in length have been lifted off such soils. More normal figures for black sandy soils are between 25 and 75 bags of dried root.

Virgin soil ('nuwe grond') of most types gives high yields. With 20" rainfall on the crop, one producer got 52 bags dried root per morgen and with 18" another farmer harvested 45 bags.

Red sandy and yellow sandy soils give yields of between 15 and 50 bags whilst reddish-brown soils appear to yield a little higher - with 15" on the crop a producer took 60 bags of dried root. These soils are often shallow (6"-9") and underlain by pot-clay.

Grey sandy soils do not seem to be prolific yielders; in fact, with 20" rainfall one producer harvested only 30 bags. On worn out soils yields drop heavily. For instance, on worn out grey sandy soils (long exhausted, mainly by mealies) and with a rainfall of over 20", yields of 18 and 20 bags of dried root per morgen were recorded.

Two other natural factors affecting chicory cultivation are winds and topography.[1] The former is often of more than casual importance with regard to the inputs, for most returns indicate that winds 'generally' affect the newly planted seed.[2] Once the root is established, winds 'rarely', usually 'never', cause trouble. When winds come after dry, hot weather, there is considerable wind erosion in areas of light sandy soils with clouds of sand racing by: the Fenland of England (mainly a sugar beet area but with some chicory) suffers similarly from wind erosion.

The beneficial effects to soil fertility of organic material

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[1] The insects and pests that occasionally ravage chicory seedlings, particularly if planting is late and the spring months are warm, have been described by Hepburn and Bishop (1951).

[2] Replanting is often necessary, sometimes more than once.

carried down by rainwater from slopes, mentioned above, suggest that if lands are chosen with reference to topographical situation the chances of high chicory yields are enhanced. As with most crops chicory is not planted on steeply sloping lands.

In conclusion we attempt a summary of the optimum natural conditions for chicory cultivation:-

i) Rainfall:- early winter or summer rains for early planting, steady rains for germination, general development and maximum root growth prior to harvesting; 2-3" per month ideal, no dry periods in the first six weeks and no prolonged dry periods thereafter,

ii) Temperature:- cool temperatures permitting germination and growth; not so high as to emphasise evaporation, harden the ground or affect the root after lifting,

iii) Soils:- deep, well-drained, not given to hardening, with plenty of organic material, e.g. sandy loams,

iv) Topography:- valley situations and sites at foot of slopes possibly advantageous,

v) Winds:- no high winds, particularly in early stages of growth.

Departures from these optimum conditions - either seasonally or regionally - increase the costs of production per unit output. Additional inputs may, however, result in a higher yield than would have otherwise been the case. Rainfall and soil conditions may be influenced by farming methods and with greater inputs - of irrigation and/or of fertilizers - the outputs may be increased also.

The costs of irrigation would appear in most parts of the Union to be so high as to offset any increased output resulting therefrom. Moreover, though the root has been grown under irrigation within the Proclaimed Areas, the natural precipitation is generally adequate and its reliability sufficiently high to obviate the perennial necessity for irrigation. Certainly any areas that find it necessary to irrigate every season would not be able to compete; with the irrigation

water available they would naturally turn to other agricultural enterprises.[1]

The application of fertilizers, however, may be economically advantageous. Neethling and Spamer (1929) showed that the increased yield resulting adds little to the total costs of production per morgen, and it is clear that the cost of the fertilizer and its application is more than offset by the returns from the extra output.[2] In 1917 experiments on the Government experimental farm Winkelspruit showed a yield of 6,532 lbs. per acre on unfertilized ground while with the use of 130 lbs. concentrated super phosphates it was 7,992 lbs. Parish (1921) commented: "Manuring or fertilizing is generally profitable. Farm manure, if used, should be applied early and at a rate not exceeding 10 tons per acre, otherwise the crop is liable to produce excessive foliage and poor quality roots ... it is expected that on most soils a moderate dressing of phosphatic fertilizer would be profitable." The results of experiments, chiefly at Langebosch and on ground adjoining the Alexandria High School, by Hartman, Orchard, van Rooyen, Strachan and others indicate that various amounts of super phosphates, potash and basic slag can increase or revive yields if judiciously applied.[3] Strachan, for instance, has harvested off poor sandy soil a crop on a fertilized section 22 per

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[1] Chicory was produced at Committees (some 25 miles north-east of Grahamstown) in the valley of the Great Fish River during the period from 1954-1957. The rainfall - which totals between 15 and 20" over the year - is inadequate for a satisfactory chicory crop and overhead spray irrigation was practised. When there was a surplus of chicory (with all the consequences described later in this thesis), the producers in the district very quickly abandoned chicory in favour of more profitable lines; one farmer now has all his lands under irrigated lucerne, for which he receives ready cash and for which there is a heavy demand.

[2] See Sections 8 and 9

[3] Results of other experiments are filed at the Chicory Control Board, in addition to the results recorded by Orchard and van Rooyen (1953).

cent greater than the crop on an unfertilized section. The additional output per morgen was ·94 tons dry root and this was achieved by the application of a quarter of a ton of mixed fertilizer. Without reckoning the costs of harvesting, drying etc. incurred by the extra yield, the nett return on the fertilized morgen is £37·0 greater than the nett profit on the unfertilized area.

Of greater significance in costs of production over a period is rotation. Experience has shown it to be inadvisable to grow chicory on the same soil for more than two successive seasons, especially where the general level of fertility is low. Wind erosion was experienced during a third season on the same experimental plot. One producer reckoned that five successive crops on fertile virgin soil were sufficient to reduce the lands to such a low state of productivity that they were only good for grazing animals - and then only as long as the quick grass that spread over the ground was young. Many producers indicated that they had old worn out lands and others that the yields on their lands were dropping. The general fertility and carbon and nitrogen content drop rapidly under cultivation and, clearly, such losses add to costs of production per unit output. Over half a century ago, Burtt-Davy (1906) stated: "It is not profitable to grow chicory on the same ground indefinitely; the yield and quality are sure to suffer."

The rotation most commonly used today - chicory, mealies and barley - has been considered a clear example of over-cropping. The loss of humus leads to wind erosion and in wet weather to the soil becoming compact and the seeds being choked. Research work to find suitable systems of rotations is constantly pursued on the Board's lands. Amongst others, leys and straw crops, potatoes and bird seed are used in the rotation by experienced farmers. The need to include crops such as these appears to be an urgent agricultural problem in the older chicory regions around Alexandria.[1]

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[1] In the U.S.A., according to Stilgenbauer (1931), the principal rotation is:- chicory - A grain (oats or barley) - hay (clover or alfalfa) - corn, potatoes or beans; Nix (1954) showed that in the Fens chicory fits into a rotation with sugar beet, potatoes and wheat

OPERATIONS AND COSTS IN STAGE ONE

From the influence of geographic factors on yields we turn to outline the operations in Stage One of production,[1] to consider possible variations in the costs incurred, and to state the average proportions of the inputs that come under selected cost-items.[2]

1. Preparing the ground: this includes ploughing, discing, harrowing and rolling. (Taking in new land will clearly necessitate clearing of bush etc. and, with the reminder that considerable expense is involved if this is done, we omit that from our analysis.) The stages in preparing the land involve, primarily, labour costs, such costs varying with culture practices. Seasonally, there appears to be no reason for significant variations in the costs of these inputs. In the case of flood there may be additional items of expense, but these occur spasmodically and are here discounted. Regionally, as indicated later, labour rates vary and different soils may require different labour inputs.

2. Planting: two distinct cost items are involved: the cost of the seed used and the costs of the actual planting.

a) Seed: the cost of seed is small in relation to the total costs (Noethling and Spanner calculated it as 4·1 per cent of total chicory costs) and all producers pay the same rate per pound of seed. Seasonally, the price rate varies but little[3] and regionally not at all. Variations in this item are due to culture practices: farmer 'A' may plant 4 lbs. (24/-) and another 'B' 6 lbs. (36/-) per morgen. If these inputs are due to soil or rainfall differences, they may be regionally significant, for the different inputs may result in similar outputs of chicory or in markedly different yields. If yields are equal, 'B' has higher seed costs per unit output; if soil and/or

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1 For recent accounts of chicory cultivation one may refer to Erasmus (1953) and Radloff (1955).

2 Costs and Returns are tabulated as decimals of a pound whenever they are averages.

3 For example, in 1953 the cost was 5/9d. per lb. and in 1956 it was 6/- per lb.

rainfall factors in 'A's' region give higher yields, then seed costs per unit output are even lower whilst the costs that vary with yield will be easily offset by the extra returns.

The seed factor may also vary seasonally and regionally because of the need for replanting. Replanting may be necessary on account of wind, poor germination in cool months (possibly due to late planting), failure of rainfall required to ensure germination or on account of the ravages of insects. A replanting, of course, doubles the seed item (as well as certain costs of planting).

b) Planting costs: chicory is normally planted by means of drills in rows 12" to 15" apart at as shallow a depth as possible. Labour and implement costs are the major inputs, varying according to culture practices and/or labour rates.

3. Cultivation: this entails hoeing (by hand or with a cultivator) to control weeds, thinning to obtain optimum density of plants, and for some farmers, though the practice is not in general use, ridging or the slight banking of the soil against the plant. The labour costs of chicory cultivation are a notoriously big item; the more fertile the soil and the heavier the rainfall the greater these cultivation costs must be. Some regions report that up to three or four complete hoeings are usual. The success of the crop may depend largely on the intensity of cultivation, for chicory can soon be overwhelmed by weeds. The closer the rows are together the less land there is to keep clean; in better areas 10-14" is a favoured distance between rows. The yield of chicory is closely related to the number of plants on a given area; the more widespread the sowing or thinning the bigger the individual roots; the more closely are the seeds sown or the plants allowed to grow the smaller the root. Yield has been found to be highest from the smaller and more numerous roots (though other labour costs are obviously greater).

4. Lifting: the root must be dug or ploughed out. The latter is general and a one-furrow plough is used, drawn by either oxen or

tractor. Differences in soil lead to slight differences in costs whilst the spacing of rows also affects the time taken. Inanimate and animate power probably equate themselves.

5. Topping and Bagging (Harvesting and Handling): labour is the major item in this process of removing the top of the root and the leaves and of filling bags with the topped root. Labour and bag costs obviously increase with increased yields. A set of bags may last two years; producers generally need one and a half sets per season.

The five groups of operations discussed above involve costs which are listed in Table X.

TABLE X

CHICORY COSTS IN STAGE ONE OF CHICORY PRODUCTION[a]
(Per Morgen)

Items	Cost as a %	Cost in £'s
Labour[b]	48	15.6
Implements	22	7.15
Bags	7	2.275
Seed	5	1.625
Ox labour	1	.325
Fertilizer	7	2.275
Miscellaneous	10	3.25
TOTAL	100	32.5

Source: Questionnaires

Notes: a) Average of twenty-three farms.

b) About one-third of this item is costs of topping and bagging with a yield of 3,800 lbs. dried root (13,300 lbs. wet).

Apart from the labour in topping and bagging and bags required, these are fixed or overhead costs; in other words, they remain more or less fixed irrespective of the actual yield obtained. The amounts and proportions of these costs do, of course, vary from region to region.

Labour costs are incurred in all the processes involved in the production, drying and despatch of the root to Alexandria. From Table X it is clear that labour costs form the greatest single item

and nearly half of the total costs incurred in the processes of production before the root is moved to the drier (either the Central Drier or a farm kiln). The Table is based on replies to the questionnaire; only twenty-three replies were considered of value in the computation of the Table. Twenty-one producers attempted to assess the cash value of the wages for labour employed up to this stage in the cultivation of chicory. From the total costs (under the specified items) of twenty-one producers for Stage One it has been possible to arrive at the average as £32·5 per morgen and for the individual items as in the Table. The range of costs per morgen was from £72·0 to £15·0; the labour item at its absolute highest was £36·5; at its lowest it was £7·5.

From an analysis no regional variation in the labour costs is discernible with any clarity. Grouping those producers who reckoned their labour costs at £15·0 or less, thirteen were within 30 miles of Alexandria (over half within 10 miles) and the other three were within 48 miles. Of the group that estimated labour inputs of more than £15·0 per morgen, three were East London, two Port Elizabeth, two Seven Fountains, two East of the Kowie and five within 15 miles of Alexandria. Before we rashly state that labour inputs seem cheaper in the Alexandria area (rural) than in the Port Elizabeth and East London areas (near-urban), we must consider a) the differences in these labour costs due to the differences in the intensity of the application of labour in chicory production and b) the value of the data.

The total real wage paid to labourers on farms in South Africa includes a cash payment and payment in kind. If our data applied only to cash payments and there were no other payments, we could perhaps compare the costs of the labour input from farm to farm and, of special significance in this study of the pattern of chicory production, from region to region. However, this is not the case; payments in kind (including rations, land for cultivation, grazing rights, huts and so on) form a substantial proportion of the total

real wage. Tomlinson (1951) reckoned cash payments were 59·5 per cent of the total real wage on dairy farms in Natal whilst Haines (1935), working in the Border area of the Cape Province, found that the cash wage was only 36 per cent of the total wage paid to farm labourers. The costing of such payments is complicated and from region to region such payments have a variable value. Without precise information along these lines for chicory farms it is impossible to assert that the labour costs in production for, say, Port Elizabeth area (Greenbushes) are higher than in the other, 'time-honoured', chicory regions. The proximity to a big urban area would suggest, a priori, that labour must be paid more on the farms in order to compete with urban wages; on the other hand the rural areas are aware of the necessity to stabilise the labour supply in the rural areas and the total real wages are adjusted to attain this end.

Whilst 5d. per bag (of standard size) has been quoted as the rate for chopping chicory root and filling a bag in the Greenbushes area, for the same unit output near Alexandria we find 3d. a bag on some farms (payment in kind not calculated) and on others 6d. Some producers pay 1/- per bag, believing such payments to 'pay' in the long run. Similarly, the hand-weeding costs vary per 100 yards, or per morgen, or per day.

Clearly of some importance in labour costs is the over-all value of the labour to the farm during the year. Chicory labour requirements being considerable, the root is seldom cultivated in a farming system that is predominantly citrus, which demands attention at regular intervals. The labour consumption of dairying being neither seasonal in character nor 'whole-day', chicory and dairying appear to combine in this respect. Further mention of prevailing farming systems occurs later but there are no data to assess the value of labour as a whole.

From the replies to the question: "Do you employ extra labour for chicory?" it can be stated that only in a few cases in the

regularly employed labour sufficient for certain aspects of chicory cultivation. In some cases this extra labour is paid a greater cash wage than that paid to the regular labour; it would seem, however, that the majority of producers pay extra to their regular labourers i.e. these labourers also benefit from the particular demand for their services at certain stages of chicory cultivation.[1] No data relating to the amount of the work that is done by the extra labour and no worthwhile comparative costing are possible along these lines.

The availability of the necessary labour varies from farm to farm: one Alexandria producer replies that labour was "always easily available", another, almost his neighbour, that it was "difficult to get". Replies from the other areas show the same degree of variation. At the most one can hint that in Alexandria and the southern parts of Albany labour is more readily available than in Greenbushes and East of the Kowie.[2]

Though Census material does not permit regional comparisons of total real wages paid to farm labourers per capita, some indications of the regional variation in costs may be derived from the Special Reports.[3] For Natives (male and female) only, the cash wages paid per head in August 1954 varied over the Proclaimed Areas as follows: Kongha £0·96, Albany £1·424, Bathurst £1·600, East London £1·612, Alexandria £1·861 and Port Elizabeth £4·120. From other tables it is possible to say that for every £1·0 paid in cash to Labourers and Domestic Servants in these magisterial districts, kind to the following values was also paid: Kongha £1·17, Albany £0·91, Bathurst

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1 Migratory workers received 93 per cent of their total monthly earnings in cash and rations whilst resident workers received 50 cash and rations and 50 per cent from other rewards.

2 Over the years obtaining labour has been a growing problem for farmers. Many have to fetch labour from African areas to work for a specified period. In addition to a cash wage, rations, huts and so on this involves transporting the labour from the African areas and back again. Middledrift and Peddie are areas of labour supply. Both are about 100 miles away from the main chicory regions.

3 The statistics in this paragraph, as in footnote 1, have been extracted from Special Report No.3 "Labour on farms and Wages", Agricultural Census 1953–1954.

£0·54, East London £0·87, Alexandria £0·76 and Port Elizabeth £0·16. It would seem likely then that total real wages do show regional variations and that Port Elizabeth has higher costs than the other chicory regions.

Certainly, however, there are regional variations in the total labour input (and of course the total labour costs). Weeding, replanting, chopping and bagging depend on certain factors. High winds, which frequently occur within 10 miles of the coast, often mean replanting. If this is necessary, some 13 man-hours work per morgen must be paid for again for each replanting. If one hoeing is sufficient, the farmer is saved the costs of the second and third hoeing which are necessary in the wetter and better-yielding areas. The expenses of chopping and bagging are, of course, directly related to the yields. Such variations in total labour input are discussed in later Sections.

7. THE COSTS OF PRODUCTION (ii)

Stage Two in the production of chicory involves the handling and transport of the fresh root to the drying centre. If the root is cut and dried on the farm in a kiln, the dried root is transported to the Chicory Control Board at Alexandria; if the Central Drier is used, the fresh root must be delivered at Alexandria. The form of production in which chicory is produced on the farm is largely a function of the distance of the farm from the Central Drier.

The steps leading to the establishment of the present drying facilities are recalled first and then drying costs are reviewed. The Section continues with an outline of transport costs which are, finally, considered as an element in the total costs of production.

DRYING OF THE ROOT

In earlier years the product was delivered by the producer direct to the chicory and coffee manufacturer. Sun-drying, which was general before 1917, did not result in a root entirely suitable for manufacturing purposes. In 1906, at the factory, good ripe fresh root fetched up to £2. 10s. a ton, and manufacturers preferred delivery in this form. Such deliveries were charged at the rate of ½d. per ton per mile. Where factories were some distance from the farms, dried root was sent. In the early 1920's the Bethal production, having been sun dried on the roofs of the farm buildings, was sent to Pretoria. Drying trays or racks were general in Alexandria. However, by 1929 small use was made of the sun-drying method for chicory; the process was slow (taking from eight to five days for a lot) and the root had to be covered at night because of the damage that could be caused by dew, and covered in the event of rain. Furthermore, the process was so uneven that factory drying (or finishing) was usually necessary after sun-drying.

Artificial drying by means of kilns was introduced in 1917 and became general about 1924. The process of drying was thus speeded up (from five to eight days to some twenty-four hours per lot)

and normally a more thorough job was done, thus pleasing the manufacturers. The farm kilns in use are all basically of the same pattern and any variations are usually in size and in the design and position of the furnaces or 'fireboxes'. Both Neethling and Spamer (1929) and Orchard and van Rooyen (1953) stated that the farm kilns were by no means satisfactory. The latter wrote: "At their best these kilns are unreliable, badly ventilated, smoky and allow little or no scope for temperature control." The result was often that the root was burnt or its quality injured by the smoke which gave it a flavour of which manufacturers were said to complain. Cillie (1950) believed that "all the care in the world" in designing a kiln would not produce a clean product of attractive appearance with the inevitable smoke and ash from the firewood fuel.

Just as important in preparing an acceptable dried product is the process of cutting. It is essential to have a uniform size for drying - so that all the pieces will be evenly dried and the smaller pieces not burnt - and in the processes of roasting and grinding uniformity is achieved only when the dried pieces are of the same size. Cutting may be performed by a modified chaff-cutter, a mangold pulper, a dicing machine with special steel knives or by hand; mechanical cutters are in general use today. Johnson (1921) outlined a simple method of grading the cut root whereby an upper tray retained the smaller pieces and allowed the larger pieces of root to fall through to a lower tray.

Finally washing of the root seems to be essential for the production of the best dried article. The capital costs, the scarcity of water, the extra labour costs and the time involved do, perhaps, make adequate washing a rather rare feature on the drying farm. However, manufacturers do not care to pay for sand and soil; furthermore, there is some discolouration of the dried root if it is not washed sufficiently before drying.

The costs of drying in the old farm kiln appear to be the lowest of any method available to the South African producer at the moment.

Cillie (1950) believed such drying to be the most economical though Orchard and van Rooyen (1953) clearly thought otherwise: "Even the best of the kilns appear to have a low drying efficiency, high fuel consumption and are erratic largely because they are unduly sensitive to weather conditions and wind in particular." Cillie, however, qualified his assertion by stating that if a better article as regards cut and cleanliness were required the costs of farm treatment "became prohibitive".

The case for co-operative kilns was put by Parish (1921) when he stated that "in other countries, in districts where chicory is grown,there are usually central drying kilns run frequently in conjunction with the factory to which the root is sent to be cut and dried". Neethling and Spamer (1939) warned producers that the requirements of manufacturers should always be met: "It should be borne in mind that manufacturers can obtain their supplies from other countries." Perhaps, they thought, the Co-operative Society could solve the difficulties of washing, cutting, drying and the treatment of the root, by erecting a suitable kiln or kilns centrally situated or otherwise at the nearest railway station. The 1934 Commission felt that the Co-operative Society should concentrate on "quality, grading, and plant preparation (washing, cutting, drying, and general preparation of the root)".

The Marketing Council's Report (1939) noted that the quality of the product could be improved by "better cleaning, grading, drying and storing", and that greater returns to producers would be achieved by, inter alia, improvements in the preparation and collective handling of the root for the market. The proposed scheme envisaged that growers would be required to deliver the chicory root to the Board for which purpose conveniently placed depots would be opened. In another paragraph it was stated that a depot would be located conveniently within a narrow radius of Alexandria. The terms of the Chicory Control Scheme (as amended 1939) were wide enough to enable the question of Central Drying to be raised in the future:

"to treat in such manner as it may deem fit, grade, pack, store, process, adapt for sale, insure, advertise and transport, chicory which it has bought".

The 1947 Marketing Act Commission commented on the issue, raised by the National Marketing Council, of whether the Chicory Board should be allowed to erect storage and drying facilities by saying: "The Commission feels that the industry is so small that a separate co-operative organisation to conduct such an establishment would hardly be warranted."

Orchard and van Rooyen (1950) described the results from a pilot drier, which was largely the work of the Division of Dehydration and Cold Storage, that was put into operation in April 1946. The costs derived from these investigations persuaded the Board to try an alternative method. In 1948 another pilot drier was designed and built at Alexandria under the supervision of an engineer of the Western Province Fruit Research Institute. The success of these trials led to the Overseas Mission.

