6

PRIMARY PRODUCTION

Land Settlement and Irrigation

Land Utilisation

Introduction

The climatic conditions of Victoria (for details see pages 47 to 68) and especially the incidence of rain have resulted in the development of a wide range of farming practices, but at the same time have been largely responsible for restricting the number of enterprises on individual farms. Farming is generally carried out on a single enterprise basis, a major exception being the association of cereal growing and sheep grazing in the main wheat areas. Other exceptions occur on a less extensive scale with other forms of production.

Most farms in the State are owner operated and, with the exception of the larger holdings, the routine work on the farm is carried out by the farmer and his family, but at times of peak labour requirement, such as during shearing or harvest, additional labour is employed.

Considerable areas in the State are retained as forest reserves and for water catchments (see page 294).

The pattern of land use is more or less clearly defined in each of the statistical districts (see map on page 319). Thus the Mallee and the northern part of the Wimmera District are used almost exclusively for cereal production and sheep raising. The more intensive carrying of livestock in these districts has been made possible by a channel system of domestic and stock water supply originating in the mountainous area of the Grampians to the south. The agriculture of the Northern District is based largely on irrigation and ranges from dairying to fruit production. The non-irrigated parts of the district are used for cereal and sheep production. In the Western, Central, North-Central, North-Eastern, and Gippsland Districts, the rainfall is heavier and more reliable; consequently, there is more diversity in land utilisation. In these districts, sheep grazing and dairying are the most important industries. Cultivation is generally limited. Some wheat is grown in the North-Eastern and Western Districts and there is some production of potatoes, vegetables, and other intensive cultivation crops on the more fertile soils in the higher rainfall parts.

Mallee District

This district is situated in the far north-west of the State and has a total area of 10·8 mill. acres. However, there are extensive areas in the north and west which, because of water shortage and the liability to severe soil erosion, have not been settled, and the total area used for agricultural production is 7·6 mill. acres.

The soils of the district being light in texture are easily and cheaply cultivated and the main farming enterprise is cereal cropping, associated with wool, and prime lamb production. The principal crop grown is

wheat and the area sown to this crop averages about 1·4 mill. acres. In addition, some 300,000 acres of oats, including 18,000 acres for hay and 60,000 acres for grazing, and 73,000 acres of barley are usually grown. Yields from cereal crops vary widely, according to seasonal conditions. The average district yield per acre for wheat in recent years has been close to 20 bushels.

In the past, lack of suitable pasture species was a major problem in pasture development, and the grazing was provided largely by native pastures, green cereal crops, and crop stubbles. The discovery and introduction into crop rotations of suitable medics has resulted in marked benefit to both crop production and grazing. The use of medics is now widespread in the district and has greatly improved the conditions for production of early prime lambs mainly for the Melbourne market. Dry land lucerne has also contributed to the vastly improved grazing afforded by the pastures.

The district carries about 1·7 mill. sheep and produces about 17·2 mill. lb of wool in addition to the early lambs.

Irrigation areas located close to the River Murray, which marks the northern boundary of the State, produce most of the State's dried vine fruits and considerable quantities of citrus fruits.

Wimmera District

The Wimmera occupies the central western part of the State and has an area of 7·4 mill. acres, of which 6 mill. acres are used for agricultural purposes. Rainfall in the north is about 16 in per year, increasing in the south to 20 in. The Grampians in the south of the district have a higher rainfall. This area is unsuited to agricultural production and is retained by the Crown as a watershed area and forest reserve.

There are wide variations in soil type, but the district includes substantial areas of fertile self-mulching clay loams, which are among the most productive wheat-growing soils in Australia. South and east of the Grampians the soils are podzols and in the south-west there is a large area of light-textured grey soils.

Wheat farming in association with fine-wool growing or prime lamb production is the main farm enterprise over the north and central Wimmera. Both climate and soils are suited to cereal cropping and yields obtained are high. The area sown to wheat averages about 950,000 acres, the average yield being close to 26 bushels per acre. Other major crops are oats (325,000 acres, including 29,000 acres for hay and 21,000 acres for grazing), and barley (33,000 acres). In recent years the development of suitable strains of medics and clovers has resulted in the inclusion of a pasture phase in crop rotations.