Following resolutions taken by the Chicory Control Board in 1950, a delegation of three was sent to the United Kingdom and the Continent with the primary purpose of investigating the methods of the mechanical drying of chicory. The report of the Overseas Mission stressed the problems of water and power that would arise at Alexandria, and concluded, inter alia, that growers should be approached to discover the extent of the demand for a drier at Alexandria. The Board appointed a special committee "to investigate the report and explore the possibility of creating drying facilities for groups of farmers desirous of erecting their own drying plants".[1] The possibility of limited centralisation (or limited decentralisation) of chicory drying was thus investigated, and the Board determined to erect a model drier on its property, "which would serve as a prototype

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[1] Annual Report, C.C.B. 1951.

along which lines farmers or groups of farmers could then build their own driers".[1] The possibility of erecting driers at "various strategical points" in the chicory growing areas appears, however, to have lost favour - to quote: "The Board are still left with the difficulty that even should Belgian three-floor driers be erected at various strategical points in the chicory growing areas, some farmers might be unable to avail themselves of the services of any of these driers. Then, if they are short of firewood, they would be unable to grow chicory."[1]

Undoubtedly the shortage of wood in the Alexandria area was a factor persuading certain producers to support centralised drying. Schauder (1948) asserted that the "only solution" to the fuel problem, resulting from the denuding of the indigenous forests, was a Central Drying Plant.

A farm drier after improvements and amendments was apparently usable by growers who had no firewood on their farms but the Control Board and the Department of Agriculture decided against encouraging an improved design for farm kilns on the grounds that the suitable kiln would cost at least £500 which was "not only beyond the means of a large proportion of the producers, but also implied a capital outlay of more than £200,000 in the area". Furthermore, they rejected the possibility of zoning the chicory-producing area and placing large drying kilns of good design centrally in each zone "as it would entail the maintenance of a large trained staff throughout the year.[2]

After examining all the evidence and obtaining the manufacturers' favourable reaction to samples of root dried overseas by the drum drier type, the Board concluded negotiations with an overseas firm for

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[1] Annual Report, C.C.B. 1951.

[2] It is interesting to note that, according to Stilgenbauer (1951), drying kilns in Michigan were located at strategic points, within the chicory region, where plenty of raw material, water and coke were available. 95 per cent of the United States chicory production was dried by 8 kilns and chicory was grown "as far as 20 miles away from a drier".

the erection of a mechanical drying plant at Alexandria. The plant - a rotary green crop drier - was officially opened on 9th December 1954, having cost the Board £44,000.

The Central Drier, which promised much for the Industry, presented the Board with many difficulties during its first season 1st January to 30th September 1955). The costs of drying were higher than had been forecast. Bituminous coal adversely affected the colour of the dried product and the more expensive coke had to be used. The drying equipment, exposed to rain, cold, wind and sun, was corroding and there was loss of heat. Some form of sheltering for the drier was clearly necessary. The continuous process of drying necessitated the provision of rest rooms for the staff whilst the Board had to employ a Works Engineer because of the difficulty of obtaining suitable European shiftmen and non-European stokers. A concrete floor covered by a shelter had to be constructed as a dumping site for undried root, which because of exposure to wind and weather, especially the sun and the rain, suffered and resulted in losses. The original dumping site with its gravel floor further complicated the processes when stones entered the washing machine and cutters. Modifications to the cutting machines "at great expense", the installation of an automatic water conveyor system for undried root and the hampering of the entire drying process by the absence of an adequate supply of electrical power - these and the points mentioned above make it clear that the early months of the Drier were somewhat expensive. Finally, the adverse weather conditions resulted in a lack of undried root and the Drier actually discontinued operations on 5th June 1955.

The 1955 season's capital expenditure was £90,000 (in comparison with £50,000 during the first fourteen years of the Board) of which about £80,000 was expended on 'the drying scheme'.

One hundred and forty-one growers used the Drier in this first 'experimental' period; a total weight of 13,189,911 lbs. of wet root

yielded 3,634,648 lbs. of dried root, and direct drying costs worked out at 5/9d. per 100 lbs. Abnormal experimental expenditure of about 3d. per 100 lbs. was not recovered from producers.

The 1955-1956 season was slightly more successful for the Central Drier: 60 more farmers used the Drier, to which 41 per cent of the season's 510 producers sent wet root; some 19·4 million lbs. of wet root were treated and yielded 5·6 million lbs. of dried root. The increase was, however, primarily due to the fact that the earlier 'year' was only nine months. 85 producers sent wet root only to the Central Depot. Once again the Drier did not function for the full season; it was out of action during October 1955 and August 1956, and working either part-time or at a lower capacity during part of November 1955, April, June and July 1956. Trials and experiments supervised by the Fuel-Research Institute with the object of lowering fuel consumption without affecting the capacity or contaminating the colour were not successful and the fuel costs item showed no decrease from the previous season. After the failure of the newly acquired cutter, a second one was purchased to work under the first one and a considerable saving on the loss of fine root and a consistent cut were obtained. Capital expenditure was necessary on water supply problems and "there seems to be no sign of solution" (October 1956). The Chicory Board decided to bear the extra costs 'themselves' and claim only direct drying costs from producers as they had done in the previous season. These amounted to 5/6d. per 100 lbs. of dried root.[1] Indirect drying costs - incurred mainly by plant repairs - were approximately 3d. per 100 lbs.

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[1] Those producers who delivered <u>wet</u> root for central drying were paid 10/- per 100 lbs. wet root. As 350 lbs. of wet root are required to give 100 lbs. of dried root, the Board was paying such producers at the rate of 35/- per 100 lbs. dried root. This figure of 35/- is 9/- less than the producer would have received for delivering 100 lbs. of First Grade <u>dried</u> root. Allowing for levies, amounting to 3/6d., on the dried root, the Board's drying charges were 5/6d. per 100 lbs. of dried root.

The 1956-1957 season saw 27,971,531 lbs. of wet root dried by the Central Drier; 7,929,597 lbs. of dried root resulted. By acquiring a bore hole in Alexandria and erecting pipes and pumps, the Board appeared to have solved the water requirements of the washing machine. Bituminous coal was replaced as a fuel in the Drier by anthracite and coke; both of these are more expensive than coal but both produce a better-coloured product. The implications of the increase in the use of the Central Drier and the expansion of such facilities are discussed in later Sections.

The drying costs of producers who dry their own root have been averaged from the questionnaires. It must be remembered that the farmer's figure is to some extent influenced by his appreciation of the range of the cost items involved. For instance, whenever fuel (forest and thornveld) is available on the farm, it has generally, no doubt, been regarded as a 'free item'. Furthermore, the labour or machinery involved, particularly in cutting, may not have been taken into consideration by some producers when thinking of 'drying costs'. Some thirty producers submitted their drying costs, the highest was 10/0d. per 100 lbs. of dried root, the lowest 1/- per 100 lbs.; the average was 4/4d. per 100 lbs. It seems that those producers whose output is considerable and who have their own driers have lower costs per 100 lbs., but the outlay on cutters, washing machines and driers is very heavy and beyond most of the producers. What is clear from the returns is that certain producers would rather pay the Board's drying costs than dry themselves for less; indeed, a number of producers state that an even higher Central drying cost would still attract all their output if the Drier could take it. This preference for the Central Drier appears in the Alexandria region where, however, quite a number of producers still dry 100% of their own crop. Farmers in this region are not complacently satisfied with the present drying costs; several believe that with proper studies of the cost items (particularly as they are affected by the arrangement of the Board's equipment) the drying costs could be decreased substantially. The

comparative costs of drying in a number of different places and at different times are set forth in Table XI.

TABLE XI
A COMPARATIVE SELECTION OF DRYING COSTS
(per 100 lbs. dried root)

Location	Date	Cost	Source
South Africa	1929	2/3d.	Neethling and Spamer
Proclaimed Areas	1957	4/4d.	Questionnaires
Central Drier	1956	5/9d.[a]	C.C.B. Records
Central Drier	1955	5/6d.[b]	C.C.B. Records
Pilot Drying Plant	1946	6/0d.	Orchard and van Rooyen
England	1950	5/2d.	Overseas Mission Report
France	1950	7/0d.	" " "
Germany	1950	3/0d.	" " "

Notes: a) Full Drying Costs were 6/0d.
b) Full Drying Costs were 6/3d.

The differences in these costs are due to the size of the plant, the quantity handled, the fuel and labour consumption and the differences in the costs of the items as between country and country and between one period and another.

Drying costs vary from producer to producer in the Union's Proclaimed Areas, depending largely on the size of the crop handled by the farmer's kiln, the fuel used and the efficiency of the cutting machines and kilns. It is not uncommon for one producer to handle also chicory from a number of producers who either choose not to use their antiquated kilns or do not have their own kilns.

TRANSPORT OF THE ROOT

The Chicory Board differs from other control boards in that it also handles the product;[1] all the chicory from the Proclaimed Areas must, therefore, be transported to the Board's depot. This is situated about one mile north of Alexandria on the Alexandria-Grahamstown road. It was possible at one time, as noted earlier, that there would be more than one such depot but it is doubtful whether the present demand for chicory would warrant the capital costs and

[1] The Maize Industry Control Board, for instance, acts as sole buyer in 'Area A' but the physical handling of the maize is in the hands of three groups of agents in the producing areas and they organise the receiving, grading, storing, financing, etc.

running costs of another depot.

At present the Board does not concern itself with the transportation of the root; this must be arranged by the producer and there are several means by which the transportation is effected.

The Railways Administration distinguishes in its Tariff Book between 'chicory root in bags', and 'chicory'. Wet or dried chicory as handled by the Board is rated on the railways in the former category on Tariff No. 8.[1] The Road Motor Services rate chicory on Tariff 4.[2]

Much of the chicory moves to Alexandria by road, some in lorries belonging to producers and some in hired lorries which are part of the transport contractor concerns situated in Alexandria. In the former case costs are, of course, not so readily seen as in the charges of the contractor.

If dried root is sent to the depot, the costs are less for the total output of a producer than if root is sent wet when the weight moved is approximately 3-5 times greater. (It is assumed that charges for handling, which are greater if the root is dried on the farm as the bags must be moved from field to kiln, are included in farm drying costs.) If the root is dried at some distance from the point of production (perhaps, at another producer's kiln), there is an intermediate transport and handling charge item to be considered.

The three possibilities are thus:-

A) farm to Central Drier as wet root,
B) farm to Central Drier as dried root,
C) farm to neighbour's kiln as wet root and then as dried root to the Central Depot.

In each case the distance in terms of the relevant transport rates will determine the actual cost.

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[1] South African Railways Tariff Book. General Manager of Railway, Johannesburg.

[2] Road Motor Services Tariff Book.

COSTS IN STAGE TWO

The costs of production in Stage Two are considered further for the different chicory regions in Section 11, and this general analysis is concluded by setting forth the costs for an 'average morgen' with yield of 3,800 lbs. (1·9 tons) of dried root. The three possibilities noted above are individually dealt with as A, B and C for a distance from the Central Drier of 20 miles. Road rates only are considered in the calculations.

TABLE XII

SAMPLE COSTS IN STAGE TWO OF CHICORY PRODUCTION
(per morgen)

	Cost as %			Cost in £'s		
	A.	B.	C.	A.	B.	C.
Drying	74	83	77	10·93[a]	8.24[b]	10·83[c]
Transport to Central Drier[e]	26	17	9	3·78	1·17	1·17
Transport, Other	-	-	14	-	-	1·92[d]

Source: Questionnaires

Notes: a) 5/9d. per 100 lbs.;
b) 4/4d. per 100 lbs.;
c) 5·7s. per 100 lbs.;
d) Distance one way involved in transport to kiln is 10 miles; no change in transport distance to Central Drier;
e) Based on known rate of 3/0d. per mile for 5½ tons; a given tonnage is thus multiplied by 3/5·5 and then by the distance (one way only) involved, and 2·5s. is added as contractor's handling charge.

It may be noted here that the percentage of the total costs of production (Stages One and Two combined) formed by transport is, in case a) 8 per cent, in case b) 2·8 per cent and in case c) 6·7 per cent. The costs in Stage Two are variable or prime costs; they increase as the output increases. They are in the same category as a portion of the labour costs (in Stage One concerned with topping and bagging the yields.

8. THE CHICORY REGIONS (ii)

Groupings of producers have been presented as chicory regions in Section 5. Following one or two general points, these regions are now considered with special regard for the influence of the factors that determine the profitability of chicory cultivation in each. Using available data, a comparative picture of the regions is depicted.

SOME FEATURES OF THE AGRICULTURE OF THE PROCLAIMED AREAS

Some of the information in the following pages may appear in the relevant Bulletins of the Department of Agriculture on the Agro-Economic Survey of the Union. Work on the areas concerned has not yet been completed for publication; consequently, the writer has not had access to what would certainly have been helpful sources. A general summary of the Eastern Cape coastal areas has, however, been issued and this is quoted:

"Nearly all the chicory of the Union is grown here, and it is also the most important pineapple producing area of the Union. Apart from these two products, maize, vegetables and fruit also contribute towards the cash income ... Cattle farming plays an important role. Dairying - especially fresh milk - is a very important branch of the cattle enterprise. Two cities, namely East London and Port Elizabeth, stimulate dairying. Furthermore, large poultry farms are found. Sheep - particularly woolled sheep - also contribute towards the cash income."[1]

One feature of the farming of the principal chicory regions that has expanded since 1945 is pineapple culture. Malan (1954) showed that the pre-war East Cape pine areas (approximately Kasouga to the Fish - or the East of the Kowie chicory region, and north and south of East London) have been expanded by extensive plantings in

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[1] Key to the Agro-Economic Map of the Union of South Africa. Economic Series No. 39, Pretoria, 1951.

Peddie, Bushmans River, Salem, Alexandria and Sandflats.

High prices in the decade following the war stimulated pine-apple production. In isolated instances prices reached £25 per ton; a more general price has been £15. With competition on the export markets from Malaya the prices paid to producers by the canneries have dropped. In 1957 they fell from £14 a ton for Cayenne and £12. 10s. for Queens to £10 and £8. 10s., respectively. This has caused some farmers to contemplate leaving pineapples.[1] According to one report "pineapple farmers cannot carry on under these circumstances".[2] Another source has indicated that the farmer can still market an annual nett return of £240 per morgen[3] whilst a further estimate was £130 nett.[4] Such receipts indicate that chicory farming is not a more profitable undertaking. The significance of the present price changes on the spatial pattern of pineapple production - and its influence on chicory - is difficult to predict. From the "nervousness in the pineapple industry" have sprung the negotiations at present in progress to organise a control scheme under the Marketing Act.[5] The projected Board will share with the Chicory Board that aspect of control which is a <u>sine qua non</u> of fixed prices - control of production or rather over-production.[6]

From Table XIII (page 77) may be seen the expansion of the cultivation of both chicory and pineapples in the Eastern Cape since 1945.

A second feature of the farming that merits a general comment is <u>dairying</u>. The Areas, in general, form natural grazing country.

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1 <u>Evening Post</u>, Port Elizabeth, 20th April 1957

2 House of Assembly Debates. Cape Town, No. 16, 10th May 1957 (Column 6106)

3 <u>Evening Post</u>, Port Elizabeth, 27th April 1957

4 Personal comment, Mr. L.A. Gower, Alexandria

5 House of Assembly Debates, Cape Town, No.16, 10th May 1957 (Column 6111)

6 Primarily dependent on open overseas markets, a Control Board is going to experience difficulty in making prices 'artificially' high for Union producers. It will probably be in the fortunate position, however, of commencing its Control of the Industry with curtailed production and low prices.

The problems are ones of veld improvement (eradication of such weeds as jointed-cactus) and water conservation, and the arable rotation includes straw and other supplementary crops. The 1936-1947 N.M.C. Report commented " ... dairying, for which the area is eminently suited". The 1939 N.M.C. Report believed the Areas to be well adapted to mixed farming with winter and summer fodder crops possible. It further stated that "should future circumstances force producers to abandon the planting of chicory reasonable alternatives are available". It is probable that with the attractiveness of chicory cultivation in the past six years there has been a relative shift of resources into chicory, as into pineapples, from dairying. The markets for milk in the Areas are stable and considerable and the distances are not great.[1]

TABLE XIII

EASTERN CAPE CHICORY & PINEAPPLE PLANTINGS
BY MAGISTERIAL DISTRICTS
(morgen)

	1945-1946		1946-1947		1949-1950		1953-1954
Districts	Chicory	Pines	Chicory	Pines	Chicory	Pines	Pines
Albany	566	1126	965	1398	1165	1850	4192
Alexandria	2561	180	2115	258	2251	672	1618
Bathurst	110	5070	220	6202	1179	7387	7505
East London	-	1587	-	2023	106	2113	3376
Humansdorp	1	-	-	-	-	-	66
Mossel Bay	-	-	-	-	3	1	-
Port Elizabeth	-	-	-	-	8	-	-
Uitenhage	6	2	-	11	1	13	88
Cape and Union Total:	3244		4206		5713		

Source: Agricultural Census Reports

Most organisations arrange collection of milk and cream by lorries; transport costs are nowhere more than four or five pence per gallon

[1] Population figures from the 1951 Census:
Port Elizabeth & Walmer - Total: 100,000 (incl. over 78,000 whites)
East London - 99,000 (incl. over 46,000 whites)
Grahamstown - 23,783 (8,680 whites)
King Williams Town - + 12,000 (+ 6,000)

Others include: Port Alfred, 5,733; Alexandria and Alicedale, about 1,700; Paterson and Bathurst, about 1,000.

Butter, cream and cheese factories exist in the larger towns and, in addition, there are chocolate manufacturers and plants processing milk. A broad division of the Areas into milk supply regions for the three larger centres is: (i) Port Elizabeth - from Greenbushes, Sandflats and Sidbury, Congoskraal and Konkelbosch, Alexandria (including Zuney), East of the Kowie, part Seven Fountains, (ii) Grahamstown - from Salem, part Seven Fountains, (iii) East London - from Peddie, East London, Komgha.

It is clear that dairying represents an alternative to chicory and that there is a general move at present to emphasise dairying and decrease the dependence on chicory (see Section 9), and hints of a change from pines to dairying.[1]

AGRICULTURE IN THE SEVEN CHICORY REGIONS

I. Greenbushes

Entirely within the magisterial district of Port Elizabeth (proclaimed in 1950), this region entered chicory cultivation in a small way in 1951. In 1954 twelve other farmers joined the pioneer,[2] and in 1955 thirty-two made deliveries to the Board. The severe general drought of 1949-1950 left a big gap between Union supply and demand and Port Elizabeth farmers were encouraged to produce the root;[3] the 1952 local shortfall (plus an advance payment on root delivered of 80 per cent, a price increase of 6 per cent etc.) gave the region further stimulus, and kilns and cutters were purchased by some producers to suit the grading standards operative in those years. The whole of the magisterial district produced 36,000 lbs. or 1 per cent of the total crop in 1950: the region discussed here (a region which includes the vast majority of the farms producing chicory in the magisterial district of Port Elizabeth) produced 1·6 million lbs. or 8·5 per cent in 1955.

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1 Evening Post, 20th April 1957: "Some farmers are turning their pine lands into pasture ground".

2 Farmer's Weekly, May 1954

3 The Board, for instance, was "pleased to oblige" a P.E. small holder (2 morgen) who requested information on chicory cultivation - Farmer's Weekly, 3rd November 1954.

The region is undulating, 500–700' above sea level and somewhat hilly nearer the coastline. A stream - the Maitland - and a number of tributary head streams drain the chief chicory areas. The Table Mountain Sandstone soils are sandy; with continuous cultivation they tend to lose their structure and so become susceptible to wind erosion - at which stage it is difficult to establish crops on them. These soils - often three feet deep and underlain by heavy pot clay - are fertile when first cultivated, especially when they are found in favourable locations such as hollows or silt collecting areas. The rainfall is about 30" with an all-seasons distribution and a tendency for slight maxima in March–May and October–November. The hottest month of the summer (February) averages 70°F. As far as drought conditions are concerned - for the years 1926–1939 de Swardt and Burger (1941) showed that Port Elizabeth escaped declaration entirely (as did East London and Kongha). Levinkind (1941) demonstrated that Port Elizabeth was free of drought when all the other chicory regions were affected in 1916, 1919 and 1926. In the great drought of 1927, however, the entire chicory area was affected (as was 72 per cent of the Union). Between 1940 and 1956 Port Elizabeth was stricken from 20th May 1949 to 1st January 1950 and from 10th June 1953 to 24th November 1953.[1] The region escaped the 1950 drought which affected Alexandria, Albany and Bathurst. From the relevant data it appears that Groenlushes does not invariably suffer droughts when they aflict the Central Areas. There are patches of Alexandria Forest along a narrow coastal strip (some three miles wide); inland the natural vegetation is false macchia.

The proximity of Port Elizabeth is the chief economic fact in the farming system of the area. The region concentrates on satisfying the considerable urban market in respect of fresh vegetables and milk. Tomatoes, potatoes and cabbages are the principal vegetables marketed; other vegetables grown include carrots, cauliflowers, beans and peas.[2]

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[1] The data on drought conditions for the period 1940–1956 were furnished to the writer by the Department of Agriculture.

[2] See sample farm: Farmer's Weekly, 27th May 1953.

About 40 per cent of the average farm[1] is under the plough and the non-vegetable crops - barley, oats, lucerne - are supplementary to the dairying. Herds are mainly Frieslands and the average cow density for the district is 5 per 100 morgen.

Vegetables represent a variable source of income to the farmers in this area.[2] With considerable fertilization (essential to keep the soil in trim) high yields per morgen are harvested and when prices are high gross profits are high. The costs of labour are relatively high in this area but nett profits per morgen are normally higher than chicory returns. On the basis of a yield of 200 bags (37½ lbs.) of potatoes per morgen and a Grade I market price of 8/- per bag, the gross return is some £80 and the nett profit around £40-£50 per morgen.

Chicory is significant as a contributor to the gross cash income of the chicory-growing farms, providing in one case as much as 50 per cent.[3] Dairying and vegetables (particularly potatoes) are, however, the principal sources of income.

II. Sandflats and Sidbury

This region is partly in the Alexandria magisterial district (Sandflats) and partly in Albany (Sidbury). Both districts were in the original Proclaimed Areas. Small quantities of chicory have been sent to the Board since 1940. Most of the 1955 deliveries came, however, from producers that had entered the Industry since 1950.

The Bushmans River cuts north-south through this region of rolling plateau country which is 1,000-1,300' above sea level. Considerable areas are covered by Eastern Province Thornveld and bushveld. The annual rainfall is the lowest of any of the regions (15"-20") and

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1 The average farm is 499 morgen for the entire Port Elizabeth magisterial district.

2 The price of onions, for instance, was, on the average, nine times higher in September 1957 than in September 1956 on the Port Elizabeth market - Eastern Province Herald, 16th September 1957.

3 Though the features of farming are discussed in the present tense in the following pages, it will be appreciated that agriculture is dynamic and that patterns are continually changing.

the variability high. There is a strong tendency for a summer maximum of rainfall. From the data for the magisterial districts of Alexandria and Albany it is fairly certain that the region has its full share of drought. The soils, though mainly on Alexandria beds, are heavier and shallower than those nearer the coast. The maturing period is extended from six months to about nine months mainly on account of the low rainfall. Red and grey sandy soils are used for chicory. The area is primarily a dairying region with some sheep and poultry farming.

The five chicory returns are from farms south of Sandflats itself, one of which is near Sidbury. Two producers with over 50 per cent of their gross cash income from chicory and with over 30 morgen under chicory distort the averages and conceal the fact that three of the farms have less than 6 morgen of chicory apiece and derive less than 20 per cent of their cash incomes from the sale of the root. The average farm size is 560 morgen; the biggest farm is over1,100 morgen (with over 900 of this described as bush). Four of the farms run dairy herds, ranging in size from 60 cows to 15; the average herd is 25 cows. Only one farm has slaughter cattle.

The sources of income are summarised in Table XIV and the crops planted in Tab le XV.

TABLE XIV

GROSS CASH INCOME ON SANDFLATS AND SIDBURY CHICORY FARMS

Activities.	% contribution.	No. of farms averaged	Highest.	Lowest.
Chicory	38	5	90	15
Dairying	34	4	60	25
Other	26	4	57	20
Beef	2	1	10	10

Source: Questionnaires

Notes: a) In the tables of Gross Cash Income (Tables XIV, XVI, XVIII and XX) the absolute highest and lowest percentages are recorded.

b) In the tables of Farm Crops (XV, XVII, XIX and XXI) the absolute highest and lowest morgenages are recorded.

TABLE XV

FARM CROPS - SANDFLATS & SIDBURY CHICORY FARMS

Crop	Morgen planted	No. of farms averaged	Highest	Lowest
Chicory	10	5	56	2
Oats	10	2	40	10
Mealies	6	2	20	10
Bone	2	1	20	20

Source: Questionnaires

The substantial contribution to farm revenue of 'other' is probably derived from fowls and bone. The average farm has only 37 morgen under cultivation, some 250 morgen of pasturage and the rest (250+) bush.

IV. Alexandria (in which is also included Congoa Kraal and Kenkelbosch)

Chicory has been grown in this region for commercial purposes since 1895. The region developed between the two world wars into the chicory region 'par excellence', a position it has maintained during the era of the Control Board.

On the sandy soils (developed from sandstone) with pH 5·5-6·0, a top-soil about 18" deep and underlain by pot clay) of the Alexandria Plain and especially on the grey and black sandy soils (limestone in origin, with pH 7·2-7·5 and a top-soil over 24" deep) along the coastal strip and in the land-locked valleys, chicory cultivation is widely practised. Yields ranging from over 100 bags of dried root per morgen to under 15 bags are harvested. The low yields come from lands long exhausted by chicory monoculture, the high yields from lands carefully rotated and fertilized and lands naturally replenished with plant foods and humus by streams from bordering slopes (e.g. in the Kaba Kloof). This rolling country has, on the hills nearer the coast, a rainfall in excess of 30"; there natural and planted forests (for instance Langebosch) thrive. Much of the natural forest has, however, been felled; in fact, Cresswell (1892) noted that the forest was "scrubby in character owing to reckless waste". Most of the region has a rainfall

between 25" and 30" with a tendency for a maximum in spring. Soil and (generally) rainfall conditions result in the crop maturing in five to six months. De Swardt and Burger (1941) showed that the area suffered drought conditions for 'under thirty months' between 1929 and 1939. Between 1940 and 1956 the entire magisterial district of Alexandria was declared drought stricken from 2nd July 1940 to 31st January 1950 and from 28th April 1950 to 10th February 1951. Parts of the district were declared for four months in the winter and spring of 1953 and between October 1955 and October 1956.

It is interesting to note that MacDermott (1906) considered that this region was "one of the most backward district we have". Whilst it "was rich beyond the dreams of avarice with agricultural possibilities", it lacked adequate communications with the markets and ports, and the sons of the land were busy transport riding. Even today the railway line penetrates as far as Alexandria only while the roads of the area are "no roads at all".[1]

The returns from chicory farmers serve to indicate the prevailing farm system. Nearly forty returns were available from the region and thirty-one were completed satisfactorily for analysis. The farms in question are dispersed over the region, there being a number from west of Zuney at the western limit of the region (about 30 miles from the Central Drier) and a few from the eastern areas in the Kariega and Kasouga River valleys. The bulk of the producers are located within a 20-mile radius of Alexandria. Representative returns are available from the Fertile Kabe Kloof, the Beach Hook, the Groefwater Valley and the 8-mile strip between the Olifants Hoek Forest Reserve and the coast and the areas to the north of the Forest.

Two farms are over 1,000 morgen in extent; one, less than 10 miles from the Central Drier, is primarily a dairy farm, the other in the Zuney area also concentrates on dairying and has under 20 morgen of

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[1] Opinion expressed at a Farmers' Meeting, Alexandria, 10th October 1957.

chicory. The average size of farm is 475 morgen. Twnety-three of the thirty-one farms run dairy herds, four herds are over 120 cows in number, and the average farm has a herd of 46 cows. Only six farms have flocks of sheep and six have slaughter cattle.

Table XVI summarises the sources of Cash Income and the crops planted may be seen in Table XVII.

TABLE XVI

GROSS CASH INCOME - ALEXANDRIA CHICORY FARMS

Activities	% contribution.	No. of farms averaged	Highest	Lowest
Chicory	54	31	100	7
Dairying	36	23	85	5
Pineapples	6	8	55	1
Other	2	7	10	3
Beef	2	6	20	4

Source: Questionnaires

TABLE XVII

FARM CROPS - ALEXANDRIA CHICORY FARMS

Crop	Morgen planted	No. of farms averaged	Highest	Lowest
Chicory	24	31	120	2
Mealies	10	22	120	3
Barley	11	11	80	1
Oats	8	14	50	2
Other	7	10	90	2
Cowpeas	2	7	25	2
Pineapples	3	8	30	3

Source: Questionnaires

Barley and oats are, generally, for cattle feed and mealies for farm requirements. Here and there, cowpeas, birdseed and batata are grown in small quantities; even rarer is tobacco.

Three of the four farms that are under 100 morgen are entirely dependent on chicory for their cash income and they are no more than 14 miles from the Central Drier. Farms of size 100-200 morgen derive 64 per cent of their income from chicory. Of the fifteen farms that are over 60 per cent chicory income, thirteen are within 16 miles of the Drier. Generally the smaller farms have the greatest percentage morgenage of chicory; some have nearly 50 per cent of the whole farm

under the root. The highest areas of chicory are found on the farms of 600 and more morgen. Whilst the smaller farms tend to be mainly chicory, the farms of larger size are more diversified, having large dairy herds and many morgen under foodstuffs.

V. Seven Fountains

Occupying the southern section of the magisterial district of Albany, this region produced some chicory in the 1930's but expanded considerably in the years after 1945.

This is rolling and hilly country rising to nearly 1,300' with some areas of dense thornbush and bushveld. The rainfall is between 20" and 25" with a tendency for a summer maximum. Of all the chicory districts Albany is most prone to drought conditions. Between 1926 and 1929 it had the greatest aggregate time for drought (between thirty and fifty-nine months); since 1940 it has been hit by droughts in 1941-1942, from 31st January 1945 to 10th May 1948, from 7th December 1948 to 5th January 1951, in 1953, and almost continuously from 5th July 1955 to 18th December 1956. Fertile soils are confined mainly to river valleys. The red sandy loam soils are 6"-9" top-soil and pot clay below. The clay layer limits the length of the chicory root. The colder soils inland, developed mainly on Witteberg, delay the maturing of the root so that the period is nearer eight months than the five-six of the coastal regions. The general farming characteristics are sheep, cattle, poultry and pineapples,[1] and the average size farm for the entire magisterial district is over 1,000 morgen with 80 sheep per 100 morgen.

This large chicory region is analysed from data returned by eleven chicory producers. Two of the returns came from farms in the Longford Grange locality i.e. very near the northern boundary of the Alexandria region (as delimited in this study). Two more came from

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[1] Farmer's Weekly, 28th August 1957.

the area north of Salem between the Assegai Bush River and the Kariega River i.e. from the eastern parts of the Seven Fountains region. The remainder were sent from farms within 5 to 6 miles of Seven Fountains itself and more or less south of the Port Elizabeth-Grahamstown road.

Three of the farms are over 1,200 morgen and one is less than 150; the average farm is 735 morgen. All but one of the farms have dairy cows, three farms have over 90 cows each; the average figure is 43. In contrast only two farms keep sheep; averaged over the eleven returns, the two flocks give the average farm 70 sheep. Seven farms have slaughter cattle, three of the farms keep over 130 beasts each, the average is 58.

The sources of Cash Income are summarised in Table XVIII and the crops planted in Table XIX. Pineapples contribute to the cash incomes of six farms only and only four of the farms have percentage contributions greater than 36 per cent; these four, however, are all over 55 per cent. These are small chicory producers and they thus inflate the significance of pineapples in both tables; only one of the four has dairy cattle.

The average farm of 735 morgen has about 100 morgen under crops, the remainder is pasturage and bush; the distinction between these two, however, is not clear. The region is mainly a dairying one with over half the cultivated land directly contributing to the dairying. Chicory plys a part in a diversified farm system. From the returns it is clear that the producers in the region do not plant large areas of chicory regardless of the size of their lands. Chicory falls into a rotational system on most farms with maalies and a straw crop (barley or oats), and in some cases with birdseed.

TABLE XVIII

GROSS CASH INCOME - SEVEN FOUNTAINS CHICORY FARMS

Activities	% contribution	No. of farms averaged	Highest	Lowest
Dairying	30	10	67	8
Pineapples	30	6	92	1
Chicory	20	11	40	5
Beef	10	6	40	3
Other	5	5	10	1
Wool	4	2	33	7
Citrus	1	1	10	10

Source: Questionnaires

TABLE XIX

FARM CROPS - SEVEN FOUNTAINS CHICORY FARMS

Crop	Morgen planted	No. of farms averaged	Highest	Lowest
Chicory	20	11	60	3
Mealies	30	9	80	5
Pineapples	28	9	75	2
Barley	5	5	20	2
Oats	13	8	50	6
Cowpeas	2	4	10	1
Lucerne	2	3	7	4
Ryegrass	½	1	6	6
Dabala	4	2	30	12
Birdseed	1½	2	15	3
Wheat	½	2	4	3

Source: Questionnaires

VI. East of the Kowie

Although a few farms in the vicinity of Bathurst have been producing chicory since as early as 1910, most of the producers in this chicory region (which is almost wholly within the Bathurst magisterial district) began producing the root in the 1940's; a number of farms - particularly those over 40 miles from Alexandria - only started chicory in the period 1950-1956.

In this area, where the annual rainfall is generally over 25" and is spread throughout the year, there is rolling plateau country with deeply cut meandering rivers and some areas of thornveld and bushveld. The variability of the rainfall is much the same as in the

Alexandria region and both were declared drought stricken in 1941-1942, 1946-1947, 1949-1950 and 1950-1951. Bathurst, however, was not declared for any period from 19th January 1951 to the end of 1950. Chicory is grown on a variety of soils. Reddish brown sandy soils give high yields; many of the chicory lands are located, however, on patches of the sandy Alexandria beds and not on Boldeveld.

Citrus, pineapples and dairying are the main sources of income and the average farm in the district is 404 morgen in extent.

This large region with relatively few chicory farmers is treated on the basis of eight chicory returns. The locations of the producers who furnished data vary from the coastal areas - between the Kowie and the Great Fish River - to the Manleys Flat area, some 12 miles from Grahamstown. Other farms represent the Trappes Valley, Clumber, Coombes and Bathurst Rail areas.

One only of the farms is over 1,000 morgen; 1,100 morgen of this farm is bush, and chicory is grown on only three morgen. Excluding this farm, the average size of the remaining seven farms giving chicory returns is about 400. All but one of the farms keep dairy cows, though only four list any contribution to the cash income under 'dairying'. Three farms have over 40 dairy cows each, the largest dairy herd is 60 strong, the average farm has 20. There are no sheep on these farms. Four of the farms have slaughter cattle, two farms have over 30 each. The average for the eight farms is 6.

The sources of Cash Income are summarised in Table XX and the crops planted in Table XXI. Five of the six farms marketing pineapples derive over 60 per cent of their income from this source, two of them are reliant on pineapples to over 80 per cent; chicory and other crops make up the rest of the income, with dairying featuring in only one of these pineapple farms. The absence of citrus in any of the returns merits a special word. Apparently chicory and citrus are not popular combinations; citrus irrigation generally requires immediate satisfaction and the labour force must be more or less free to look after the citrus orchards. Dairying and citrus are similarly difficult

combinations, though by no means rare.

The average farm of 400 morgen has 55 morgen under cultivation. The remainder is bush or pasturage in variable proportions.

East of the Kowie we are, actually, in pineapple country (see Table XIII). In most cases chicory is planted, apparently, as a sideline to pineapples and nowhere is the morgenage planted large. Quantities of potatoes and birdseed form the 'other' crops; where rotated, chicory is planted after these or mealies.

TABLE XX

GROSS CASH INCOME - EAST OF THE KOWIE CHICORY FARMS

Activities	% contribution	No. of farms averaged	Highest	Lowest
Pineapples	49	6	80	25
Chicory	27	8	80	5
Dairying	10	4	40	5
Other	8	7	20	5
Beef	6	3	20	10
Wool	Nil	-	-	-
Citrus	Nil	-	-	-

Source: Questionnaires

TABLE XXI

FARM CROPS - EAST OF THE KOWIE CHICORY FARMS

Activities	Morgen planted	No. of farms averaged	Highest	Lowest
Pineapples	19	7	40	5
Other	12	7	40	2
Mealies	11	6	40	3
Chicory	6	8	15	3
Oats	5	1	40	40
Cowpeas	2	1	20	20
Lucerne	1½	2	10	3
Wheat	½	1	4	4

Source: Questionnaires

VII. East London

Kenga magisterial district was proclaimed in 1954 but no deliveries from there were made in 1955. Here we are concerned only with those farms in the East London district, which, together with Peddie (in which no chicory was produced in 1955 - it being in fact largely native land), was proclaimed in 1948.

In 1950 East London and Peddie contributed 4 per cent of the total supply; in 1955 East London contributed 2·1 per cent of the total. Most of the producers began chicory cultivation in 1950; some began later.[1]

This hilly country with numerous streams in well cut valleys has an annual rainfall that is over 30" with a tendency for a slight maximum in February/March and September/October. As with Port Elizabeth, neither East London nor Komgha were declared drought stricken during the years 1926-1930; the region missed the drought of 1950-1951 and it appears that the rainfall is less variable here than in the central chicory areas, though in some years it is below normal when the central areas are normal. Grey sandy coastal soils have been used for chicory in a few instances but the data on which the East London picture is built is to a large degree derived from producers using alluvial valley soils that have been exhausted by monoculture of mealies (for instance, those soils in parts of the Kwelgha River Valley).[2] Thornveld and bushveld cover many of the hillsides with Coastal Forest on the wetter slopes. The general terrain of much of the East London district is not suitable for cultivation whilst the deep soils are restricted to the valley floors.[3]

With the East London urban market near at hand, the growing of vegetables (mainly potatoes and sweet potatoes) and dairying are important. The cow density of the district is the highest of all the chicory regions, 11 cows per 100 morgen. Pineapple production is very considerable in the district (on 'red' soils), though often it cannot be satisfactorily combined with dairying on account of the

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[1] The inaugural meeting of the Border Chicory Producers Association was reported in The Farmer's Weekly, 19th December 1951.

[2] The Border Regional Survey, conducted by Rhodes University, will include the results of some fieldwork on soil types in this area. Of particular significance, it is understood, on agricultural activities is the distinction between soils developed on Beaufort sediments and soils developed on dolerites.

[3] A farmer in the area may be quoted: "On my farm there is a steep kloof and to plough it would require an ox with two short legs on one side". Daily Despatch, East London, 10th April 1957.

paucity of cultivable land and the necessity to utilise what there is for maize, oats and feedstuffs.[1]

From five returns of chicory farmers it is possible to state cautiously a few features of the chicory farms. They are under 500 morgen, the average being 305.[2] Some eighteen morgen are under chicory, which is a quarter of the total crop land on which mealies, oats, sweet potatoes and other vegetables are grown together with small quantities of tobacco and flowers. Chicory contributes about 20 per cent of the gross cash income, the remainder comes from dairying and vegetables.

A COMPARATIVE ANALYSIS OF INPUT/OUTPUT RATIOS

In preparing the regional input/output ratios shown in Table XXII (page 92) certain costs have been averaged. From the relevant returns the costs in Stage One of chicory production have been extracted and they stand as the costs for each region's average yield. In Stage Two the cost of drying on the farm is a uniform figure for all regions. On the income side two important generalisations should be pointed out. Firstly, all the chicory has been taken as attaining First Grade and, secondly, a sample distance from the Board has been the basis of the calculations of transport costs. It should be noted that apart from Alexandria (from which both dried and wet root is sent to the Depot) the costs in Table XXII are based on farm dried chicory.

The influence of climate and soil and the intensity of cultivation are reflected in the yields per morgen. The data from East London were from poor lands; the remaining yields seem to be reasonably representative. A relatively reliable and ample rainfall,

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1 One producer commented: "I have a little land with deep soil but if I put it to pines, how will it work with my dairy scheme? I'll have two half-baked schemes going".

2 The average farm for the East London magisterial district is 175 morgen. We may say that it is not smallholders who grow chicory in this region.

TABLE XXII

SUMMARY OF AVERAGE INPUTS AND OUTPUTS IN SIX CHICORY REGIONS, 1957

ITEMS	ALEXANDRIA : 20[a]		GRIEKWASTAD : 85[a]		EAST OF KOWIE: 50[a]		EAST LONDON : 150[a]		SANDFLATS/SIDBURN:45[a]		SEVEN FOUNTAINS:25[a]	
	Per Morgen	Per Ton	Per Morgen	Per Ton	Per Morgen	Per Ton	Per Morgen	Per Ton	Per Morgen	Per Ton	Per Morgen	Per Ton
Yield - lbs dry rt	4,000	-	7,500	-	2,500	-	2,500	-	3,500	-	3,000	-
GROSS INCOME[b]	£88.0	£44.0	£165.0	£44.0	£55.0	£44.0	£55.0	£44.0	£77.0	£44.0	£66.0	£44.0
Expenses: Stage One												
Labour	18.0	9.0	35.0	9.33	14.0	11.2	16.0	12.8	14.0	8.0	11.0	7.4
Implements	9.0	4.5	10.0	2.67	9.0	7.2	6.0	4.8	7.0	4.0	10.0	6.7
Bags[c]	1.66	0.83	3.15	0.83	1.05	0.83	1.05	0.83	1.46	0.83	1.25	0.83
Seed	2.0	1.0	1.6	0.43	1.5	1.2	1.875	1.5	1.0	0.57	1.25	0.83
Ox-labour	0.5	0.25	-	-	0.5	0.4	0.75	0.6	-	-	-	-
Fertilizer	0.5	0.25	5.0	1.33	2.0	1.6	5.0	4.0	5.0	2.9	5.5	3.7
Miscellaneous	0.5	0.25	0.5	0.13	0.5	0.4	0.5	0.4	0.5	0.29	0.5	0.33
Total - Stage One	32.16	16.08	55.25	14.72	28.55	22.83	31.175	24.93	28.96	16.59	29.50	19.79
Expenses: Stage Two	Farm CCB	Farm CCB										
Transport	1.14[f] 3.99[f]	0.57 1.99	6.422[g]	1.710	1.406[h]	1.125	2.604[h]	2.083	1.836[h]	1.049	1.15[h]	0.77
Drying[l]	8.662 11.09[i]	4.326 5.5	16.25[j]	4.326	5.409[j]	4.326	5.409[j]	4.326	7.583[j]	4.326	6.5[j]	4.326
Levies[e]	5.0	2.5	9.375	2.5	3.125	2.5	3.125	2.5	4.375	2.5	3.75	2.5
Special Levies[d]	2.0	1.0	3.75	1.0	1.25	1.0	1.25	1.0	1.75	1.0	1.5	1.0
Total - Stage Two	17.72 21.99	9.326 10.99	35.797	9.536	11.19	8.951	12.388	9.909	15.544	8.875	12.9	8.596
TOTAL COSTS[k]	49.952 54.15	24.476 27.07	91.047	24.256	39.74	31.781	43,563	34.839	44.504	25.465	42.4	28.386
NETT PROFIT	38.048 33.85	19.524 16.93	73.953	19.744	15.26	12.219	11.437	9.161	32.496	18.535	23.6	15.614

NOTES:

a) Distance in miles from Chicory Control Board.
b) At 44/- per 100 lbs (First Grade)
c) Calculated at 1/- per bag (120 lbs wet root)
d) 1/- per 100 ~~kgs~~ lbs. (Balancing levy not included)
e) 2/6d. per 100 lbs (First Grade)
f) Road Rates (Contractors), see page 74, note e to Table XII.
g) Rail Rates (South African Railways) including 7/- per ton for transport to station
h) Road Motor Service Rates
i) 5/6d. per 100 lbs (1955-1956)
j) 4/4d. per 100 lbs dried root
k) No charges for interest or rent are considered as these figures were not available.
l) Apart from Alexandria, where 'C.C.B.' indicates cost for root dried by the Central Drier, all root is farm dried.

a fair soil, which is considerably fertilized, and intense cultivation lead to Greenbushes far exceeding any other region in yield per morgen. The Alexandria average yield masks very high yields from fertile well-watered coastal areas which are 'pulled down' by low yields from long-exhausted soils in the area.

Stage One costs per morgen vary from £55·25 (Greenbushes) to £28·55 (East of the Kowie). Portions of the 'labour' and 'bags' items are directly related to yield; labour rates also appear to vary regionally. On the tonnage basis Greenbushes (£14·72) comes out best, followed by Alexandria (£16·98). Other regions with low yields have higher costs per ton.