In addition to mixed sheep and wheat farming, there are extensive areas, particularly in the south and west of the district where rainfall is higher and pasture establishment easier, which are used solely for grazing. Almost three-quarters of the sheep carried in the area are Merinos, and, although a number of early fat lambs come from the wheat-growing areas, emphasis here is more generally on fine-wool production and breeding. The district carries over 4 mill. sheep and produces more than 45 mill. lb of wool. As is the case in the Mallee, dairying and beef cattle production are only of minor importance.

Northern District

This is an area of plains country extending from the Central Highlands in the south to the River Murray in the north. The total area of the district is 6·3 mill. acres, of which 5·6 mill. acres are occupied for agricultural purposes. The soils vary from typical light Mallee soils in the north-west to fertile red-brown earths in the east. Average annual rainfall is 14 in in the north-west and increases to 25 in over the foothills of the ranges, which are on the eastern boundary of the district. The district includes the major irrigation areas of the State, and because of this several different farming enterprises are carried out.

Wheat growing is an important industry. The area sown averages about 600,000 acres, and, because of climatic and soil differences, yields vary widely across the area, the district average being 23·1 bushels per acre. As in the other major wheat-producing districts, oat crops are an important feature in rotations and for grazing. In the Northern District about 285,000 acres of oats are sown each year, including 45,000 acres for hay and 16,000 acres for grazing.

The district carries about 4 mill. sheep, largely on wheat farms, and emphasis is on prime lamb production rather than fine-wool growing. Extensive irrigation has made it possible to establish highly productive perennial pastures which are used mainly for dairy production, but, in addition, the irrigation areas fatten sheep and lambs from the non-irrigated areas in Victoria and New South Wales. The milk produced is mostly used for butter, cheese, and other manufactured products, but small quantities are used for city whole milk supply. There are over 410,000 dairy cattle in the district.

Apart from dairying, irrigation has permitted the establishment of an important fruit-growing industry. This area supplies fresh fruit to Victorian and interstate markets and also provides fruit, mainly apricots, pears, and peaches, for the important canneries operating in the district. Tomatoes are also produced on a large scale.

North-Central District

This district includes much of the Central Highlands area and the rainfall is generally over 28 in, but on the northern slopes it is as low as 22 in. There is wide variation in topography and soils and much of the area is used for grazing sheep and beef cattle. However, the district is relatively small, containing only 2·9 mill. acres, of which 2·1 mill. acres are occupied and used for farming production.

Cereal cropping is unimportant, but potatoes in the volcanic hills east of Ballarat and pome fruits in the Harcourt area are the most important crops grown. Although dairy farms are scattered throughout the district, it is marginal for this form of production and emphasis is on sheep production associated with beef production. The district carries about 2·4 mill. sheep and about 80,000 beef cattle.

North-Eastern District

The district has a total area of 7·2 mill. acres, but includes substantial areas of Crown lands, many of which are very steep and heavily timbered. The area occupied is 3·8 mill. acres. Annual average rainfall varies from 20 in in the north-western corner of the district to well over 60 in over the mountains. Almost all of the area used for rural production has a 20 to 30 in rainfall.

Although cereal cropping is not general, there is an interesting development of ley farming based on subterranean clover pastures. However, areas concerned and production are small in relation to the State totals. The fertile river valleys are suited to specialty crop production, and some 8,000 acres of tobacco and small quantities of hops are grown in these areas. The district carries about 145,000 dairy cattle, mainly along the river valleys.

Prime lamb growing and crossbred wool production are the main sheep enterprises in the north-western and western parts of the district, but fine-wool growing is more common on the unimproved pastures along the Murray Valley and in the Omeo area. The district carries about 2 mill. sheep.

The North-Eastern District is an important beef cattle breeding and fattening area, and over 250,000 head are carried. The cattle make good use of the rough pastures of the foothill country and the productive pastures of the flats make suitable fattening areas.

Western District

Most of the district falls in the 25–30 in rainfall belt, but an area north and east of the Otways is influenced by a rain shadow effect and the average annual rainfall is about 24 in. In the Otway Ranges the average annual rainfall is as high as 70 in. The soils of the district vary considerably in type and fertility. Basaltic soils cover the great bulk of the plains area. In the north the soils are similar to those of the southern Wimmera. The total area of the district is 8·8 mill. acres, of which 6·7 mill. acres are occupied. There are substantial areas of forest reserve in the Otways, which are in the south-eastern part of the district.