Distance from the Central Drier is significant in the costs of Stage Two. Per ton, East London has transport costs of £2·083; this region is followed by Greenbushes (£1·710) and at the other end of the scale is Alexandria with £0·57 per ton. All the items in Stage Two vary with the yield, which may be seen as significant in the differences in the total Stage Two costs. Greenbushes has costs per morgen (£35·707) more than double those of Alexandria (£17·792) which has a figure nearly £5·0 more than the Seven Fountains costs, only 5 miles further away. The most distant region - East London - has costs per morgen of only £12·388; they would increase greatly with a higher yield. Per ton, all regions are remarkably similar, the difference between each being entirely due to the difference in distance from the Board.

Total costs (which do not take into account either charges for interest on capital or rent) vary per morgen from £91·047 (Greenbushes) to £39·74 (East of the Kowie). Per ton, Greenbushes and Alexandria only are under £25; East of the Kowie and East London, due to low yields and the distance factor, are each in excess of £30·0.

The nett profit accruing per morgen is greatest in Greenbushes (£9·953). Alexandria averages £18·048 whilst East of the Kowie and East London produce chicory for a nett profit of under £16·0 per morgen. Distance and yield are reflected in the profit per ton. On

the one hand Alexandria and Greenbushes exceed £19-0; on the other East London and East of the Kowie are under £13-0 whilst East London receives a nett profit of only £9-161 per ton of dried chicory root.

As it was overwhelmingly Alexandria that fed the Central Drier with undried root, only that region is considered at this point as far as the Central Drier is concerned. Transport costs increase 3-5 times when undried root is sent to the Drier and drying costs are higher than the average farm figure. Profit per morgen (£33-85) falls to near the Sandflats/Sidbury level (£32-496) whilst profit per ton (£18-93) falls below that region's figure (£18-535).

In conclusion it is desirable to stress:-

a) that Alexandria (particularly those parts within 10 miles of the coast and those producers cultivating fertile soils) forms the geographical and economic core of the Chicory Industry, favoured as it is by low average total costs, low transport costs and good yields,

b) that Greenbushes by virtue of high yields gets (under the conditions obtaining in this picture) only a little less per ton than Alexandria and very much more per morgen and is, therefore, an economic appendage to Alexandria, albeit a geographical outlier and a relatively minor contributor,

c) that Sandflats/Sidbury is third in the regional list of profit per morgen and per ton, this position depending entirely on a yield which, under the rainfall conditions experienced and the soils of the area, must be difficult to obtain,

d) that Seven Fountains with lower yields obtains, by virtue of its proximity to Alexandria, average profits per morgen and per ton,

e) that East London due to distance and the use of poor soils is a very marginal area - economically as well as geographically,

f) that East of the Kowie is marginal economically and more or less marginal geographically.

These regional profit levels may be constrasted with those that would obtain if inputs (other than transport) were equal in cost over the whole area - i.e. if geographical differences in soil and rainfall,

relief etc. and differences in cultivation techniques and labour costs were non-existent. We may, for the moment, consider only a part of Fig. 15. Nett profit per ton decreases upwards on the left-hand ordinates scale from a maximum of £10; that is, the uniform average total costs figure per ton used is £25; costs are shown increasing on the right-hand ordinates scale. At £44 costs, the profit is nil if root is First Grade. The abscissae scale is distance in miles from the Alexandria Depot, and the sloping lines on the graph indicate various transport costs per ton, measured against the left-hand scale and increasing with distance for both undried and dried root.

Assuming all root is sent dry, with this uniform cost and quality the profit levels are different regionally from those actually obtained by the following significant amounts:-

Alexandria : -£1.1; Greenbushes : -£1.9; East of the Kowie : +£6.2; East London : +£7.9; Sandflats/Sidbury : -£0.1; Seven Fountains : +£3.0.

9. THE DEMAND ANALYSED

The trends in the demand for chicory are briefly stated, together with an outline of the products in which chicory reaches the consumer. The demand trends of the past few years are discussed with reference to the price of the products, and the apparently unstable demand since 1950 is examined. Finally, the possibilities of exporting chicory are considered.

TRENDS IN THE DEMAND

The average annual importation of chicory over the period 1870-1874 was 527,000 lbs.; a gradual increase in the demand for the product is reflected in the increase in the importation total. The annual average for 1904-1908 was 1·4 million lbs. For the period 1910-1914 the average was 2·2 million lbs. annually. The former figures are for the Cape of Good Hope only and do not include Natal imports through Durban whilst the latter total for the Union of South Africa was, of course, further supplemented by commercial production on a small scale in South Africa.

Between the wars the demand, measured in terms of the combined imports and local production, rose from some 3 million lbs. in the early twenties to 4·8 million lbs. (average annual total for 1923-1927). In the period 1936-1938 the figure was 4·5 million lbs.

During the Second World War possibilities of importation were severely restricted and local production increased from under 2 million lbs. in 1941 to over 6 million in 1944. This was in spite of the general shortage of chicory seed which caused the supply to fall short of the demand.

In the period 1946-1949 manufacturers purchased about 10·5 million lbs. per annum whilst during the years 1950-1956 the annual demand increased by some 65 per cent to 16 million lbs.

The steady rise in the demand over the years would appear to be due to the gradual increase in the proportion of chicory that is mixed with, mainly, coffee.

Chicory is marketed in one of the following general groups:-

i) Coffee mixtures - with a chicory contribution of less than 25 per cent of the total weight,

ii) Coffee-chicory mixtures - with chicory between 26 per cent and 50 per cent,

iii) Chicory-coffee mixtures - with chicory the larger proportion of the mixture,

iv) Chicory-cereal mixtures - with chicory considerably over 50 per cent of the mixture.

The present consumer demand is divided approximately as group i) 22 per cent; group ii) 47 per cent; group iii) 24 per cent and the chicory-cereal mixtures about 7 per cent. This last group is overwhelmingly a demand from the gold mines and certain other industries employing African labour.

Though statistics are not available to show periodic variations in the levels of demand for the groups, it seems clear that present emphasis on approximately 50 per cent chicory and coffee has arisen due to the relatively high price of coffee. Consumer sales resistance to high coffee prices has obliged manufacturers to increase chicory as a proportion in the mixtures; this has clearly expanded the total demand for chicory.[1] One manufacturer has stated: "The demand for chicory is relatively constant and is not so much influenced by the price of the chicory as by the purchasing power of the public. Since 1953 there has been a constant change-over in the public's taste or demand from mixed coffees with 25 per cent chicory maximum to mixtures of coffee and chicory with higher percentages of chicory, 50 per cent and more.[2]

It is not possible to assess the influence of tea prices in recent years: they may have caused a slight general switch to more coffee (and so more chicory).[3] Tea import prices per ton increased

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[1] Sample retail prices per lb. for the groups are: i) 5/7d. ii) 5/0d. iii) 4/0d. iv) 2/0d. Pure coffee retails at about 6/9d. per lb

[2] Correspondence, dated 30th July 1957.

[3] As might have been expected, when tea came off the ration in the United Kingdom in 1952, the consumption of coffee fell. Nix (1954) showed that such a change in demand affected chicory: the factories had such large stocks on hand that when they came to issue contracts to farmers for 1953 they offered a lower price per ton and contracted for smaller quantities than for previous years. Fenland farmers are keen to grow chicory and the processors are in a monopsonistic position.

from £169 in 1945 to over £400 in 1950. The value of coffee imports rose per ton from £56 to £353 in 1951. Chicory prices were £35 per ton in 1945 (First Grade) and £44 per ton in 1950.[1]

As it appears that in general the demand for chicory is related to the relatively high price for coffee, it is pertinent to consider the consequences of further price changes in coffee and chicory. Such changes may well have repercussions on the types of mixtures in demand.

A substantial drop in coffee prices would probably see a substantial drop in the demand for chicory-cereal mixtures; a decrease could also be expected in the chicory-coffee mixture group. The consequences of such changes on the total demand for chicory might well be offset by increased sales of coffee mixtures and possibly coffee-chicory mixtures. The palates of the consumers will determine, in the event of this price change, just how much chicory is required. If, as is likely, coffee with chicory is an acquired taste, the total demand is likely to be much the same as at present.

A change in chicory prices would, no doubt, meet an equally inelastic demand. It is difficult to see how manufacturers could buy, and sell, more chicory should it be offered at a lower price. One manufacturer stated: "In my opinion, the consumption of mixtures with large percentages of chicory (50 per cent and over) is not likely to increase much more (if at all) per capita of the population." If, however, the price were to increase substantially (relative to coffee prices), there might well be a tendency to use less chicory and more coffee in the mixtures.

The apparently unstable demand of the past six years (see Fig.4) must now be analysed. In 1950 manufacturers implemented their stocks so that they themselves carried at least one quarter of a year's supply, a procedure that was agreed to by the Chicory Control Board and the manufacturers. This additional 25 per cent together with the 1950 demand was met in that year by local production and heavy

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[1] The actual price paid depends on the monthly increases for storage charges.

importations: the actual consumption in 1950 was of the order of 15 million lbs.[1] The amount purchased by manufacturers in 1951 reflects the fact that the estimates of the manufacturers' 25 per cent (made at the end of 1949) were over-estimates: thus their stocks were reduced to a normal figure and the chicory actually consumed in 1951 was again 15 million lbs. The 16 million lbs. taken in 1952 show an increase in the demand for chicory, and to the 1953 figures as shown (some 12 million lbs.) must be added a further 3 million lbs. consumed from manufacturers' stocks, again giving an annual consumption of 15 million lbs. The 1954 level of demand represents the normal demand and, once more, the replenishing of stocks, and the actual consumption was about 17 million lbs. The 1955 figure reflects the over-estimation of the stock order in 1954 and the fact that 1955 in the accounts was a nine month period only. In 1956 the 16 million lbs. plus represents the actual consumption.

The 1956-1957 contracts were for 13·3 million lbs.; 17 million of this was estimated as actual consumption. Recent data reveal that manufacturers actually bought 19.7 million lbs. The Industry's carry-over was reduced to 0·8 million lbs. This increase in demand, on the basis of contracts for the 1957-1958 season, will persist into a second season at least.

One major buyer by increasing his annual purchases from 3·9 million lbs. to 7·6 million lbs. is almost entirely responsible for the over-all increase in demand. A new firm, continuing its expansion, took in 1955-1956 ·2 million lbs. and in 1956-1957 over ·6 million lbs. It would appear that these increases are not solely due to these firms selling to more and more of the market; possibly 'lines' with greater proportions of chicory are being pushed by them.

It is worth remembering that most chicory buyers are also tea

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[1] The influence of financial policies was also felt in 1950: the abnormal demand was partly due to a scheme whereby the Government strove to save foreign exchange by granting exchange for 2,500 tons of chicory instead of the same amount of coffee.

and coffee manufacturers and the relative price changes of all these substitutes are under close scrutiny. A recent switch from an annual purchase of chicory amounting to .7 million lbs. to one of only .2 million lbs. is apparently the result of a change of policy in one firm on the death of the senior partner who was closely associated with the Chicory Industry.

TABLE XXIII

ACTUAL CONSUMPTION OF CHICORY BY MANUFACTURERS, 1950-1957
(lbs.)

1950	15,000,000
1951	15,000,000
1952	16,000,000
1953	16,000,000
1954	17,000,000
1955	17,000,000 a
1956	16,000,000
1957	15,000,000

Source: Correspondence with Manager of Chicory Control Board
Note: a) Calculated as for a full 12 months.

An aspect of the demand which must be recorded is the manufacturers' constant desire for a better quality product. "Overseas roots are still superior in quality" according to one manufacturer. As the manufacturers are denied the right to import overseas roots[1] (should they wish to), the greatest attention should be paid to improving the qulity of the root that, when available, they are obliged to purchase.[2] The Control Board, which includes manufacturers' representatives, appear to be aware of this need for improved quality.

In summary it may be noted:-

a) that the increase in demand over the years has been primarily due to the relatively high price of coffee,

b) that the over-all demand for chicory has been relatively

1 "The manufacturers wholeheartedly supported the appointment (in 1948) of the Board as sole importer and distributor of chicory root, which appointment took place mainly at their insistence." Annual Report, C.C.E. 1952.

2 Manufacturers are 'obliged' to contract with the Board only in the sense that they have no alternative, as supplies from outside the Proclaimed Areas are insignificant.

stable from year to year,

c) that manufacturers' carry-over stocks have assisted them to meet their requirements in poor seasons and in following good seasons manufacturers have bought chicory above the general demand level,

d) that the over-all demand for chicory is more or less inelastic as well as stable, i.e. it will not increase or decrease noticeably if the price is lowered or raised respectively,

e) that any increase of the price of local chicory might, however, meet with claims for the right to purchase better quality chicory, when available, on overseas markets,

f) that an expanded demand by the largest single purchases of chicory suggests that the average annual requirements of chicory for the Union will rise, perhaps temporarily, however, to 18 million lbs.

g) that a drop in demand of the same proportions as the expansion noted in f) would seriously lower the over-all demand.

With the existing Control Board, it is through the fixed price, the grading standards and so on that the features of the demand affect the supply. The Board would surely be open to criticism if its policies were not promoting flexibility and quality of supply in relation to demand.

EXPORT POTENTIALITIES

The capacity of the Union's chicory farmers to produce sufficient root in years of normal rainfall to meet the demands of the internal market is beyond question. A tendency to produce a surplus to the demand has characterised the past few seasons. As a result there has been more than a casual glance at the possibilities of exporting surpluses and, indeed, at the possibility of regular exportation of the root. It is misleading, however, to group chicory, as van Vaasdijk (1954) has done, with other agricultural products that are "only exported in so far as there is a surplus". It is relevant to consider export potentialities.

The big chicory consuming areas are Europe and North America whilst in the Southern Hemisphere small quantities are used in New Zealand and Australia. Both Europe and North America produce chicory at prices which make export of South African root to them quite uneconomical. The 1955 selling price in Europe was £28 per ton, and it was calculated that in order to compete in Europe the farmers' price in the Union would have to be between £10 and £13 per ton.[1] The 1955 Union producer's price was, in fact, £48. 10. 0d. per long ton. It would clearly be misdirected resources that were used to produce chicory for sale in Europe. Similarly, no doubt, North American markets offer no prospects. A trial quantity of 1½ tons First Grade root was shipped to New Zealand in July 1955, but a market does not seem to have materialised there; indeed, the suitability of both Australian and New Zealand climates for chicory cultivation would suggest that the small quantities those Dominions require could be easily and economically provided by their own farmers.

The Asian countries do not consume chicory at all as far as is known. The availability of tea at low prices does not allow coffee as a serious challenge as a beverage. South America has, of course, little need of chicory. The best hopes of export markets appear to lie in the nearer African territories south of the Sahara.

A recent plea for the Government to campaign to expand the Union's agricultural markets in African territories[2] might result in the offer of a market for chicory direct from Alexandria. Should such exports require subsidisation from a stabilisation fund, exporting the dried product would be a doubtful economic proposition. Producers would be ill-advised to create a surplus over the internal demand if such a surplus had to be exported on, say, the same basis as maize surpluses. Dairy, meat and maize farmers have expressed

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[1] Annual Report, C.C.B. 1955.

[2] Made at the Annual Congress of Cape Province Agricultural Union; reported in Eastern Province Herald, 5th September 1957.

concern about "detrimental" exporting. In any event, wherever a demand might be found, the South African root would be in competition with the surpluses from the European countries.

Of greater promise than exporting the dried root is the possibility of opening up a market for chicory in the various coffee-chicory mixtures. This the manufacturers have undertaken to do.[1] No details of the developments are at present available. What is certain is that there will be little, if any, increase in the demand for chicory in the next few years and producers in the Union should plan to satisfy the known demand.

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[1] Annual Report, C.C.B. 1955.

10. COMMERCIAL FACTORS IN CHICORY PRODUCTION

The principal variable factor in the input/output ratios of the chicory regions has been shown to be transport costs to the Central Drier. Centralised collection of the root is, however, but one influence on the pattern of production and structure of the Industry that springs from organised marketing. In this Section other aspects of the Chicory Control Board's policy - so called commercial factors - are discussed.

GRADING

The process of grading an agricultural product is the sorting of the product into lots of uniform size or/and quality. The purpose may be a) to reduce total production, by eliminating lots deemed substandard, b) to maintain the price or improve it, by removing the depressing influence of the inferior article, c) to encourage the increased production of high grade lots in order, inter alia, to hold the market or extend it.

Whatever the reason or combination of reasons, it is desirable that grading take place near to the point of production so that the handling of unsaleable produce can be eliminated at the earliest stage possible.

Since the Chicory Control Board was inaugurated, grading has been a feature of the Industry and has been performed at the centralised depot at Alexandria.

The desirability of grading chicory for size was stressed by Johnson (1921): by means of trays with wire netting bottoms, grading into smaller and larger pieces of root was simply and effectively performed. Noethling and Spamer (1929) found that though grading for size was fairly common it was not done in all cases. They stressed the necessity to meet satisfactorily the manufacturers' requirements. As for grading for quality, this, they reported, was "almost unknown" in the history of chicory and, if there were to be a general and rapid improvement of the chicory produced (in order to attract manu-

facturers to the South African article), the better quality product should be able to command a better market price. The 1934 Commission suggested that the Co-operative should concentrate, inter alia, on quality grading. The N.M.C. Report on the Proposed Chicory Scheme (1939) reported, however, that steps taken to keep the standard of the quality high were inadequate.

The Control Scheme permitted the Board "to advise the Minister as to the conditions, regarding grades, standards of quality ... subject to which any chicory may be sold",[1] and since 1940 there has been much attention devoted to grading for quality. From 1940-1948 chicory payments were received by producers according to the grade into which their dried root fell - First, Second or Third. Furthermore, chicory might be rejected as undergrade. From 1948-1954 dried root received by the Board could, in addition, be graded 'Super'. Since 1954, when the Board itself started to dry some of the root, grading regulations have covered both wet root deliveries and the dried root. The grading specifications have been prescribed from time to time by Government notices (e.g. Notice No.2264 of 1948, Notice No.333 of 1953, and more recently, Notice No.2309 of 1956), and the general effect has been to improve the quality of the product offered to the manufacturer. Table XXIV shows the proportions of each season's crop that came within the different grades.

TABLE XXIV

THE GRADES AS PERCENTAGES OF THE LOCAL CROP, 1941-1957

	Super Grade	Grade I	Grade II	Grade III
1941	-	97	2.9	.1
1942	-	94	5.2	.8
1943	-	91.5	7.5	1.0
1944	-	49.4	37.6	3.0
1945	-	87	11.6	1.4
1946	-	90.1	8.3	1.6
1947	-	89.5	9	1.5
1948	-	90	7.5	2.5
1949	.3	92	5.5	2.2
1950	.9	92	5.4	1.7
1951	.4	93	5.4	1.2
1952	.8	93	5.7	2.5
1953	5.0	82	11.5	1.5
1954	7.6	73	16.6	2.8
1955	16	76	7.4	.6
1956	22	66	9	3
1957	32.7	40.5	22.0	4.8

Source: C.C.B. Records

The quality of the root is primarily dependent on a) the seed, b) the cultivation practices, c) the weather and d) the drying. The variations from year to year of the quality of seed available account for the poor 'quality' years (1944 for example) whilst the greater attention paid to drying and cultivation practices is mainly responsible for the general improvement in quality.

By means of price differentiation between grades the Board has been able to stimulate the general improvement of the quality of the root, (as well as affect the total plantings). The price levels on Fig. 4 clearly indicate the Board's intentions and from Table XXIV the results may be judged. The 3/- per 100 lbs. increase for First Grade chicory and the 2/- per 100 lbs. decrease for Third Grade declared for 1945 followed the low quality distribution of the 1944 chicory and were followed in 1945 by improved quality. The additional reward for Super Grade (2/- over First Grade price) had little to show in the proportion of the crop graded as Super from 1949-1952. From 1953 onwards price differentiation between First and Super of a further 1/- clearly had the desired effect; the increase from 5/- to 7/- of the First Grade above the Second Grade also had the result of reducing the proportion of lower quality root received by the Board. Of the 5·6 million lbs. dried root treated by the Central Drier in 1955-1956 over 66 per cent was graded Super; together Super and First made up 93 per cent of the root dried at the Control Board. 95 per cent of all Super Grade chicory in 1955-1956 came from the Central Drier.

The statistical data of rejected root are patchy. Prior to 1950 all rejected root was retained and sold at the end of the pool year. Latterly, however, the size of the crop and the limited available warehouse space have meant that chicory rejected by the Board as undergrade has been destroyed either by the Board or by the owner. Chicory delivered to the depot could have been rejected on other grounds (viz. too many long pieces, clods, scorched, too high moisture content) in which case it would have been taken away by its

owner, treated in a manner suitable to the nature of rejection and again delivered, and accepted.

Clearly linked with grading are cutting and washing, and producers wishing to obtain a high grading for their dried root have had to spend capital on the necessary machines, as well, of course, as making their driers efficient. In fact, they are competing with the Central Drier in the grading 'stakes'; as the Central Drier becomes more and more efficient and as the washing and cutting facilities there are improved, so the standards demanded of Super Grade can be raised, and the producers drying their own root must improve accordingly or be content with root of grades other than Super.

The available evidence suggests that the best of the farm kilns with washing and cutting facilities of a high standard can produce chicory which is graded as Super. One of the biggest producers near to Alexandria calculates his drying costs as 4/- per bag and had the satisfaction of obtaining mostly Super Grade in 1956.

On the other hand, producers who are not prepared or able to invest about £2,000 for a moderate sized kiln and good cutting and washing equipment,[1] and who dry in less efficient kilns and cut with machines that (now) do not produce the optimum sized pieces feel they have little chance of receiving a high grade for their consignments of dried root. This is clearly so. Producers within 'drying distance' of Alexandria without good facilities have the choice either of using their less efficient equipment and receiving a lower rate for their dried root when it is graded at Alexandria, or of cutting their losses on their own equipment and despatching as much of their root to the Central Drier as possible. That many choose the latter and that many wish to be able to send all their wet root to the Drier was mentioned earlier. The proposed extension of the Board's drying

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[1] The washing machine alone is reckoned to cost each farmer £500.

should enable the wishes of these producers to be met.[1] The Board stated: "The consensus of opinion is that the drying done by the Board is entirely satisfactory in respect of the financial side to the farmer, consequently only a small minority would continue drying in their kilns on the farms if the Board were in a position to handle their whole crop ... some desire the Board to acquire adequate drying facilities to dry at least as much chicory as is offered to the Board and can reasonably be determined in advance."[2]

Those producers situated beyond the 'drying distance' have, however, a more difficult choice. They can send their undried root to Alexandria, incur very high transport costs, receive, possibly, First Grade for their consignment and take low profits. They could, secondly, invest in the necessary equipment to ensure high grading of their root according to the standards in operation; thirdly, they can receive low grading for the root they dry themselves and thus low profit margins, with their present equipment. Investing in modern equipment is not popular because of the constantly changing grading regulations; some producers who were encouraged by the Board to buy cutters in 1953 found that later grading regulations rendered the cutters obsolete.[3] Both the first and the third choices strongly suggest a readjustment of farming resources and the leaving of chicory. That readjustments have occurred in various regions will be shown in the next Section.

There has been some abandonment of chicory by growers within drying distance of Alexandria on the score of grading. The comment of one producer may speak for such growers: "I discontinued producing chicory because I am of the opinion that it is not worthwhile when one has to abide by so many rules and regulations. For me the good old days of chicory production have gone."

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1 It is not possible, however, to effect a smooth flow of root to the Board, a proportion of the harvest during the peak months will still have to be dried elsewhere.

2 Annual Report, C.C.B. 1955-1956.

3 It is possible, however, that such cutters (42 were imported in 1952-1953) were, in fact, in need of replacement or re-equiping anyway.

Deliveries of undried root to the Board are not, in fact, given super grading. The undried consignments are not uniform and adjustments in weight have to be made. The individual consignments receive credit for quality; this credit is given in the form of weight increase on a tabulated basis. On the other hand there is a debit for inferior quality, also on a tabulated scale in the form of weight decrease, with the proviso that root below certain standards is rejected. In other words, for normal quality there is no adjustment, for good quality a certain percentage is added to the nett weight of clean root and for inferior quality a deduction from the nett weight of the clean root is made. Thus the good quality undried root earns its producer more than the poor quality undried root.

PRICE FIXATION

The Control Scheme allows the Board to fix prices for the different grades before the season starts and the fixed prices have generally been announced a few weeks before the pool year. For instance, the prices for the year ending 1938 were fixed by Government Notice 2987 of the 24th December 1952.

The very existence of guaranteed prices has encouraged production of chicory root, and some producers have indicated that this factor alone makes them insensitive to price changes - either poorer prices for chicory or temporarily better prices for other agricultural products. One parliamentarian asserted that a fixed price system in agriculture would cause increased production eventually giving a surplus.[1]

From the years of earliest production, chicory growers have sought fixed prices and have been advised to co-operate with manufacturers before they actually planted the root. Thus King William's Town farmers (1895-1913) were associated with the King William's Town coffee/chicory factory, and Bethal farmers with Pretoria interests

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[1] House of Assembly Debates. Cape Town, No.4, Column 1091. 3rd February 1937.

(1929-1933). The movement that led to the Co-operative Society was born out of dissatisfaction with prices that fluctuated with the supply (which could never be foretold) in the face of an inelastic manufacturing demand. The 1932 Report believed that fixed prices should be at levels not too attractive in return to producers less embarrassing surpluses accrued. In 1940 when fixed prices were under consideration it was pertinently recalled that the Industry was entirely dependent on the South African market.[1]

The effects on quality of the price levels fixed since 1941 are mentioned above. Any increase in the price level has been an encouragement to producers cultivating at a lower profit margin; conversely a drop in price, lowering the profit margin, has been a discouragement to economically marginal producers. The effects of price changes on annual and regional production are considered in a later Section.

Though there has been no decrease in basic price per 100 lbs. paid to the producer since 1932, there has been a reduction in the price received by the producers for the whole of their crop. This has resulted from stricter grading and may be illustrated from the experience of recent years.

In 1955 the price paid to a producer for 10,000 lbs. of dried chicory in the proportions of 16 per cent Super Grade, 76 per cent First Grade, 7·4 per cent Second Grade and 0·6 per cent Third Grade was:-

£640	0	0	(16 x 47/6) for Super Grade
£167	6	0	(76 x 44/-) for First Grade
£13	3	10	(7·4 x 37/-) for Second Grade
	18	0	(0·6 x 30/-) for Third Grade
Total:	£821	1	10

In 1956, with the same basic prices but stricter grading regulations, the former delivering 10,000 lbs. of dried root (of quality in the proportions of the total crop) received a total gross return of £212. 0. 0. This was made up as follows:-

[1] Annual Report of the Department of Agriculture 1940.

£52	5	0	(22 x 47/6) for Super Grade
£198	12	0	(66 x 44/-) for First Grade
£16	13	0	(9 x 37/-) for Second Grade
£4	10	0	(3 x 30/-) for Third Grade

Allowing for levies, the differences between the two years is greater. In 1955 the rates and totals payable were:-

16 x 2/6d. for Super Grade	= £2	0	0
76 x 2/6d. for First Grade	= 9	10	0
7·4 x 2/- for Second Grade	=	14	10
0·6 x 1/6. for Third Grade	= .		11
Total:	£12	5	0

In addition to these a special levy of 6d. per 100 lbs. on all raw dried root was imposed. The total levy charge was therefore £14. 15. 9. and the price received for 10,000 lbs. dried root £206. 6. 1.

In 1956 the levy rates remained the same and levies due were calculated as follows:-

22 x 2/6d. for Super Grade	= £2	15	0
66 x 2/6d. for First Grade	= 8	5	0
9 x 2/- for Second Grade	=	18	0
3 x 1/6d. for Third Grade	=	4	6
Total:	£12	2	6

The special levy rate was changed from 6d. per 100 lbs. of dried root to 1/- and added £5. 0. 0. to the levy charge, bringing the price paid for the 10,000 lbs. dried root down to £194. 17. 6d.

The drop in price from 1955 to 1956 of £9. 1. 10. on producers' earnings is thus made greater when levies are taken into account - it is a drop of £11. 8. 7. On the same basis the gross profit in 1956-1957 for 100 bags dried root would have been £198. 4. 0., a slight increase on the previous season but still below the 1955 level. Clearly, the quality of the root a farmer achieves is significant in his input/output ratios. The regional significance of this is considered later.

Price stabilisation: it is worth noting here that fixation of prices has by no means stabilised the income of either the Industry or the individual farmer. On the contrary, as the supply is, in the

last resort, dependent on the weather and is therefore unstable, fixation of prices has meant considerable instability of producer incomes.[1] Their instability may be seen in Table XXV where the price fluctuations from year to year of First Grade (which has normally formed the bulk of the output) are set against the income changes from year to year based on the First Grade delivered.

TABLE XXV

PRICE AND INCOME FLUCTUATIONS, 1941-1956

	a.	b.		a.	b.
1941	(24/- First Grade)	(1.4 m. lbs.)	1949	0	-13
1942	+12	+ 371	1950	+ 17	-32
1943	+11	+ 106	1951	0	+ 585
1944	0 (no change)	- 35	1952	0	- 146
1945	0	+ 69	1953	+ 6	- 32
1946	0	- 13	1954	0	+ 191
1947	0	+ 47	1955	0	+ 10
1948	0	+ 8	1956	0	- 19

Source: C.C.B. Records

Notes: a) Per cent Price change on Previous Year
b) Per cent Income change on Previous Year

No allowance may be made for increased or decreased plantings; ideally, one should set income per morgen for each year against the price per 100 lbs. to illustrate the instability of incomes in spite of the stability of prices. The effects of an increased proportion of Super Grade have been ignored; in 1955 the percentage increase in income would have been substantially greater than shown in the table whilst the 1956 drop would have been considerably smaller.

PAYMENTS SYSTEM

The Chicory Control Board sells the chicory it buys from the producers. The amount so realised, less the costs incidental to the

[1] As Bauer and Yamey (1957) have pointed out, incomes may, in fact, be destabilised when prices are stabilised and may fluctuate more widely than would otherwise have been the case if, as often happens, variations in market prices move inversely with the size of crops, compensating or even over-compensating for changes in output from year to year.

to the sale of the chicory,[1] is distributed among the producers according to their individual deliveries in respect of weight and grade.

Furthermore, the Board may, with the approval of the Minister, make advances to producers who deliver root for sale, such advances being, of course, in proportion to the quantity and grade of root delivered.

Two points are relevant to this study of production. The voorskot (advance payment) was fixed at 60 per cent of the value of the chicory delivered; in 1953 the maximum advance permissible was increased to 80 per cent.[2] Secondly, the agterskot (final dividend) may be paid out only when the pool is closed (i.e. when all the chicory delivered in the pool year is sold) and has, generally, made the price to producers up to the declared level.

The voorskot has been varied from time to time, since 1953. The agterskot is normally paid out shortly after the close of the pool year; this has not been possible in certain years since 1951.

TABLE XXVI

VOORSKOT AND AGTERSKOT PAYMENTS, 1950-1956

Pool Year	Voorskot	Agterskot	Delay in Payment	Not Paid
1950	60%	40%	nil	nil
1951	60%	20%)	nil	nil
		20%)	10 months	
1952	60%	20%)	1 month	nil
		20%)	4 months	
1953	80%	40%	nil	nil
1954	80%	20%	nil	nil
1955	70%	25%)	6 months	1·2%
		3·8%)	9 months	
1956	60%	30%)	5 months	·9%
		9·1%)	7 months	

Source: C.C.D. Records

The influence of the general trading position since 1950 is reflected in the details of Table XXVI.

[1] These incidental costs include all and every cost and charge directly incurred in connection with the receipt, handling and financing and disposal of the chicory and the conduct of the pool.

[2] Proclamation No. 262 of 1953.

The voorskot percentage changes represent policy changes; the agterskot delays are the inevitable financial results of over-supply. The change from 60 per cent maximum advance to 80 per cent was made "with a view to encouraging production".[1]

The capital invested in chicory cultivation plus the profit from sale of the product do not increase in proportion to the delays in their payment to the producers: in fact, of course, there is loss of interest. This, then, must be added to the costs of production and reduces the profit margin. According to the individual's costs, the agterskot may represent all profit alone, part only of the profit or profit plus part of capital invested.

The recent surpluses over annual demand have, in fact, led to the position where a) the producer has no guarantee that he will receive the full fixed basic price and b) the producer has no idea how long he will have to wait to get his agterskot. That this is a factor influencing planting will be obvious and, in general, the smaller farmer who has regarded chicory as a cash crop and the farmer with a low profit margin have tended to leave chicory production whilst the medium-sized farmer has reduced his investment in chicory. Investment of capital, where natural resources permit it, has been made in other agricultural lines.

The problem first arrived with the large 1951 crop. Whereas previously the pool had been cleared on time and the agterskot paid out shortly afterwards, in that year the Board could not close the pool until more than a year after the end of the season. The 60 per cent voorskot paid out had been more than the amount received for chicory sold by the end of the year. The Board decided actually to pay a further advance of 20 per cent on the 1951 crop in January 1952 and thereby made it necessary for a loan to be raised. The consequent increase in pool expenditure (through interest on the loan) prevented the pool income meeting the final payment of 20 per cent and,

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[1] Annual Report, C.C.B. 1953.

desirous of continuing the tradition of paying the full basic price in the interests of the prestige of the Board and the "whole district", which had suffered severe losses as a result of damages caused by flood, the Board made full payment of the basic price by transferring £10,000 from the levy fund to a reserve fund and using £7,000 to meet the shortfall.

This practice was not followed in 1955 and 1955-1956 when the basic prices were not paid up 100 per cent. In 1955 extra costs incurred in preserving the chicory from beetle infestation prevented attainment of the full target prices. During 1957 advance payments were not paid on promulgated basic prices; it was decided that the value of the agtershot would be determined after the sale of the previous pool's carry-over and when the quantity of the 1957-1958 pools deliveries could be accurately assessed.

LEVIES

Finally, amongst this group of factors influencing supply, we must note that inaddition to the levies according to grade, which have remained the same since 1950,[1] special levies have been introduced in recent years. A special levy of 6d. per 100 lbs. on alldried root was imposed in 1955.[2] In 1956 this was withdrawn and a special levy of 2/- per 100 lbs. on dried root replaced it.[3] One of the purposes of the special levy is to create a stabilisation fund.[4] Inter alia, from the fund the Board could draw assistance to subsidise exports in times of over-production. These recent levies[5] are, of course, the result of over-supply and reduce the immediate profit margin to the producers.

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1 Government Notice No.118 21st January 1955
2 Government Notice No.92 13th January 1956
3 Government Notice No.533 23rd March 1956
4 The 2/- special levy actually comprises three levies: 6d. for the Price Stabilisation Fund; 6d. for Capital Expenditure and Redemption Fund, and 1/- as a Balancing Levy. Whilst the first two levies must be reckoned as costs against the gross returns on chicory, the 1/- levy is not deducted from producers' earnings unless, after the sale of the crop by the Board, the Board have an amount in hand which would permit payment to producers of more than 100 per cent of the basic price. Should this happen - probably as a result of increased efficiency at the Central Depot and lower costs - the Balancing Levy would operate and the amount in excess of the full price would be retained by by the Board under the terms of the Balancing Levy.
5 By Government Notice No. 2020 of 27th December 1957 a special levy of 2/6d. per 100 lbs. dried chicory was imposed, substituting for the 1956 Notice No. 533.

11. THE SUPPLY ANALYSED

The influences of price changes, grading regulations, central drying, voorskot percentages and delays of agterskot payments are now considered with regard to the total seasonal supply of chicory root and, in the latter half of this Section, with regard to the seasonal supply from the chicory regions.[1]

SEASONAL FLUCTUATIONS OF TOTAL SUPPLY

Excess of supply over demand threatens the stability of the Chicory Industry.[2] In recent years the Board has often had to report a surplus on the year's trading; this over-supply may be seen on Fig. 4. Assuming that for the time being no new markets will be found to absorb the surpluses, it is clearly the duty of the Board to estimate the reality of over-supply, to analyse the causes of it, to present its conclusions to the producers and to take action to prevent undesirable perennial over-supply. At the same time, it must be borne in mind that drastic remedies will pave the way for shortfalls should the weather prove unfavourable to normal yields for even two successive

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[1] The present writer would like to indicate that the difficulties of supply schedules have, it is hopes, not been overlooked in this study. As Giles (1955) has stated: "Given an income which he regards as adequate the farmer may take his ease; conversely a slump in farm prices may not persuade farmers to move into other occupations until bankruptcy drives them from their farms." He has also reminded us that there is no validity in discussing alternative uses and chicory prices under the ceteris paribus clause. All prices are, in fact, changing all the time. The data assembled here may, however, go some way to explaining supply fluctuations in the Chicory Industry.

[2] It should be noted here that since this study was prepared at the end of 1957 there have been indications that the demand/supply position in the Industry will have altered somewhat by the end of the current season, i.e. by 30th September 1958. It appeared likely during the first quarter of 1958 that the drought conditions then prevailing in the main chicory regions would result in a very small chicory crop. There was a possibility that the Board would have to import chicory in order to meet the local demand. However, on the 8th May 1958, the Daily Despatch, East London, reported: "Soaking rains have saved the chicory crop in Alexandria. Present indications are that the chicory crop this year will be sufficient to supply all the country's demands and it will not be necessary to import any chicory."

seasons; a number of consecutive bad seasons in all the chicory regions would undoubtedly necessitate importation, as in 1953.

How far can favourable climatic factors be held responsible for over-production? Undoubtedly they are the sine qua non of heavy yields in the Chicory Industry. Elsewhere the correlation of rainfall and yield has been stressed. We may now examine the climatic conditions and the chicory production of recent years.

The first-ever surplus of nearly 11 million lbs. in a total crop of 24·3 million lbs. occurred in 1951. The manufacturers had contracted for 13·5 million lbs. only, which was a lower figure than the actual consumption of chicory (see Section 9), and the producers had had the co-operation of nature in their efforts. Alexandria had a rainfall of 22·04" in the six months July-December 1950, and January 1951 saw a total of 3·72". In other areas the winter rains were equally good and necessary after the drought conditions of 1949-1950 (and the heavy losses and small crop of under 4 million lbs.). The plantings that had been made after the first winter rains of 1950 accordingly yielded heavily, exceeding the preliminary estimate of 14 million lbs. by 10 million.

The following two seasons were badly hit by adverse weather conditions. Floods were widespread in the Alexandria region, and for many producers the season's crop was a total loss. Fig. 12 shows the distribution of rainfall in all the chicory regions in 1952. The excess of supply over demand in 1952 was, in fact, caused by the exceptionally heavy carry-over from 1951.

In 1953 the poor deliveries from the local producers enabled the carry-over to be absorbed, and in 1954 the heavy crop of 18·4 million lbs. was taken up by manufacturers, mainly due to the shortfall in total supply in 1953. The 1954 crop, which included some deliveries from early plantings during March and April 1954, and the big crops of the following two seasons, were produced under generally favourable climatic conditions.

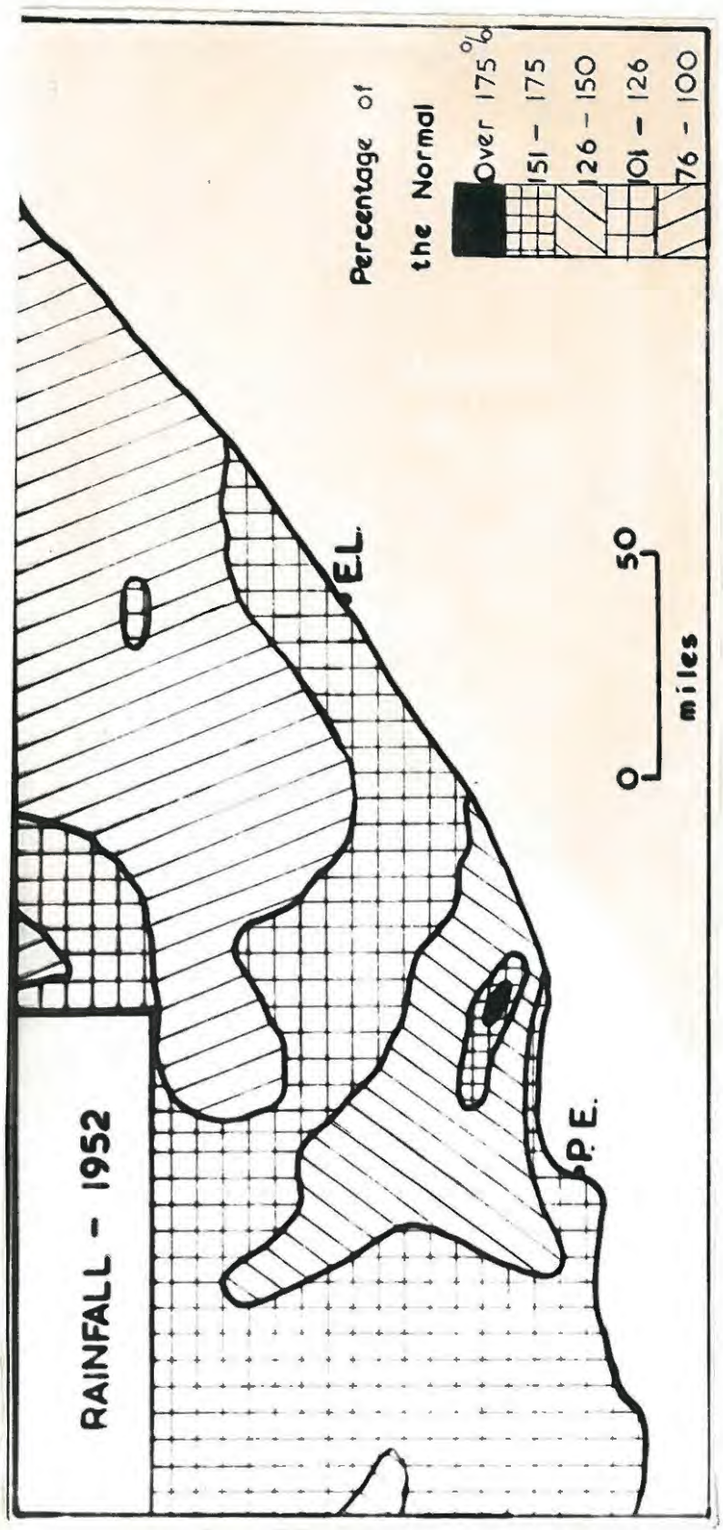

FIG. 12. 1952 RAINFALL IN THE PROCLAIMED AREAS AS A PERCENTAGE OF THE NORMAL

Source: Annual Report of Union Weather Bureau, 1952.

The intervention of nature between the farmer's hopes and his achievements is certainly shown clearly in the Chicory Industry for the years 1950-1956. Nature is indeed the 'final arbiter' with regard to agricultural output. But what precisely were the hopes? If they were normal, then it must be conceded that the weather alone caused over-supply. It would, of course, be foolish to tamper with normal hopes - at any rate for more than a season or two. If, however, there were intentions of producing a big crop, then the weather only abetted the fulfilment of the producers' plans to harvest a bigger crop - bigger, in fact, than the demand in weight warranted. In other words, was it only high yields per morgen that gave big crops or was it also an increased morgenage under chicory?

Failing lack of data on morgenage planted, the quantity of seed sold to farmers is of assistance in assessing the intention or otherwise to produce more. Table XXVII shows the quantity sold each year since 1950.

TABLE XXVII

SEED SOLD TO PRODUCERS OF CHICORY ROOT 1950-1957

Year	lbs.	Per cent of previous year
1950	30,621	149·4
1951	29,673½	96·9
1952	17,490	58·9
1953	21,394½	121·8
1954	29,243	137·1
1955	47,785	163.7
1956	28,692	60
1957	14,308	50

Source: C.C.B. Records

Notes: a) For the first six years seed was on ration to producers
b) In 1956 18,206 lbs. were not sold and 3,258 lbs. were returned to the Board on credit by producers
c) In 1957 10,981 lbs. were returned to the Board on credit.

The quantities of seed sold cannot be taken as an exact indication of the production desired by the producers. Earlier it has been mentioned that replanting due to damage caused by insects and/or high winds is often necessary in some chicory regions, so that heavy sales of seed do, in some cases, reflect this need to

replant. Furthermore, it is assumed here that seed bought by producers is seed planted.

In 1950 sales of seed were 50 per cent in excess of those in 1949 (20,500 lbs.). This increase is in some measure due to the replantings that were made necessary by damage through insect pests and strong winds, but it must be attributed primarily to the stimulus of increased prices.

The demand of over 18 million lbs. in 1950 was, however, met in major part by importation and the producers' reaction to price changes was frustrated. Thus when the rains came in July 1950, producers, for several reasons, planted heavily and bought over 30,000 lbs. of seed from the Board.