The only cereal crop of importance grown is oats which are used as a fodder crop, cut for hay, or harvested for grain which is also used very largely to feed stock. The more fertile soils produce both potatoes and onions, and about 60 per cent of the State's onion acreage is located on volcanic tuff soils near Colac and Warrnambool. However, emphasis is placed on animal production, and climatically the district is well suited to the development of improved pastures. It is the major wool producing area of the State, carrying over 10·6 mill. sheep. Almost half the total sheep population is Merino, and the fine-wool breeds—Merino, Polwarth, and Corriedale—make up nearly three-quarters of the total sheep population. There are relatively few crossbreds, and prime lamb production does not have the same importance as in other districts. The Western District is an important beef cattle breeding and fattening area and carries close to 420,000 head. Many of the State's leading stud herds are located in the district, and in addition, many sheep properties carry beef cattle.

Dairying is an important industry and there is widespread distribution of dairy cattle. However, the main concentrations are in the following areas : Colac, Camperdown, Koroit, Allansford, and the Casterton–Coleraine region. A proportion of production is used as whole milk for town supply, but a considerable proportion of the State's processed milk products and butter is produced in the district, which carries about 434,000 dairy cattle.

Central District

Rainfall varies from 24 in within the rain shadow area, north of Geelong, to more than 35 in over the ranges north and east of Melbourne. Topographically there is variation from plains country on the western side of Port Phillip Bay to the steep hill country north and east of Melbourne. There is also a wide variation in soil type and fertility. The total area of the district is 4·1 mill. acres and 2·6 mill. acres are occupied—the remainder being reserved as forest and water-shed areas.

The climate is suited to the production of malting barley and about 40,000 acres are grown—mainly on the plains to the west. Potatoes are grown in the Romsey–Ballarat area, on the Bellarine Peninsula, and the Kooweerup Swamp.

Market gardening is important in the area extending from the south-eastern suburbs of Melbourne to the northern shores of Westernport Bay, and also on the irrigation settlements near Werribee and Bacchus Marsh.

The district is the major producer of apples; dessert types of pears and peaches and other stone fruits are of importance. Orchards are located in the eastern Metropolitan Area, on the Mornington Peninsula and near Bacchus Marsh and Pakenham. Ninety per cent of the State's strawberry crop is grown in the Dandenong Ranges some 25 miles east of Melbourne.

The district carries about 2·7 mill. sheep and production is almost evenly divided between fine-wool growing and fat lamb production.

Beef cattle are grazed in conjunction with sheep over most of the area, but in the east they are run with dairy cows to produce vealers.

The major dairying area is in the east, and this forms part of the most important dairying area of the State. The area is an important supplier of whole milk for city supply and for butter and cheese manufacture. There are just under 300,000 dairy cattle in the district. Pig production is also important.

Gippsland District

The total area of this district is 8·7 mill. acres, but the northern and eastern parts are mountainous and are reserved by the Crown. The area occupied is 4·1 mill. acres and the bulk of settlement is south of a line between Dandenong and Bairnsdale. Rainfall varies from just under 25 in within the rain shadow area near Maffra and Sale to 60 in and above in the highlands. Average annual rainfall over the most part of the settled areas is about 34 in and climatically the district is well suited to the development of highly productive perennial pastures. The soils range from poor sands to relatively fertile loams. The highly fertile alluvial soils of the river valleys are important sources of production.

With the exception of forage crops, cropping is not important in the area, although certain specialty crops, such as maize, beans, and potatoes, contribute substantially to the State's total production.

Gippsland is the most important dairying district of the State and dairying is by far the most important rural industry in the district. The highly productive pastures of the 30 to 40 in rainfall areas are

the basis of the industry. The district supplies the greater part of the whole milk requirements for the Melbourne market, and in addition, plays an important part in the production of butter, cheese, and other processed dairy products. In addition, the dairy herds contribute to veal and beef production. The district carries about 526,000 dairy cattle. Pig raising is associated with dairy farming, and there are 65,000 pigs carried in the area.