Thanks to the weather, the crop delivered in 1951 from these plantings was of record proportions (24·3 million lbs.), and with manufacturers taking only enough chicory to make their stocks normal there were 11 million lbs. unsold at the end of 1951.

The over-supply reacted on the producers in two ways: they had to wait for the carry-over from 1951 to be sold before they received their aftershot (see Table XXVI), and they had to pay out on storage and transport for part of this record crop as this item was borne by pool expenditure.[1]

The seed sales for 1951, again heavy and almost as much as the previous year, indicate that the producers were following up their expansion of chicory. The implications of the 1951 crop were not known, of course, when the seed was bought and planted.

The supply position in 1952 was, however, affected by the weather, as mentioned above, and the carry-over plus the poor crop of 1952 more than met the demand. In fact, the carry-over was 3 million

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[1] In the first five months of the year deliveries exceeded actual removals from the Board's premises by 120,000 bags - 75,000 of them had to be despatched to Port Elizabeth and stored there. At the end of the season a little over 73,000 bags were in storage at Port Elizabeth. The railage alone amounted to 9d. per 100 lbs.

lbs. Had the weather not been unfavourable, there is every reason to think that a large crop would have been harvested, presenting the Industry with the over-supply problem in an acute form.

Ironically, the seed sales of 1952, over 50 per cent less than either of the two previous seasons, yielded such a small crop that a more substantial carry-over from 1952 would not have embarrassed the Board in 1953. The expectations for 1953 were 10 million lbs.; the crop realised was 5·7 million lbs. Manufacturers' requirements totalled 16 million lbs., exceeding the total available supply. The available supply comprised 5·7 million lbs. from the local crop, 4·5 million lbs. from importation[1] and a 2·08 million lbs. carry-over. The increased prices to producers for 1953 were again out of reach, for the 1952 plantings were necessarily small due to the widespread floods.

In 1953 seed sales show the desire to reap a large crop, and the manufacturers had contracted to buy 20·8 million lbs. of root from the Board. Preliminary estimates of the 1954 crop (made in September 1953) indicated that 10 million lbs. would be produced; favourable weather conditions later prompted alteration of this figure to 14 million lbs. The 18·2 million lbs. that actually arrived induced the Board to cancel some of the 8·8 million lbs. it had ordered from overseas to meet the contracts, and the final imports were 5·6 million lbs. On the season's balance, therefore, the total supply exceeded the demand by 1·8 million lbs. This amount is, however, attributable to March and April plantings that were mature and ready for delivery in 1954.

Seed sold in 1954 amounted to all that was available (2,165 lbs. of the ordered 31,216 lbs. arriving late and being carried forward to 1955), and the weather assisted to give a local crop of 19·4 million lbs., making the total supply over 21·0 million lbs. of which 8·7

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[1] Contracts with overseas suppliers for a total 7½ million lbs. were not all executed; and when other imports were arranged they came early in January 1954 i.e. they are in the 1954 accounts.

million lbs. had to be carried forward.

The 1955 plantings were the heaviest on record, judged by the seed sold. Seed sales showed an increase of 64 per cent over 1954 and an increase of 50 per cent over the high figure of 1950. These seed sales were, however, due partly to replanting made necessary by adverse weather conditions and damage to young plants by insects. Some measure of the influence of this need can be judged from the fact that 8,000 lbs. of the 1955 seed sold were supplied in September of that year. Nevertheless, the 1956 crop, with the late plantings favoured by the weather, was itself greater than the demand by over a million lbs., and, in view of the 1955 carry-over, some 10·1 million lbs. were unsold at the end of the season.

Seed sales in 1956 were 40 per cent down on the 1955 figure, indicating the producers' awareness of the difficulties of over-supplying the limited market. Copious rains during September 1956[1] promised to turn the relatively restricted plantings into a bumper crop.

The 1956-1957 crop was 16·6 million lbs. - a decrease reflecting a considerable readjustment of the factors of production by producers as a whole. A heavy demand of 19·7 million lbs. not only absorbed the 1956 carry-over but took sufficient of the 1957 crop to reduce the carry-over for 1957-1958 to 6·8 million lbs. Seed sales in 1957 (for the 1957-1958 season) were only 50 per cent of the previous season's, and the expected crop is some 15 million lbs. If this is the actual crop delivered and the demand contracts are fulfilled, the carry-over at the end of 1957-1958 will be no more than 2 million lbs. The Industry will then find itself freed from the dangers of having a continually growing surplus but, perhaps, faced with the need to import should there now be a number of consecutive bad seasons.

From the discussion it is apparent:-

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[1] For example, Alexandria : 5·75", Bathurst : 6·11", Welbedacht : 4·57", Labgebosch : 4·08", Longvale : 5·13".

a) that the weather can make or mar the crop, and so cause under or over-supply, almost regardless of the total morgenage planted to chicory,

b) that there was over-supply by increased plantings - reinforced by high yields in 1951, 1955 and 1956,

c) that but for the total shortfall to manufacturers' demands in 1953 there would have been over-supply by local producers in 1954,

d) that had there been no importation in 1954, the manufacturers could have made up their stocks in 1955 and there would have been very little over-supply in 1955,

e) that in 1956 the position and its drawbacks (particularly the delay in payment of the agterskot) were sufficiently appreciated by the producers to induce them to plant less,

f) that a limited over-supply by local producers can be of value in satisfying demand if one or two poor seasons follow, e.g. the 1951 carry-over assisted the 1952 local production and had the effect of leaving 2·98 million lbs. of that crop free for 1953.

Taking point b) further, we must ask what factors encouraged the increasing of output. In 1950 chicory producers needed to make good their losses on the disastrous 1949-1950 crop, and they planted heavily in the autumn after the first winter rains of 1950. Possibly the major stimulus, however, to expanding the supply, was the general price increase in 1950; First Grade was increased from 35/- per 100 lbs. to 40/- per 100 lbs. This 14·3 per cent increase compared with an average increase of 15·3 per cent for all grades - sufficient, one might think, to encourage an increase in supply. The fixing of producers' prices at these higher levels could not be justified by the trading position of the 1949 season alone when over 70 per cent of the demand was met by local production. A further factor must have been anticipation of an increased demand.

The price level is obviously a factor, though not acting so directly as in 1951, in the big crops of 1954, 1955 and 1956. The basic price for First Grade chicory was increased for 1953 by 10 per

cent whilst Super Grade was increased by 11·7 per cent and Second Grade by 5·7 per cent. The Board explained this increase by asserting the considered opinion that production costs of chicory had increased (from 1951 to 1952) by 10-15 per cent. If this were so, the price increases should not be adjudged a decisive factor in over-supply. One might note that the 1953 prices have been held ever since. The increase of the voorskot from 60-80 per cent in the 1954 season was aimed at encouraging production, and, as has been mentioned earlier, such an increase assists quicker returns and higher profit margins.

The provision of drying facilities at Alexandria (see Section 7) appears without doubt to have stimulated production. Indeed, at the opening of the Drier it was stated that "this plant would enable farmers to grow more and better chicory".[1] In the Annual Report of the Board for 1954 no mention was made of quantity, however, when it was reported that: "By means of the Board's drying plant it is hoped that the adverse factors in connection with the farm drying of root will be eliminated so that an absolute uniform product of high quality will eventually be marketed. By relieving the farmer of the necessity of drying root himself, it is hoped that the labour thus saved will be directed towards the cultivation of root of the highest quality."

The Central Drying plant made labour and time available not only for better production but also for increased production. The speed of drying, which had also improved on the farms, permitted the production of greater quantities of root by the individual producer. The other adverse factors that were solved, or partially so, were the diminishing supply of wood for the farm kilns and the pressure on supplies of water on the farms.[2]

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[1] Farmer's Weekly, 22nd December 1954

[2] The following comments on questionnaires may serve to illuminate these points; it should be noted that they came from producers talking about themselves.
i) Labour is my worry and drawback.
ii) Would not grow chicory if I had to dry it myself - no wood!
iii) With the old type ovens, one took (say) three months to dry 300 bags, whereas now one can dry 300 bags in a month, with the result that a farmer grows three times as much and still dries for three months.
iv) In my circumstances, the Central Drier is an inducement to plant more. However, in the long run I ...

Relieved, then, of the restrictions formerly imposed by labour, fuel, and time, producers (or some of them) increased their output. Furthermore, would-be producers without kiln facilities (termed by some 'plot holders') could now produce chicory, having it dried at the Board or at a neighbour's. The fears that were expressed in 1951 that a big portion of the crop would have to be left in the ground to rot as the producers had not got the facilities or labour for drying it, were not likely to restrain production after December 1954.[1]

Contributory causes of over-supply by increasing yields[2] were:

a) the use of better seed,

b) the introduction of a semblance of rotational farming,

c) the judicious application of fertiliser,

d) the development of mechanisation,

e) the spread of the practice of ridging the rows.

The over-supply of 1951 was not regarded with concern by the Control Board. The Board's considered opinion was that the basic prices of 1951 "would be sufficient incentive to farmers to grow chicory, and that a reduction in prices would discourage them and be detrimental to the healthy development of the Industry."[3] The 11 million lbs. surplus from the 1951 crop plus a proportion of the 1952 crop would meet the 1952 contracts, and the surplus would be only 5 million lbs. at the end of 1952. From 'seed sales' indications it is clear that had the weather conditions been favourable the carry-over would possibly have been 15 million lbs. rather than 5 million lbs., with a total crop of about 20 million lbs. for 1952.

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1 Farmer's Weekly, February 1951

2 In Holland yields have increased steadily from an average of 16,000 kilogrammes per hectare (2·4711 acres) for the period 1861-1870 to 25,000 for 1931-1940. Bolma de Boer (1949) explained this increase entirely by changes in cultivation techniques:- preparation of seed beds (ploughing, harrowing, rolling), sowing of the seed (depth, quantity and distance of rows), quality of seed (particularly reduction of number of 'shooters'), cultivating (hoeing, thinning to optimum distance) and type selection for soil conditions. It is the cultivation techniques (plus the effectiveness of the rainfall) that account for the high yields in Europe, yields that are 2-3 times those obtained in the Union.

3 Annual Report, C.C.B. 1951.

But such embarrassments were not to be - at that stage. In fact, the 1952 crop was even less, due to the weather, than anticipated and the carry-over was reduced to a little over 27 per cent of what it had been at the end of 1951 and not only to 50 per cent as had been anticipated.

The weather of 1952, which hindered plantings in the densest production areas and in parts caused floods that persisted for weeks, obliterated thoughts of increased production. The Board had, in fact, to watch carefully in case importation was indicated by poor local production due to adverse weather conditions. The crop and importations of 1953 have been noted previously. At this point we may recall that a 'hang-over' (the carry-over from 1951) was also commuted in 1953.

After the importation of 5·6 million lbs. in 1954 and the aggravation of the problem of the adjustment of demand/supply relationships by delivery in 1954 of early plantings in April and March, the Board stated that a recurrence of the phenomenon would be most difficult in future years, and it took steps to adjust the pool year.[1]

The Board anticipated a 1955 carry-over of about 8 million lbs. (nine months delivery only) and undertook to "keep a vigilant eye on the situation in order to avert unnecessary over-production with all the subsequent evils which may arise from it".[2] When the carry-over of 8·7 million lbs. materialised, the Board stated that it "always aimed to have on hand a carry-over of approximately one quarter of a year's consumption" and that by doing so "even if farmers had to wait for their final dividends, it would be much better for the money spent in purchasing chicory to go to the farmers instead of abroad at times when shortages had to be supplemented by importation."[3] The Board declared that it had "saved thousands of pounds" by providing more storage, obviating outside storage, and that manufacturers were

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[1] The pool year was changed from January-December to October-September; 1955 was the 'sandwich' year of nine months, January-September.

[2] Annual Report, C.C.B. 1954

[3] Annual Report, C.C.B. 1955

undertaking the development of a market in Africa. Producers were told: "The demand for chicory is limited and a too large surplus for which a market cannot be found may be created. This is a definite danger to an industry which so far has brought prosperity to many farmers." The Board concluded that with "the ever-increasing proclaimed area, more effective production methods, scientific and mechanical advantages ... and last but not least, the many services placed at the disposal of the producer by the Board" there was great encouragement to the producers to cultivate chicory and that the result would inevitably be "the greatest difficulties ... in the marketing of the annual crop". The answer, it was stated, would have to be more rigid tests, in other words stricter grading. Meanwhile the voorskot retreated from 80 per cent to 70 per cent for the 1955 season.

By word of mouth the Board had opened its campaign against this over-supply during the 1955 season.[1] In 1956 all Registered Producers were advised that "destructive financial problems" might result from continued chicory production at the present rate.[2] The position was envisaged when the voorskot might decrease further and, in fact, when no advance payment might be made at all if the stock for one season proved sufficient for two seasons' demands.

The 1956 and 1957 plantings were less than those of previous years. The factors responsible for this producers' response may be traced to:-

a) the Board's advice to producers to divert part of their energies to other branches of farming (farmers were encouraged to return seed for credit, and 3,200 lbs. were returned in 1955-1956,

b) the actual decrease in price by stricter grading (see Section 10),

c) the low voorskot advance (see Section 10) and the possibility that there would be no advance under continued over-supply.

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[1] The first word of warning was given on 10th May.

[2] Circular dated 11th May 1956.

At the end of the 1955-1956 season the Board reviewed the tendency towards "chronic over-production", and noted that "in spite of unfavourable weather conditions and other factors" supply exceeded demand in 1955-1956 and that as a result the over-supply had increased so that 16 million lbs. would have to go forward to the 1956-1957 pool year. This section of the Report concluded: "An appeal has been made to producers, among other things, to develop other branches of farming in order to decrease the cultivation of chicory" (present writer's underlining).[1]

Echoing the Board, the Secretary of Agriculture warned against over-production in his annual statement.[2]

From the discussion it is apparent:-

a) that one half of the law of supply operated in the Chicory Industry, viz. that rising prices stimulate supply,

b) that the Central Drier was a major factor encouraging expansion of plantings,

c) that the immediate results of over-supply - storage expenses, yoorshot decreases and agtershot delays - acted against further expansion,

d) that, together with c) above, the stricter grading (particularly, the washing requirements) acted as a price decrease and proved for the Industry as a whole the second half of the law of supply, viz. that a decrease in price causes a decrease in supply.[3]

SEASONAL FLUCTUATIONS OF REGIONAL SUPPLY

The assertion made in the pages above is that these various economic and commercial factors manifest themselves in price changes. We may now turn to consider the elasticity of supply in the different chicory regions, for the varying spatial pattern of production is the heart of this survey.

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[1] Annual Report, C.C.B. 1955

[2] Annual Report of the Department of Agriculture, 1956

[3] It should be remembered, however, that for those individual producers unable or unwilling to divert their factors of production to other activities a fall in price for chicory means an increase in production. This produces a so-called 'backward-sloping supply curve'.

Price sensitivity on the part of the producer depends on many factors. The questionnaires show clearly that for certain producers chicory was, is and always will be their mainstay, and that they will not change intended output whatever the stimuli (within reason!). Ten producers within 20 miles of Alexandria, one 60 miles away and another 170 miles away put forward this policy (in answer to question 9 of Section 4).

Twenty-one producers, averaged together, indicated that a fall in price of 10/- on First Grade root (i.e. from 44/- per 100 lbs. to 34/- per 100 lbs.) would induce them to leave chicory cultivation. There was a noticeably lower figure for producers within 30 miles; and over 60 miles a fall of 5/- tended to be sufficient to persuade farmers to divert their resources into other lines.

There would be 10 per cent less chicory planted, apparently, if the price fell 4/- per 100 lbs. and 10 per cent more if it rose 5/-. As above, it was the more distant producers who appeared to be slightly more sensitive to changes, for a fall of 3/- would affect their plantings.

Little value can be attached to these figures, however, for, as producers have made abundantly clear, it is the whole aspect of the demand position, together with the alternative uses, which determines the fluctuations in supply (the 'tended supply'). That is to say, the fixed price, the over-supply position (voorskot, agterskot) and the grading standards combine to influence farmers in their decisions to plant more or less.

From the data available for the years 1955, 1956 and 1957, the whole position of demand/supply relationships may now be discussed.

The 1955 disposition of producers and production in relation to the Central Drier is shown on the pramilograph[1] Fig. 13. Proximity

[1] This term, with the emphasis on the second syllable, is coined to denote this special case of a scatter diagram or graph.

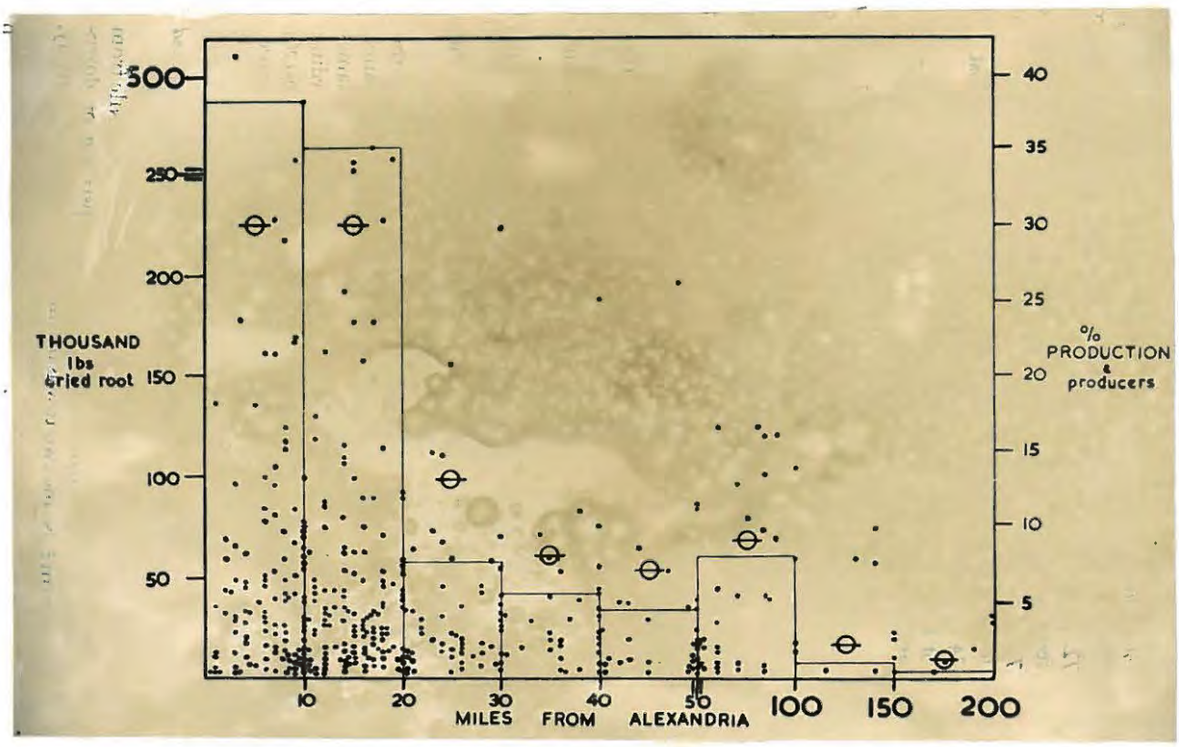

FIG. 13. PROMILOGRAPH SHOWING THE DISPOSITION OF PRODUCERS IN RELATION TO THE CENTRAL DRIER, 1955

The Columns indicate the proportions of the total chicory crop that are produced within 0-10 miles, 10-20 miles etc. of the Central Drier. The proportions of producers located within the same limits are indicated by the crossed circles (⊖). The changes of scale on both axes should be noted.

Based on C.C.B. Records.

to the Board is heavily stressed: 73·5 per cent of the total production came from producers situated no more than 20 miles from the Control Board, and 31 per cent from those within 30 miles of the Board. Some 60 per cent of the producers were within 20 miles of the Board, and 73 per cent within 30 miles. Only 1 per cent of the production, from 3 per cent of the producers, was delivered from places more than 100 miles away.[1]

In 1956 the total number of producers making deliveries rose to five hundred and ten from four hundred and forty-nine. This is attributable in some slight degree to the fact that the 1955 'year' was nine months only (January-September). Whilst fifty-five producers ceased production in 1955, there were about one hundred who delivered in 1956 who had not done so in 1955. Of these, some twenty at least were farmers who reentered the Industry, having last produced in 1954 or earlier. About twenty of the additional hundred in 1956 did not continue in 1957 (the total number of producers for this crop year is not available).

These changes resulted in a more marked localisation of production around the Control Board. As may be seen from the second pramilograph (Fig. 14) these 1955 producers who did not produce in 1957 (and many of them did not do so in 1956) include nearly all those Registered Producers further than 50 miles from the Board and about 30 per cent of the Registered Producers situated between 20 and 50 miles from the Board. The 'fall outs' in the 20 mile area are proportionally few. Furthermore, the writer has been able to ascertain that many of the 'fall outs' in this inner circle are more apparent than real - a change of ownership masking a farm's continued production.

Though it has not been possible to indicate on the graph the positions of the additional producers, one can state that of such producers in 1956 only two were over 100 miles away, and one of them

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[1] The eight hundred and nineteen Registered Producers in 1956 were distributed as follows:- Under 15 miles : 307; 16-20 : One hundred and two; 21-25 : fifty-nine; 26-30 : sixty-five; 31-40 : ninety-two; over 40 : one hundred and ninety-four.

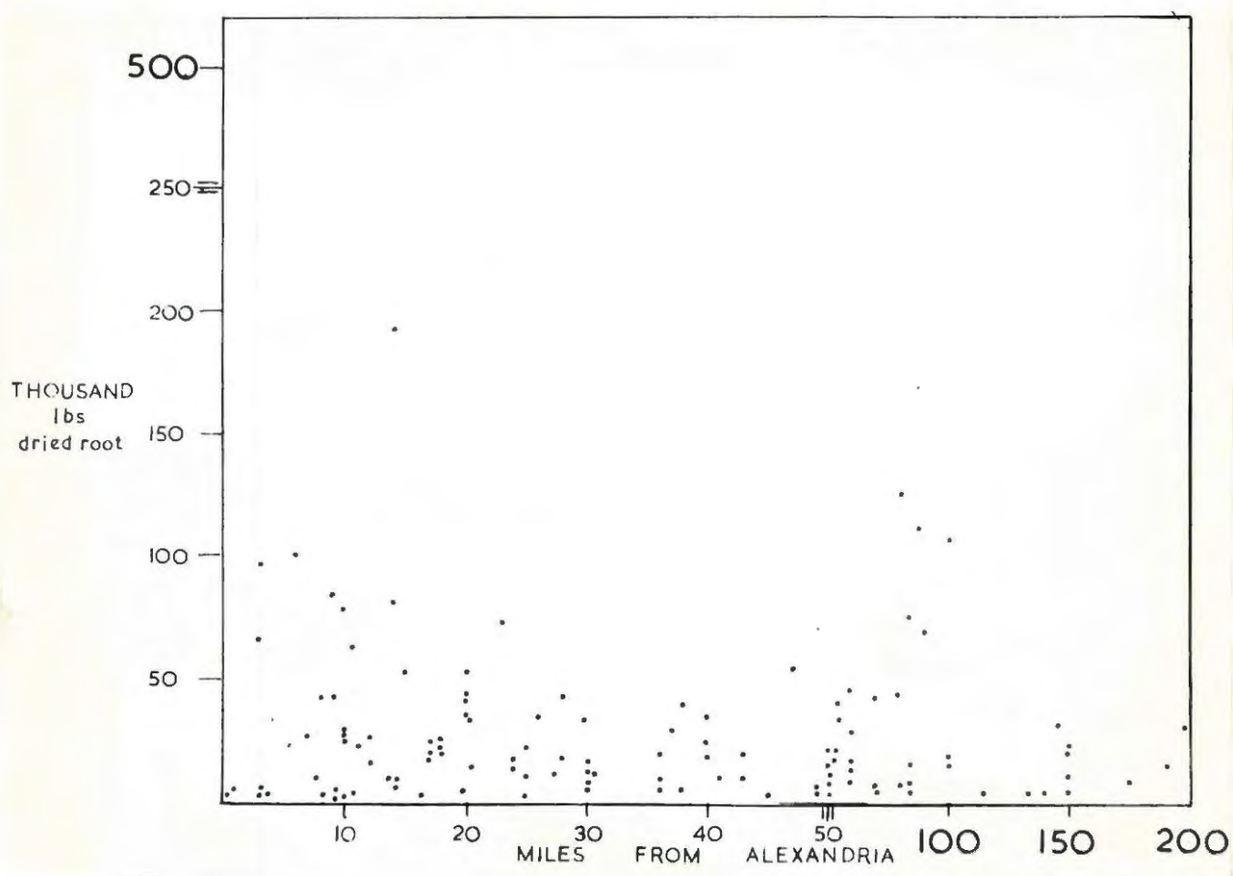

FIG. 14. PROMILOGRAPH SHOWING PRODUCERS, IN RELATION TO THE CENTRAL DRIER, WHO ABANDONED CHICORY PRODUCTION AFTER 1956 OR 1957

The changes of scale on both axes should be noted.

Based on C.C.B. Records.

did not deliver in 1957; seven to ten were 50-100 miles distant, and two of them did not deliver in 1957. The remainder were within 50 miles of the Board.

These changes, on a regional basis, have resulted in:-

a) East London and Greenbushes virtually dropping out of chicory production,[1]

b) East of the Kowie and Sandflats/Sidbury weakening as chicory supply regions,

c) Alexandria becoming even more dominant in chicory than before, with Seven Fountains remaining much as before.

In order to explain these trends it is necessary to consider that aspect of production which has hitherto been taken as uniform in relation to known input/output ratios and Central Drying developments, viz: quality of root. Quality has been mentioned elsewhere in connection with natural conditions, cultivation techniques, drying methods and commercial requirements. The Board has promoted, by price differentiation on a grade basis, the improvement of quality. Furthermore, the installation of a Central Drier, producing probably the best product of any of the driers in the Areas, has gone hand in hand with stricter grading until 95 per cent of all dry root graded Super came, in 1955-1956, into the Depot as wet root and 12 per cent of all the First Grade root was dried at the Central Depot. Only a few producers with the best of kilns and washing machines have been able to get Super Grade for their dry root. High grade is largely a function of quality drying.

Those producers whose profit levels drop heavily if they despatch undried root to the Board, and who, incidentally, pay a higher figure for drying, have tended to abandon chicory production in the last three seasons. From Fig. 15 it is possible to see for wet root deliveries a) the general effect of distance, and b) that

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1 There are probably fewer than half a dozen farmers producing chicory in both regions together during the current season.

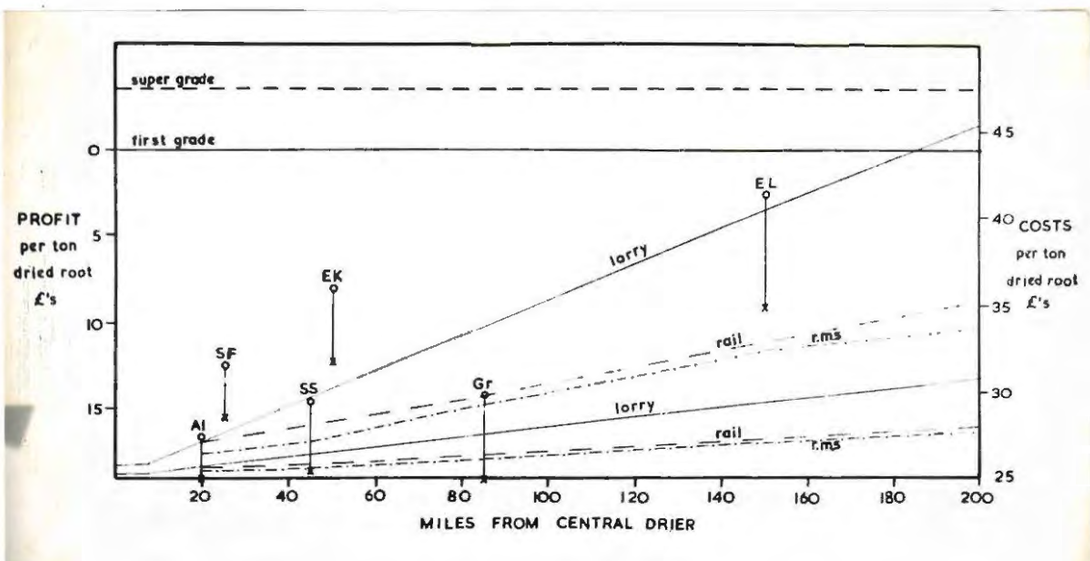

FIG. 15. NETT PROFIT AND COSTS FOR BOTH FARM DRIED AND BOARD DRIED ROOT AS FUNCTIONS OF DISTANCE FROM THE CENTRAL DRIER

The profit and cost levels for farm dried root are indicated by the lower sloping for each form of transport; for Board dried root they are shown by the upper sloping line.

No increase in the cost of drying has been allowed for when undried root is sent to the Board; handling charges have also not been altered. The Rail and R.M.S. (Road Motor Services) rates are to a slight extent "smoothed out" on this graph.

For each chicory region actual nett profit and cost levels when the root is farm dried and when it is Board dried are shown by a cross (X) and a circle (O) respectively; the difference between costs and profit under these circumstances may be gauged from the vertical line for each region.

The key to the regions is:-

Al : Alexandria
SF : Seven Fountains
SS : Sandflats/Sidbury
EK : East of the Kowie
Gr : Greenbushes
EL : East London

transport costs (of various sorts) increase 2·5 times, consuming profits in ever increasing amounts with increasing distances. The diversity of yields and costs modifies the pattern shown, and the vertical lines indicate the average profit levels for undried and for dried root for each region. As high quality kilns are only economic within the Alexandria region, where chicory provides 54 per cent of the gross cash income of farmers, those producers at a greater distance from the Depot who are obliged to dry their own root in less efficient kilns and use cutters not adapted to modern requirements and are generally without the aid of washing machines have had to accept lower and lower gradings for their root - and so lower and lower returns. Sample figures in Table XXVIII indicate this trend.

TABLE XXVIII

SAMPLE FIGURES ILLUSTRATING THE GRADING TRENDS OF FARM DRIED ROOT, 1954-1957

(lbs.)

	Super	First	Second	Third
Producer A (Greenbushes)				
1954	-	43,000	1,000	-
1955	-	104,000	12,000	2,000
1956	-	35,000	27,000	7,000
1957	-	-	26,000	-
Producer B (East London)				
1954	328	19,000	9,000	-
1955	-	29,615	992	-
1956	-	6,232	3,852	-
1957	-	-	-	-
Producer C (Sandflats/Sidbury)				
1955	-	53,249	3,776	-
1956	-	43,336	2,710	-
1957	-	5,618	52,613	-

Source: C.C.B. Records

The abandonment of or decline in production by individual farmers is not solely confined to the regions from which samples were used in Table XXVIII. As the pramilograph (Fig. 14) shows, a few nearby producers ceased chicory cultivation in 1956 or 1957. Even

allowing for the weather, the annual supply from individual producers is very variable. Decisions to plant more or less may be highly significant in terms of cash. One nearby producer - with alternative uses into which he was able to channel the released resources, and with a drier that served neighbours also - changed from producing an average of 440,000 lbs. of dried root per year to some 47,000 lbs. This represented a drop in annual chicory returns of about £8,000.

More common than such a decline when considering nearby producers is a) a switch to delivering at the Depot a greater proportion of wet root, and b) an increase (sometimes temporary) of total production. These trends result from the provision of the Central Drier and its high quality product. Sample figures for producers near enough to take advantage of the Drier are assembled in Table XXIX. All the producers, apart from F, are located within the Alexandria Chicory region; Farm F is East of the Kowie.

TABLE XXIX

SAMPLE FIGURES ILLUSTRATING TRENDS IN THE PRODUCTION OF UNDRIED & DRIED ROOT ON FARMS, 1954-1957

(lbs.)

	PRODUCER A.			PRODUCER B.		
	Dried	Undried	Total[a]	Dried	Undried	Total
1954	21,002	-	73,000	n.a.[b]	n.a.	n.a.
1955	59,505	-	-	11,000	-	-
1956	-	255,000	73,000	-	115,000	38,000
1957	-	238,000	68,000	-	54,000	18,000

	PRODUCER C.			PRODUCER D.		
	Dried	Undried	Total	Dried	Undried	Total
1954	162,000	-	162,000	61,000	-	61,000
1955	161,000	140,000	201,000	41,000	-	41,000
1956	5,000	250,000	76,000	47,000	57,000	72,000
1957	34,000	314,000	124,000	22,000	61,000	39,000

	PRODUCER E.			PRODUCER F.		
	Dried	Undried	Total	Dried	Undried	Total
1954	146,000	-	146,000	2,683	-	2,683
1955	n.a.	n.a.	278,000	32,283	-	34,283
1956	14,000	207,000	73,000	41,414	7,413	43,000
1957	-	986,000	282,000	n.a.	n.a.	n.a.

Source: C.C.B. Records

Notes: a) The total figure is of dried root; the undried root is converted to dried root in the ratio of 3·5 : 1

b) Not available

The present negotiations to install further central drying equipment, which will double the capacity of the Board to dry the producers' root, may well have, sooner or later, the following consequences:-

a) the Central Drying cost per 100 lbs. of root may decrease, for experience gained from the initial drier should reduce 'exceptional expenditure' to a minimum and costs of certain facilities, offices and staff etc. will be spread over a greater number of units of output,[1]

b) the grading standards may be made even stricter than at present, and producers may abandon their own kilns in order to obtain good returns on their chicory.

c) as a result of a) and b) and the problems of drying on the farms, producers may be desirous of having all their crop dried by the Board,

d) the producers for whom Central Drying will mean much reduced profit levels may seek alternative uses for their resources,

e) the producers favourably situated in relation to the Board for despatch of wet root may expand production, and farmers hitherto unable or unwilling to dry chicory may venture into the Industry,

f) there may be an expansion of the total output which, if not equalised by an increase in demand, may result in measures designed to discourage marginal producers. The Industry would then become the concern of a relatively few producers farming fertile soils in close proximity to Alexandria.

The regional data for such a situation - based on the average regional yields and costs (see Table XXII) - are shown in Table XXX. Whilst Alexandria drops less than £5 (13 per cent) nett profit per morgen when drying with the Board, Greenbushes falls over £20 (25 per cent). The percentage figure for East London is 72 and for East of the Kowie 33. Assuming a double yield, it is interesting to note

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[1] This fall in price is probable if i) water continues to be available cheaply, and ii) there is a controlled flow of root to the Driers, so that much of the peak period root is not lost to the Central Driers.

TABLE XXX

PROFIT LEVELS AND BREAK-EVEN PRICES AND YIELDS FOR FARM DRIED AND BOARD DRIED ROOT IN SIX CHICORY REGIONS

Chicory Regions	Nett Profit Per Morgen (£'s) with Average Yield		Nett Profit Per Morgen (£'s) With Double Yield		Break-even yields [a] (bags of 100 lbs dry)		Break-even prices [b] (£'s per ton)	
	Farm Dried	Board Dried	Farm Dried	Board Dried	Farm Dried	Board Dried	Farm Dried	Board Dried
Alexandria	38.048	33.85	102.596	92.22	c. 16	16-17	24.476	27.07
Greenbushes	73.953	53.585	188.5	180.345	26-27	33	24.256	29.705
East of the Kowie	15.26	10.135	50.4	44.05	15	16-17	31.781	35.73
East London	11.437	3.475	47.7	31.73	16	21	34.839	41.22
Sandflats/Sidbury	32.496	25.805	87.9	80.67	15	16	25.465	29.26
Seven Fountains	23.6	18.78	71.7	62.44	15	16-17	28.386	31.48

NOTES: a) With First Grade Price of £44 per ton dry root; b) With the average yield; c) All root is regarded as graded First; d) Details of methods used to arrive at these figures may be found in Appendix B (page 150).

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that the marginal areas revive considerably in the absolute and relative sense. Whilst for the Board dried chicory there is an increase in Alexandria's profits per morgen, when the yield is doubled, of £80 (100 per cent), East London's profits go up to £31.72, which is some 93 per cent more than with the average yield. (Producers with yields greater than their regional normals, as used in this study, can see their profits, more or less, from these figures. Furthermore, the statistics illustrate that costs per ton decrease with an increase of yield - at any rate up to a point.)

With all root attaining First Grade, one can see from the Break-Even Yield how many bags must be added to the yield when the Central Drier is used to ensure that total returns equal total costs. It is most significant in low yielding regions and more distant regions.

Though we have shown that First Grade (and, even more so, Super Grade) can be expected only by nearby producers of wet root and by farmers with considerable investment in the most modern equipment, it is still worth recording the different Break-Even prices per ton, with the average yield, when the root is farm dried and when it is dried at Alexandria.

The alternative uses to which producers can switch their resources are themselves subject to fluctuating costs and profits (see footnote 3 of page 116). Whilst dairying is the basis of farming in the Proclaimed Areas in general, yielding a monthly cheque and permitting the farmer to pay off his debts, chicory is the annual cash crop.[1] Wherever an alternative cash crop is possible, many producers - especially those with low chicory profits - will try them. Vegetables, potatoes and bird seed are all potential alternatives in the Areas. Wherever there is heavy dependence on chicory, more

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[1] One producer, speaking as a chicory farmer and a former professor of agriculture, wrote on his questionnaire: "Chicory should fit in as part of a mixed farming system with dairying the main venture. It should therefore not fluctuate much from season to season depending on factors of price, grading, etc."

dairying is likely to be a change also.[1] As one chicory producer told the writer: "We realise we cannot have all our eggs in one basket; we will appreciate information on guidelines that we could introduce."

[1] Davies (1954) recorded that after succeeding crop failures in 1951 and 1952 one producer dropped chicory monoculture and broadened the base of his farm's economy with dairying.

12. DISTRIBUTION OF THE DRIED PRODUCT

The existence of a few big Union consumers of chicory is first noted, and the significance of the inter-dependence of producer and manufacturer is briefly discussed. The distribution of the crop to the various consumption points is outlined, and the distribution costs incurred are calculated.

The entire chicory crop from the Proclaimed Areas is graded at the Chicory Control Board's Depot at Alexandria. From the Central Depot it is distributed to manufacturers in all the provinces of the Union except the Orange Free State. The dried and graded chicory is transported by South African Railways from the siding which is alongside the main grading and storage shed.

Some twenty different manufacturing organisations in the four major ports - Cape Town, Durban, Port Elizabeth and East London - and in two inland centres - Johannesburg and Pretoria - purchase the chicory.[1] Three of the manufacturers have more than one processing point; in all there are twenty-six receiving units. Of the twenty firms in these localities, one with four consumption points in four different places takes 44 per cent of the annual supply. Two other manufacturers receive 15 per cent and 11 per cent, these proportions of the total being processed by five units in three different centres.

The striking dependence of the Chicory Industry on three manufacturers whose combined purchases comprise no less than 70 per cent of the total annual supply is matched by the natural dependence of the manufacturers on the local supply in time of war and the 'artificial' dependence of them on local supplies at all times.[2] This mutual position (as an established fact related to current marketing practice) emphasises the need for both sides to afford every satisfaction.

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[1] These figures refer to 1955. In the 1956-1957 period there were again twenty consumers; one took 39 per cent of the total sales whilst four together absorbed 73 per cent.

[2] The Board imports only when there is a local shortfall.

The manufacturers require chicory as high in quality and as low in price as can be bought on the world market. If they were not receiving such chicory, one would expect them to agitate for the position to be rectified. If they accept chicory which is relatively highly priced without demanding improvements, the interests of the consumers would appear to be inadequately protected.

The producers, who are protected from the competition of, sometimes, cheaper and, generally, better quality chicory produced overseas, should endeavour to satisfy both the quantity and quality requirements of the manufacturers. Furthermore, for the privilege of denying the consumer freedom of access to the cheapest market, they should, through the Board, be careful not to press for prices which are unrelated to those on the world chicory market.[1]

The choice lies between depending on an overseas source of supply of chicory (which may be expensive in some seasons and would be cut off in time of war) and depending on a local supply and supplementing it by imports when necessary. These issues are, however, economic and political, and are beyond the scope of the present survey.

We may, however, legitimately add that in 1950 manufacturers paid £2 per ton more for imported root than for local root, in 1953 £3·7 per ton more and in 1954 £5 per ton more.[2] The value of imported chicory root in 1946 was about £48 per ton, First Grade local chicory was priced at a little over £35 per ton.

From Table XXXI (page 139) may be seen the proportions of the crop distributed from Alexandria to each manufacturing centre. On the basis of a total supply of 16 million lbs., the transport costs incurred annually by localised production and centralised distribution have been calculated for each centre.

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[1] "A policy of self-sufficiency is socially and economically practicable only if domestic food prices need not be kept unduly above import values." 1947 Marketing Act Commission.

[2] These figures are based on the Board's selling price to manufacturers. If the costs added by the Board to their purchase price of the root were greater than the costs of the manufacturers would have been, the imported root may, in fact, have been cheaper than the local product.

TABLE XXXI

CONSUMPTION CENTRES & DISTRIBUTION COSTS

Manufacturing centre	Consumption[a]	Miles from Alex.	Railage per 100 lbs.[b]	Railage per annum
Johannesburg	33%	739	88	£19,360
Cape Town	21%	740	86	£12,040
Durban	20·5%	980	99	£13,530
Port Elizabeth	18%	81	20	£2,400
Pretoria	7%	767	89	£4,153
East London	·5%	328	56	£187

Source: C.C.B. Records and S.A.R. Tariff Rates

Notes: a) Percentage of annual consumption

b) No account is taken here of 'sidings charges'

One may pose the question: Is the annual total of £50,000 distribution costs entirely necessary? All but the Port Elizabeth and East London manufacturers have a considerable burden to bear from these costs. Chicory production in the Western Cape and in the Transvaal would appreciably reduce the distribution costs (£12,040 and £23,500 respectively) whilst a local supply in Natal would save much of the £13,530. The equipment and staff needed in each area would within a few years 'pay for itself' out of the distribution costs saved, and the local supply would not be entirely dependent, as at present, on the weather in one very restricted area.

That such decentralisation is not a feature of the Industry indicates that the producers in these other areas do not consider such production worthwhile (comparatively profitable), taking into account quality, quantity and competing land uses etc. It should be remembered that the localisation developed in the inter-war period before the start of the Control Scheme. Manufacturers, clearly, do not believe it sound to stimulate production outside the Proclaimed Areas.

Port Elizabeth and East London are, however, within the Areas where production is carried on. Considering only the distribution costs that would be saved by creating special facilities for drying and grading in the chicory regions near these towns, the present centralised collection and distribution is probably more economical.

18. PAST AND PRESENT

1. The Union's Chicory Industry had its origin in small scale production in the Eastern Cape Colony in the 1800's. Its continued existence in the Twentieth Century owes much to wartime stimuli and peacetime protection. Faced with fluctuating crops and market prices that were extremely low in seasons of heavy production, a majority of the farmers combined in an abortive effort to stabilise the Industry. Within two years of the passing of the Marketing Act, chicory producers claimed a place under its sheltering wing. By that time (1940) over 90 per cent of the Union's requirements were met by the tariff-protected local Industry which had become concentrated in a few coastal regions of the Eastern Cape where sandy-loam soils, cool winters, and all-seasons rainfall favoured the production of the root.

2. Under a statutory Control Board, the Industry has expanded to meet fully the Union demand for which it has the monopoly. An increasingly improved product has been made available to the manufacturers at prices which are generally higher than those of high quality root on world markets. The local product has risen in price some 65 per cent between 1940 and 1956.

The expansion of production occurred in both the established chicory regions and the coastal areas adjoining them; these were, in turn, brought into the Control Scheme as Proclaimed Areas. As a result of, primarily, increased plantings and favourable climatic conditions, supply outstripped demand for the first time in 1951. After two bad seasons, supply again exceeded demand and the Board had to tackle the problems created by the surpluses.

By various means the Board discouraged production, just as it had previously stimulated it, and in 1956-1957 the crop delivered was actually below the level of demand, which, however, was satisfied by drawing on the over-supply of previous years. Attempting to harmonise demand/supply relationships, in which a major factor is the unpredictable weather, the Board's policies are often to be judged 'right or wrong' after the event.

3. The influence of the Control Board on the spatial pattern of chicory production has been fundamental. On control, the farming map of South Africa is said to depend.[1] This study has, it is hoped, succeeded in some measure in identifying and tracing the ramifications of control which are significant in the geographical pattern and in assessing also the influence of natural factors.

"The specific policies adopted by an organisation are certain to effect some of its constituents less favourably than others", wrote Bauer and Yamey (1957). With the provision of Central Drying facilities, producers in close proximity to Alexandria were favoured; with the introduction of strict grading of dried root, 'nearby' producers find it economically sound to despatch their wet root for drying at the Board whilst more distant producers and/or those with low profit levels find it uneconomical both to despatch wet root and to dry it themselves.