In western and southern Gippsland, sheep production is small and consists largely of fat lamb producing flocks run in conjunction with dairy cattle. However, in the 22–30 in rainfall area near Sale, prime lamb production on improved pastures is a major enterprise. In the foothills, fine-woolled sheep and beef cattle are carried.

Alienation of Land

The total area of the State is approximately 56,245,760 acres. On 31 December 1966, this comprised :

	Acres
Lands alienated in fee-simple	32,036,004
Lands in process of alienation	2,101,413
Crown lands	22,108,343
Total	56,245,760
Crown lands comprise :	
Reserved Forest	5,604,413
State Forest and timber reserves (under Land Act)	150,088
Water Reserves	314,145
Reserves in the Mallee	410,000
Other reserves	695,678
Roads	1,700,048
Water frontages, beds of rivers, lakes, etc., unsold land in cities, towns, and boroughs	3,844,876
Land in occupation under—	
Perpetual Leases	159,553
Leases of former agricultural college lands	24,423
Other leases and licences	1,475
Temporary grazing licences and leases	*6,004,030
Unoccupied	3,199,614
Total	22,108,343

* In addition, 79,453 acres of land listed under Reserves are held under grazing licences.

In the following table are shown the area of Crown lands sold absolutely and conditionally, and the area of lands alienated in fee-simple during the five years 1962 to 1966. A portion of the area conditionally sold reverts to the Crown each year in consequence of the

non-fulfilment of conditions by the selectors. The lands alienated each year include areas selected in previous years.

VICTORIA—ALIENATION OF CROWN LANDS

Year Ended 31 December—	Area of Crown Lands Sold			Crown Lands Alienated in Fee-simple	
	Absolutely, at Auction, etc.	Conditionally to Selectors	Total	Area	Purchase Money
	acres				$
1962..	3,584	11,299	14,883	103,337	616,674
1963..	3,308	19,425	22,733	103,766	326,934
1964..	3,896	23,055	26,951	76,587	406,554
1965..	4,705	20,757	25,462	76,965	280,839
1966..	27,135	12,508	39,643	53,136	420,313

Information regarding the Assurance Fund is found on page 713 of this book.
Government Assistance to the Farming Industry, 1964.

Soil Conservation Authority

Functions

The Authority is responsible for the mitigation and prevention of soil erosion; promotion of soil conservation; the determination of land use to achieve these objectives; and the provision of an advisory service to landholders for the efficient use and development of their land and the water resources available to them. To perform these functions, it conducts surveys and investigations into the nature and extent of soil erosion. It investigates and designs preventive and remedial measures, and carries out soil conservation works, experiments and demonstrations of soil conservation, and reclamation of eroded lands. Its major field activity with landholders is the development of group conservation schemes in which the Authority engages in conservation projects in conjunction with groups of farmers having contiguous properties.

Principal aspects of current research are concerned with conservation hydrology, soil, ecological and land use surveys, conservation agronomy, soil analyses, and conservation economics.

The Engineering Division is responsible for the design and construction of concrete erosion control structures, and promotion of efficient use of farm water supplies.

Group Conservation

The clearing and using of land for agriculture and other purposes without proper knowledge and experience of the climate and soils has resulted in widespread erosion. To handle the problem in Victoria, the Soil Conservation Authority began to work in 1950 on erosion problems of individual properties. This developed into conservation planning of whole farms to prevent erosion, to conserve the soil, and increase production. However, it was felt that co-operative projects on a large scale were needed to combat erosion successfully.

In 1962, Parliament passed new legislation which made it possible for landholders with neighbouring properties to form Group Conservation Areas designed to control erosion and promote soil conservation on a planned basis under the guidance of the Authority. For these areas the Authority designs a complete plan of erosion control works and farm improvement. Certain erosion control works, which are in themselves non-productive, are paid for by the Authority providing each landholder in the Group Conservation Area undertakes to carry out, at his own expense, planned productive works such as pasture improvement, sub-divisional fencing, and construction of dams.

There are many advantages to the State from Group Conservation Area projects. The Authority can concentrate the services of its Conservation Officers on groups of farms in defined areas, and thus save cost in administration, professional time, transport, and materials.