The move towards providing further centralised drying facilities, capable of handling 2/3rds of the entire crop, and the desire to improve the quality of the dried product will combine to emphasise the discriminating effect of Board policy. Whilst the advantages of nearby chicory production are maximised, the disadvantages of more distant are maximised.

5. As a result of changing commercial factors, producers who are marginal in the economic sense have moved out of chicory cultivation. As a consequence of the latest developments, mentioned above, geographically marginal areas are also relegated to the economic fringe, regardless of their actual production costs.

It seems clear that present policies will lead to the supply area of wet chicory root being that region enclosed within a circle of 15-20 miles radius of which the Control Board is the centre. The soils and rainfall inland from Alexandria are relatively unfavourable to chicory cultivation; the bulk of the crop will, therefore, be taken

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[1] Editorial Opinion, Farmer's Weekly, 18th September 1957

off lands in the 10 mile coastal strip.

6. The dangers of such developments lie in a) over-cropping the region without regard for the maintenance of soil fertility by careful rotation and mixed farming, b) disregarding the wise economic policy of diversified farming and c) depending on a restricted, homogeneous (in the climatic sense) region for the Union's annual supply of chicory.

POSTSCRIPT

Before the results of the 1956-1957 season were known, producers commented on how the over-supply should be tackled. A selection of the remarks may be noted here. i) Chicory production outside the normal recognised area should be discouraged. ii) Those growers further afield should return to their previous lines of farming. iii) Distant producers should be kept in production by quotas and the South African Railways should give through rates for wet root. iv) Complete Central Drying will solve the problem by eliminating far away areas. ... it may, however, one day lead to hopeless under-supply. v) Big producers should be made to curtail their production. vi) Small plot holders should be eliminated.

A system of quotas - "if fair and reasonable", "as in Sugar Industry" - was widely advocated. A sliding scale of levies was also mentioned. The former is, apparently, regarded by the authorities as too drastic a measure which should only be resorted to as a last step. The latter was approved in principle as a means of controlling over-production at a meeting of Board and Producers (11th April 1957) to be laid before the authorities; it also formed the subject of paragraph 10 in the N.M.C. Report (1940).

APPENDIX B A

THE QUESTIONNAIRE

Sections of this report (particularly those dealing with the organisation of farms producing chicory, the costs and yields, and the possible responses by producers to price changes and marketing problems) are based on data collected by means of a questionnaire which was in both official languages.

The research worker in the field of social sciences can seldom work with data which is a complete record of the field of the phenomena investigated. Either he can take what data is available and report on it alone or he can use the phenomena observed as a basis for generalisation over the whole field. Here, the questionnaires returned have been used to generalise about chicory producers over the Proclaimed Areas and in selected regions within the Areas.

The sampling could have been based on 'randomisation' (sampling evidence selected at 'random'); it might have been based on 'stratification' (where the sample is deliberately controlled so that it has a lot in common with the rest and/or where sub-divisions have much in common with the sub-divisions of the universe of phenomena). The practice followed here was to offer all the producers in a selected year (1955) the questionnaire; the sample was thus far deliberately controlled. All returns, where possible, were utilised; so that randomisation applied also. Watson (1944) advised that we should take "Samples designed by ourselves expressly for the purpose of the research in hand". In this case, certain producers who seemed likely either to fail in returning forms or to be of particular assistance were selected for a personal visit, a letter or a telephone call. Thus to some extent the final sample was selected.

The number of questionnaires available for analysis was 70, some 15·6 per cent of the 449 producers of 1955. A percentage figure of 15 was the modest minimum desired for two reasons i) in order to have sufficient to generalise on and ii) because the nature

of the questions and the survey permitted estimates, which are more likely to be of value if they are available in large numbers.

Many of the forms, however, were by no means completed satisfactorily in all respects. Where data have been used in this survey for computing averages the number of cases concerned is thus given. To some extent unforeseen difficulties and ambiguities rendered some returns questionable while, in the light of subsequent investigation, one or two other points could with profit have been added. It would have been helpful to have known the labour costs for extra labour (Section 4 No. 4); and the transport costs involved in chicory production are, no doubt, included by some producers in Miscellaneous in No. 3 (Section 4), whereas it was intended that they should not be. Questions relating to morgenage under chicory and yield per morgen of dry and wet root seem to have been difficult ones, and often the investigator has had to 'adjust' answers in the light of known deliveries to the Board (in 1955) etc.

The reasons contributing, possibly, to the return of only 15 per cent of the questionnaires may be amongst the following:-

a) the connection of the writer with the University College of Fort Hare, which in April 1957 (the time of despatch of questionnaires) was then directly concerned with the University Apartheid Bill,

b) the suspected connection of the writer with the Government and/or the Chicory Control Board (this may have prompted fears about restriction of chicory plantings, etc,[1]

c) the expressed opinion that any publicity for the Chicory Industry would be harmful, as other farmers might decide to plant and so add to the problem of over-production,

d) miscellaneous, including i) the investigator was not bi-lingual,

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[1] Frankel (1926) discussing crop forecasts in the Maize Industry, stated: "The main reason for these large discrepancies (of forecast and actual crop harvested) is usually thought to lie in the suspiciousness of the farmer and his unwillingness to give the required information, as he fears it may be used against him for income tax purposes."

ii) some farms had changed hands since 1955, iii) several farms had ceased to grow chicory, iv) producers believed that if they lacked accurate information their estimates would not be wanted, v) a general resolve, maybe of necessity, not to undertake any paper work that was not compulsory.

In order to emphasise the questionnaire, it was given some publicity. This may, in fact, have reacted against it. The Eastern Cape Newspapers and the Farmers' Journals printed short announcements and descriptions of the content of the Survey, and the Regional News was provided with a paragraph to be broadcast on the day when most producers would receive the forms. This radio propaganda actually went beyond the Regional News to the National News.

Only 33 questionnaires were returned within one calendar month (May 1957) of the posting of the 450. Following a further trip by the investigator through the chicory regions, the number was swelled by 1st July to 65. The latest return was one received, with apologies, in September 1957.

With a different approach, the time and money expended on preparing and despatching these questionnaires could have yielded better results. Experience suggests that a 25 per cent sample of producers (selected according to a) the location of farms and b) root delivered) should have first been sent the forms and then each visited and interrogated.

Whilst appreciating the manifold difficulties of producers, the writer must place on record his disappointment that 84·4 per cent of the chicory farmers declined to respond in any way to the survey of their Industry.

The contents of the questionnaires were divided into four Sections - in some instances a range of answers was suggested.

The questions were as follows:-

PRODUCER NO. (this was entered before despatch) ... Miles from Alexandria

Distance from another town .... Total morgenage of your farm ....

SECTION I

1. What do you estimate the morgenage you have under each?

Chicory	.....	Mealies	.....	Oats	.....
Barley	.....	Wheat	.....	Cowpeas	.....
Pineapples	.....	Lucerne	.....	Other Crops	.....
The Farmstead	.....	Pasturage	.....	Bush	.....

2. Number of cows in your dairy herd .....

3. How many sheep do you keep? .....

4. How many cattle do you have for slaughter purposes? .....

5. How would you divide your farm's gross cash income between these activities? (Total : 100 per cent). In a normal production year what nett profit per morgen do you receive for each?

Chicory	....£....	Dairying	....£....	Beef	....£....
Wool	....£....	Citrus	....£....	Pineapples	....£....
Others	....£....				

SECTION II CHICORY GENERAL

1. When was chicory first produced on your farm? Before 1910, 1920, 1930, 1940, 1950, 1955.

2. If you rotate with chicory, what is your normal rotation?

   1. Chicory ..... 2. ? ..... 3. ? ..... 4. ? .....

3. If you do not rotate, for how many years has chicory been produced on the same lands? 60 years. 50. 40. 30. 20. 10. 5.
   Have these lands been fertilized? Yes. No.
   Have the yields been falling? Yes. No.
   Have you any lands exhausted by chicory? Yes. No.
   What are these lands good for now? .....

4. Which month do you sow chicory under normal conditions? Which month do you plough out the crop? March April May June July - Sept. Oct. Nov. Dec. Jan. Feb. March April May

5. Which seed gives you the best yield?
   Flakkeese? Fredonia? Brunswick? Schlesiche? Magdeburg? Snouters?

6. Which descriptions of the top layer suits the soil on your chicory lands?

Black sandy	yellow sandy	red sandy
reddish brown	blackish brown clay	
worn out	virgin soil	

SECTION III CHICORY CLIMATE

1. What monthly rainfalls do you have when you get a satisfactory chicory crop?

   Jan. ..... Feb. ..... Mar. ..... Apr. ..... May ..... June .....
   July ..... Aug. ..... Sept. .... Oct. ..... Nov. .... Dec. .....
   Total ..... (ins.)

2. Do you irrigate chicory? Yes. No.

3. Is your crop yield affected by frost? Generally. Rarely. Never.

4. Is your crop yield affected by high temperatures?
Generally. Rarely. Never.

5. Is your chicory farming affected by wind?
Generally. Rarely. Never.

6. Have you wind breaks on your chicory land?
Yes. No. Made of .....

7. Is your crop yield affected by hailstorms?
Generally. Rarely. Never.

SECTION IV CHICORY INPUTS AND OUTPUTS

1. What is your average yield per morgen per annum ..... Wet Bags (lbs.) ..... Dry (100 lbs.)

2. By increasing INPUTS of labour, seed and fertilizer what do you think your maximum Economic yield could be? ..... Dry Bags of 100 lbs. (Economic in the sense that every extra lb. produced beyond that yield would lower your profit per lb.)

3. How would you divide your expenses on chicory production amongst these items?

Labour	..... %	Implements used	..... %
Bags	..... %	Seed	..... %
Fertilizer	..... %	Miscellaneous	..... %

(Total : 100%) Total in Cash per morgen £ .....

4. Do you employ extra labour for chicory? Yes. No.

5. If so, is it always easily available? Always. Generally. Difficult to get.

6. What proportion of your crop do you dry? ..... %

7. What proportion do you send to the Central Drier? ..... %
How much could you dry? ..... % What do you reckon your costs of drying per 100 lbs. Dry? £. s. d. per 100 lbs. dry. What figure (per 100 lbs. dry root) for Central Drying Costs would make it worthwhile for you to send all root to the Central Drier? £. s. d. per 100 lbs. dry.

8. How does your chicory reach Alexandria? Your own lorry. hired lorry. rail lorry and rail.
What is the cost per ton per mile? ..... per ton per mile.

9. Working on the 1955-1956 price of First Grade 44/- per 100 lbs. what increase or decrease in price would

a) induce you to plant 10% more ..... per 100 lbs.
b) induce you to plant 10% less ..... per 100 lbs.
c) induce you to leave chicory ..... per 100 lbs.
d) what would you change to under c) .....

10. What percentage Voorskot would pay your expenses ..... ?

11. With the annual carry-over and resulting delays in the payment of the Agterskot do you contemplate changes on your farm?

Plant more chicory	Less chicory
The same	Changing over to

Your comments on the present over-production and stricter gradings:-

COVERING LETTERS

The following letters were despatched with each questionnaire and were printed on official Control Board paper.

28. 3. 1957.

Mr. B.S. Young, M.A. (Cantab.), an independent University College Lecturer from the Department of Geography Fort Hare, is making a short survey of the chicory industry. He has spent several days at the Board (February, 1957) and has met several of the producers. He is particularly concerned with the conditions of production in the different producing areas and he now sends his factfinding questionnaire to our producers to gather the information which we at the Board have not collected. The questionnaire has been compiled so that producers will be as little inconvenienced as possible, and we commend to your attention the questions and would ask you in the interests of the Industry and the producers to complete the forms as fully as you feel able to, despatching the completed form to Mr. Young in the stamped-addressed envelope attached.

G. RADLOFF
MANAGER. CHICORY CONTROL BOARD.

DEPARTMENT OF GEOGRAPHY,
FORT HARE.

28. 3. 57.

Dear Sir,

The letter overleaf from the Manager of your Control Board introduces you to this survey of the Chicory Industry and the enclosed fact-finding questionnaire. The form has been compiled so that the producer may fill it quickly - where possible, answers have been suggested, and I would ask you to encircle that answer which is correct for your farm. All the producers who made deliveries during 1955 (450 of them) are being sent these forms; and when they are returned, in the envelope provided, I hope there will be information enabling me to locate each farm on the map and information that will permit an analysis of the natural conditions and economic conditions under which chicory is grown in the many areas now producing it.

May I stress a few points? Firstly, I am nobody's agent and this is an objective academic study. Secondly, your farm's individual costs etc. will be averaged with others in your area and so on, they will not be used individually. Thirdly, if you have,

since 1955, ceased to produce chicory, will you please provide the facts for that year. Fourthly, some producers may have more accurate details than others about their costs etc.; I would like you to give me your ESTIMATE whenever you feel like saying 'I never keep those facts'!

I look forward to having a form back from you during the coming month, and I shall be just as pleased to see it whether it has a few circles and facts or the lot. I hope the survey when completed may be of interest to you.

Yours gratefully,

B.S. YOUNG

APPENDIX B.

NOTES ON TABLE XXX

These notes attempt to explain methods used in the calculation of:- a) increased profit when there is a double yield,

b) yield required to break-even with present price,

c) price required to break-even with average yield,

d) all the points when the Central Drier is used.

Certain costs change with increased or decreased yield from the average; these are variable costs. Implement costs are not considered as changing significantly; the variable costs are those in Stage 2 and some of those in Stage 1.

It is reckoned that one-third of the labour costs are harvesting costs and that they increase arithmetically with the yield. All the bag costs are considered entirely variable (that is when there is no yield, no costs are incurred at all) and arithmetically so. Drying costs, transport costs and levy charges vary arithmetically with the yield.

The following formula has been arranged and used to make possible easy computation of the data as required above:-

$$\text{Profit} = £4y\ (\ (ay + by + cy) - (d - e - f)\ )$$

Where: y = yield in tons,
a = total Stage 2 expenses per ton,
b = one-third of the labour expenses per ton,
c = bag expenses per ton,
d = total expenses Stage 1 per morgen
e = one-third of the labour expenses per morgen,
f = bag costs per morgen.

With a double yield, the values as known are substituted throughout with y = the double yield. (The income is made nett by the subtraction of all expenses within the brackets.)

The break-even yield may be found by substituting '0' for profit, adding the first inner bracket in terms of y and transforming the formula to state the value of y.

The price required to break-even with the average yield is simply arrived at by subtracting the relevant profit per ton from the

price per ton, i.e. taking the total costs as the required price per ton to break-even.

When the Central Drier is considered, the only items regarded as differing are i) the transport costs ii) the drying costs. The transport costs per ton for farm dried root are multiplied by 3·5; the drying costs increase from £4·326 per ton to £5·5. The Stage 2 costs are amended in the light of these increases, and the new total costs subtracted from the price per ton of £44·0 gives the profit accruing per ton when the Central Drier is used. Multiplied by the yield in tons, the figure becomes the nett profit per morgen.

Nett profit per ton under these circumstances becomes Greenbushes: £14·295; East of the Kowie: 8·27; East London: 2·78; Sandflats/Sidbury: 14·74; Seven Fountains: 12·54.

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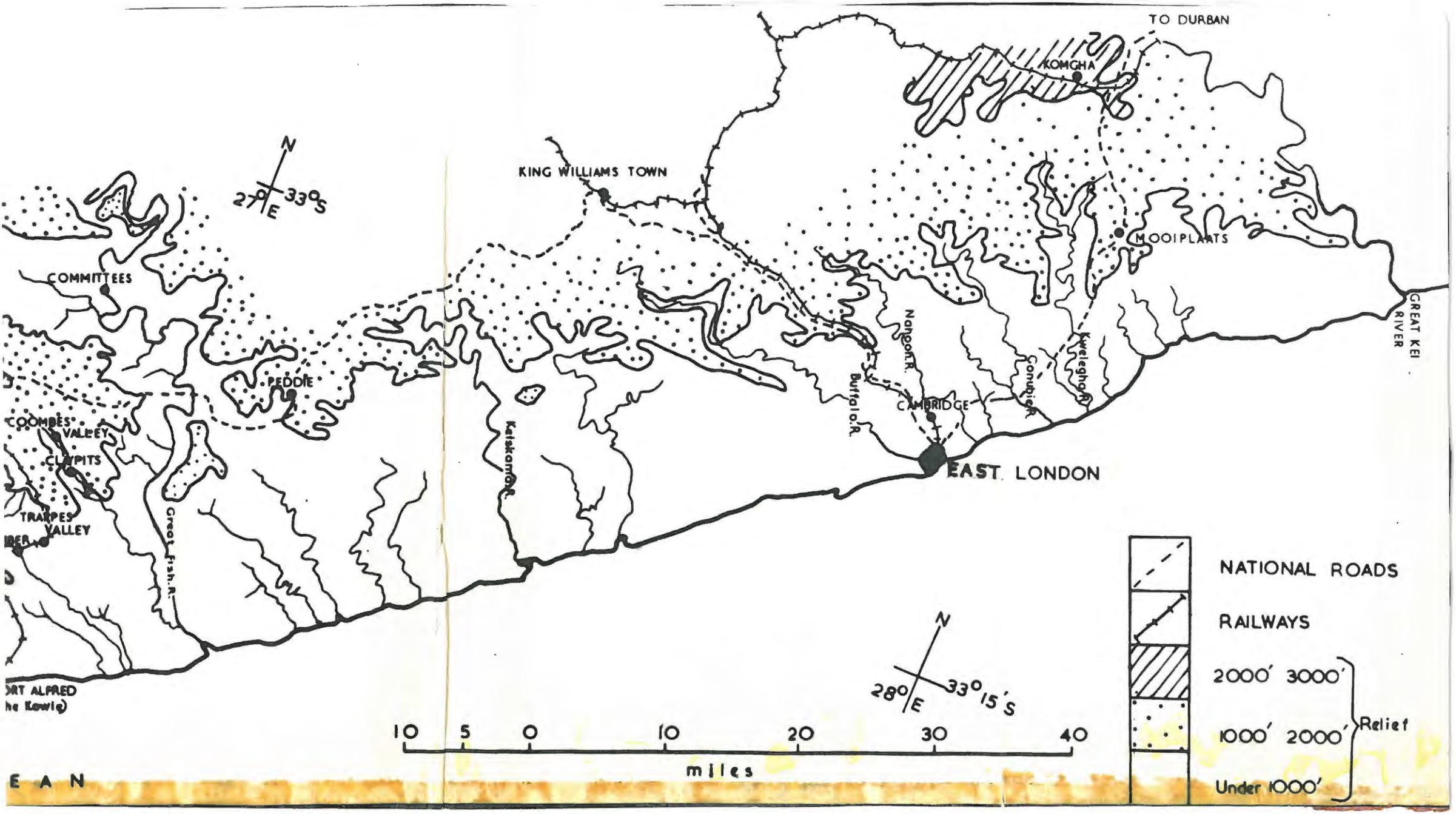
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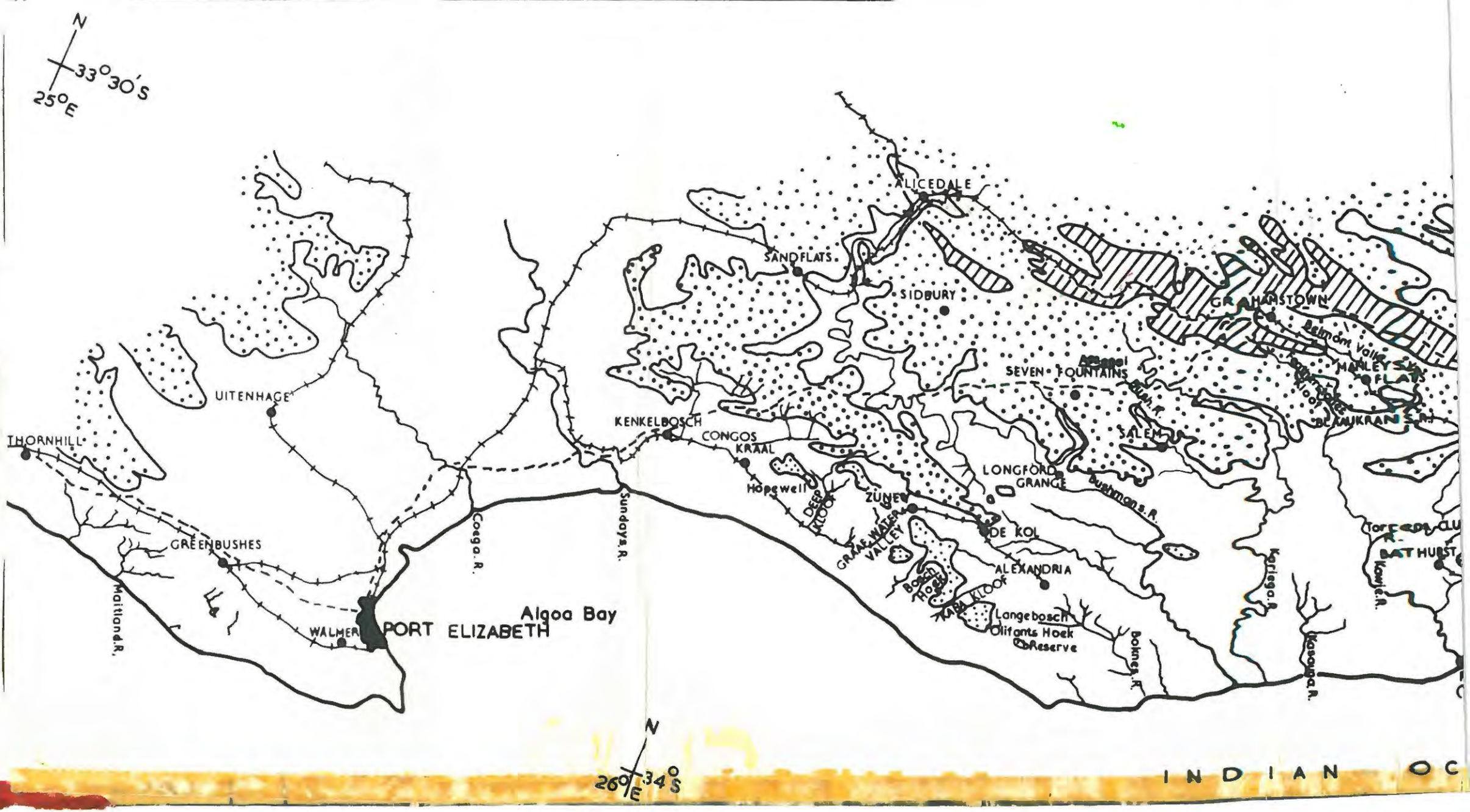
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