There is an equally important result when whole sub-catchments and catchments are planned as units. The public interest is served by the protection from the results of soil erosion of public utilities such as reservoirs, channels, roads, bridges, and railways. Rivers and streams perform more naturally as the landscape is improved.

Currently there are 30 functioning Group Conservation Areas involving 422 landholders and 284 square miles of farmlands. Another 65 projects involving 1,006 landholders and 1,046 square miles are approved and ready for planning.

Land Utilisation Advisory Council

The Members of the Council are the permanent heads, or their nominees, of the Soil Conservation Authority, Department of Agriculture, Forests Commission, Department of Crown Lands and Survey, and State Rivers and Water Supply Commission. The Chairman and Secretary of the Soil Conservation Authority also occupy those positions on the Council.

Under the Soil Conservation and Land Utilisation Act the functions of the Council are to recommend to the Soil Conservation Authority the constitution and definition of catchment areas, and advise the Minister for Conservation and the Authority concerning policy on the use of land, including Crown land, in any catchment area. After consultation with the Council, the Authority determines the most suitable use in the public interest of all lands in catchment areas. The practical result is that decisions are made about which land should be used permanently for forest purposes, and what land may be used for pasture, agriculture, or any other purpose without adversely affecting the catchment as a water supply area.

The conditions under which the various forms of land use may be permitted are defined by the Authority. However, the Soil Conservation Authority, as provided for in its legislation, is obliged to consult the appropriate district advisory committee, and the Minister's approval must be obtained before the conditions of the use of land can be applied.

Landholders are liable to a penalty of up to $100 for non-compliance with the decisions, but there is a right of appeal. Should a landholder refuse to comply, the Authority may carry out any remedial work necessary and the costs may be recovered by reasonable instalments.

In 1966, the Premier directed the Land Utilisation Advisory Council to determine the potential of land throughout the State. Where there are alternative possible forms of land use, the Council recommends those which should be adopted now in the public interest. It is also responsible for recommending a long term policy for the development and use of land resources.

Because it is the most populated State in relation to area, Victoria illustrates the problem of how modern civilisation demands land for various purposes, some of which are compatible and some conflicting or competitive. When there are, or it is anticipated that there will be, conflicting or competitive demands for land, decisions must be made and these should be based on proper criteria. The direction to the Council enables the land use problems of the State to be considered on the basis of significant scientific and other criteria. Inter-departmental study groups have been established to assist the Council by collating and examining such land use and ecological information as is already available for parts of the State, in relation to the demands for land for different purposes and the decisions which need to be made.

Soil Conservation Authority, 1961–67; Land Utilisation Advisory Council, 1962, 1967; Destruction of Vermin and Noxious Weeds, 1963; Soil, Land Use, and Ecological Surveys, 1966; Farm Water Supplies, 1968

Rural Finance Facilities

Introduction

Australia's national policy for permanent land settlement has been based on the family unit farm. Financially this has seldom been easy because even in the early days settlers found it difficult to earn enough to maintain themselves whilst they were clearing and developing their blocks. The conditions of purchase were made very easy but considerable aggregation of holdings took place because settlers failed. Later, some of these large estates were re-purchased, subdivided, and the smaller farms made available to settlers under closer settlement schemes.

After the two world wars these schemes were expanded to enable ex-servicemen to acquire farms under generous terms of settlement. In addition, money was advanced to returned servicemen to enable them to buy their own "Single Unit" farms. Soldier settlers were also granted loans for the purchase of stock, plant, and equipment.

The State set up a Rural Finance Corporation with wide powers for assisting rural industry. This was later merged with the Soldier Settlement Commission into a Rural Finance and Settlement Commission.

The Commonwealth Bank has had a Rural Credits Department for many years. Its main function is to provide seasonal assistance in the marketing of products. Thus it cushions the effect of large interim payments at harvest time and provides credit for goods awaiting shipment or in transit. The Bank also administers the Farm Development Loan Fund, and assists in financing research. The Commonwealth Development Bank is interested in making loans available for the improvement of approved properties.

The trading banks have many farmer clients who require finance mostly on a relatively short-term seasonal basis. Numerous pastoral finance companies act as agents for farmers and frequently provide

credit for the purchase of properties or for their improvement or for the purchase of livestock. The State Savings Bank also makes limited financial advances to farmers.

Rural Finance and Settlement Commission

General

The Rural Finance and Settlement Commission was established by legislation passed in 1961, which began to merge the former Soldier Settlement Commission and the Rural Finance Corporation. The new Commission carried out the functions of the previous authorities temporarily in two separate branches, namely, those of Settlement and Finance, respectively, until further legislation passed in 1963 completed the merger by removing this division and co-ordinating the functions previously performed by the two separate authorities.

Rural Finance Act

The Rural Finance Corporation was established in April 1950. Its functions, which have since been taken over by the Commission, include the making of advances through loans at low rates of interest to existing or proposed country industries, both primary and secondary. The Commission is also empowered to advance moneys to, or for the benefit of, any farmer for carrying into effect a composition or scheme of arrangement between him and his creditors. The Commission is also empowered under the Act to carry out special lending as agent of the Treasurer. Under these Agency provisions, the Commission administers relief lending to members of the rural community in times of adversity such as bushfires, floods, and drought.

Revenue, expenditure, etc., for each of the five years, 1962–63 to 1966–67 are given in the following table :

VICTORIA—RURAL FINANCE ACT : REVENUE, EXPENDITURE, ETC.

($'000)

Particulars	1962–63	1963–64	1964–65	1965–66	1966–67
REVENUE					
Interest	1,040	1,145	1,237	1,346	1,447
Other	50	20	21	34	30
Total Revenue	1,090	1,165	1,258	1,380	1,477
EXPENDITURE					
Administration	110	134	143	169	185
Interest	730	797	947	1,021	1,108
Sinking Fund	46	50	53	56	59
Other	24	108	63	61	49
Total Expenditure	910	1,089	1,206	1,307	1,402
Net Surplus	180	76	52	73	75
Loans and Advances Outstanding at 30 June	20,340	21,168	22,388	24,113	25,123
Loan Indebtedness to State Government at 30 June	19,032	20,208	21,050	22,128	22,881
Government Agency Advances Made	61	144	428	260	252
Part III Advances Made	2,965	3,706	4,051	3,559	4,236
Government Agency Advances Outstanding	844	957	1,096	1,215	1,353

General Settlement

Prior to the end of the Second World War, the Commonwealth Government and various State Governments made arrangements for the settlement of discharged soldiers on the land as part of a general scheme of rehabilitation of ex-members of the Services. In 1945, the Victorian Government completed an Agreement with the Commonwealth Government. The State Parliament ratified the Agreement and also passed legislation constituting the former Soldier Settlement Commission. Soldier Settlement in all States has now reached the stage where, apart from forfeited holdings, no further allocations of blocks are visualised.

Under the Victorian legislation, soldier settlement was carried out under two separate schemes. First, there was the general settlement scheme where the Commission acquired freehold land or Crown land for subdivision and development into holdings for application by ex-servicemen. Such holdings were allocated on a competitive basis, having regard to the merits of all applicants. The number of ex-servicemen settled under this scheme totalled 3,293. Second, there was the Single Unit Farm Scheme, where ex-servicemen were granted loans up to a maximum of $18,000 to assist them in the purchase of existing farms of their own choosing. Under this scheme 2,878 ex-servicemen were granted loans amounting to $23,917,338.

The Soldier Settlement Act enabled the Commission to make advances to general settlers and Single Unit Farm settlers to assist them in the purchase of stock, plant, equipment, and shares in co-operatives. For this purpose $12,566,142 has been advanced to settlers and at 30 June 1967, $12,448,598 has been repaid and $30,674 has been written off, leaving an outstanding balance of $86,870. In addition to its functions under the Soldier Settlement Act, the Commission, on behalf of the Commonwealth Government, administered that portion of the *Commonwealth Re-Establishment and Employment Act* 1945, which related to agricultural loans and allowances.

With soldier settlement in its final stages, the following tables set out the particulars of rural rehabilitation of ex-servicemen in Victoria as at 30 June 1967 :

VICTORIA—LAND ACQUIRED AND COST OF DEVELOPMENT, 1945 TO 1967

Particulars	Land Acquired and Total Expenditure to 30 June 1967		Balance Outstanding at 30 June 1967
	acres	$'000	$'000
Freehold Land	1,193,171	39,448	9
Crown Land	51,536		
Development and Improvement of Holdings	..	53,877	
	Total Realisations to 30 June 1967		
	acres	$'000	
Sales of Land Not Required for Soldier Settlement	65,041	3,281*	338*

* Sale price of land not required for settlement; balance outstanding represents instalments not yet due where terms were given to purchasers who are not necessarily ex-servicemen.

VICTORIA—ADVANCES TO EX-SERVICEMEN, 1945 TO 1967

Act	Total Advances to 30 June 1967		Advances Outstanding at 30 June 1967	
	No.	$'000	No.	$'000
Soldier Settlement Act—				
Advances for Settlers' Lease Liability*	3,033	57,562	2,230	38,722
Advances to Assist in Acquiring and Developing Single Unit Farms	2,878	23,917	1,345	8,831
Advances for Improvements, Stock, Implements, etc. ..	†	12,316	141	87
Advances for Shares in Co-operatives	327	250	..	..
Commonwealth Re-establishment and Employment Act—				
Advances to Assist Rehabilitation in Farming Industry	2,970	3,594	173	40

* The total number of settlers allocated holdings is 3,293 which includes 239 holdings re-allocated and 17 holdings disposed of.

† Not available.

Other Land Settlement

The *Land Settlement Act* 1959 extended the functions of the then Soldier Settlement Commission in that, under such Act, the Commission was given authority to administer a new land settlement scheme to cater for those men wishing to become farm owners—many of whom were too young to have been ex-servicemen and thus eligible for soldier settlement. The scheme generally is based on the same principles as the scheme for soldier settlement—the main differences being the interest rates payable and the basis of determining the capital liability of the settler for the farm. There is no provision in the Act for advances to buy single unit farms. The Commission is given authority to purchase privately owned land or set apart suitable Crown land for development and subdivision.

Any male British subject over the age of 21 years is eligible to apply for land made available, but the actual allocation is made on a competitive basis, having regard to a number of factors laid down in the Act, including the applicant's experience in farming and prospects of success. A feature of the legislation is that the farms are either brought to, or within sight of, production before allocation. Further details about the general principles of this legislation will be found on pages 494 to 496 of the *Victorian Year Book* 1963.

Up to 30 June 1967, the land being developed for allocation under this scheme has been on four developmental projects. These are at Heytesbury near Cobden, Yanakie on Wilson's Promontory, the East Goulburn Project near Shepparton, and an irrigation project at Rochester.

The Yanakie and East Goulburn schemes have now been completed and all farms allocated to settlers.

The demand for all holdings allotted to date has been exceedingly keen and the 460 farms allocated (381 dairying and 79 soft fruit) attracted nearly 12,000 applications.

At 30 June 1967, the position of other land settlement in Victoria under the *Land Settlement Act* 1959 was as follows :

VICTORIA—OTHER LAND SETTLEMENT, 1959 TO 1967

Particulars	Land Acquired and Total Expenditure to 30 June 1967		Balance Outstanding at 30 June 1967	
	acres	$'000	$'000	
Land Acquired—				
Freehold Land Purchased ..	23,928	1,970	12,542	
Crown Land	106,681			
Development and Improvement of Holdings	..	20,629		
	Total Realisations to 30 June 1967			
	acres	$'000		
Sales of Land Not Required for Settlement	6,125	537*	272*	
	Total Advances to 30 June 1967		Advances Outstanding at 30 June 1967	
	No.	$'000	No.	$'000
Advances to Settlers under the Land Settlement Act ..	†	1,064	234	225
Liability of Settlers Granted Purchase Leases	253	7,819	253	7,684

* Sale price of land not required for settlement ; balance outstanding represents instalments not yet due where terms were given to purchasers.

†Not available.

Other Rural Finance Facilities

State Savings Bank of Victoria

State Savings Bank loans for rural purposes fall into two categories :

(1) Credit Foncier Department loans are long-term advances to enable borrowers to purchase or improve farms. The maximum loan available from this source is $7,000 carrying interest at 5 per cent per annum and repayable over 10 years (subject to renewal). The maximum loan must not exceed three-quarters of the value of the property. Particulars for the year ended 30 June 1967 may be found on page 694.

(2) Savings Bank Department loans are advances of larger amounts—the maximum loan is $20,000—and are available on the security of first mortgage over freehold property. These are short-term loans extending over a period of three years, but are subject to renewal. Interest charged is either 5·75 or 6·25 per cent per annum depending on whether the property is occupied by the borrower or whether the loan exceeds $10,000. The maximum loan must not exceed two-thirds of the value of the property.

Reserve Bank of Australia—Rural Credits Department

The Rural Credits Department was established in 1925 as a department of the Commonwealth Bank of Australia, now known as the Reserve Bank of Australia. Its function is to provide finance to statutory marketing boards and similar authorities and to co-operative

associations of primary producers. Advances are used by borrowers principally for making payments to growers for their primary produce pending its sale and to finance marketing expenses which in some cases include processing and packing of the commodity.

Finance for the marketing of wheat, and to a lesser extent, dairy products and barley has comprised the major portion of accommodation provided, but the Department's operations have also covered such commodities as tobacco, canning fruits, dried fruits, meat, eggs, and fertilizers.

The interest rates for advances to 28 February 1967 were 4·25 per cent per annum, if against the security of a Commonwealth or State Government guarantee, and 4·5 per cent per annum against other securities ; from 1 March 1967 the rates were increased to 4·5 per cent and 4·75 per cent per annum, respectively.

Grants have also been made by the Rural Credits Development Fund for research and extension work to assist the development of primary industries. The Fund is financed by one-half of the annual net profits of the Rural Credits Department.

Farm Development Loan Fund

The Farm Development Loan Fund was established in 1966 to provide loans to primary producers, at preferential rates and conditions, for drought relief and farm development purposes. Loans are made by the trading banks from their Farm Development Loan Fund Accounts with the Reserve Bank, and are designed to supplement other loans available from the banking system.

Commonwealth Development Bank

A brief outline of the functions of the Commonwealth Development Bank, together with particulars of rural advances outstanding at 30 June 1967, may be found on pages 689–691. Rural loans are made for a variety of purposes, e.g., clearing, fencing, pasture improvement, farm water conservation, erection of essential farm buildings, and the stocking of properties. Other aspects of assistance granted include aid to successful applicants in government sponsored rural development schemes and land ballots. Special attention is also given to providing finance to applicants opening up new areas. Particulars of rural advances approved in Victoria during the year ended 30 June 1967 are given in the following table :

VICTORIA—COMMONWEALTH DEVELOPMENT BANK OF AUSTRALIA : RURAL ADVANCES APPROVED, YEAR ENDED 30 JUNE 1967

($'000)

Type of Rural Activity	Value of Rural Advances Approved
Sheep	2,689
Dairying	2,014
Cattle	630
Wheat	329
Fruit Growing	384
Poultry	177
Other	250
Total	6,473

The average loan approved for rural purposes during the year was $10,770.

Advances by Major Trading Banks

The extent of rural lending in Victoria by the Commonwealth Trading and other major trading banks is illustrated by the following table which shows bank advances to borrowers outstanding at the end of June for the five years 1963 to 1967 :

VICTORIA—COMMONWEALTH TRADING BANK AND PRIVATE TRADING BANKS : BUSINESS ADVANCES OUTSTANDING TO RURAL INDUSTRY BORROWERS

($m)

Industry of Borrower	Amount Outstanding at the End of June—				
	1963	1964	1965	1966	1967
Sheep Grazing	39.8	39.8	45.6	49.2	61.5
Wheat Growing	7.8	8.4	12.2	15.2	18.6
Dairying and Pig Raising	29.7	31.8	31.2	31.9	40.8
Other Rural	19.4	20.2	21.2	22.9	29.8
Total	96.7	100.2	110.2	119.2	150.7

Advances to rural industry borrowers represented 20·4 per cent of trading banks' business advances outstanding at the end of June 1967, and 16·6 per cent of all advances outstanding. The maximum rate of interest on bank overdrafts at 30 June 1967 was 7·25 per cent per annum but the average rate on rural loans would probably be below this level.

Advances of Pastoral Finance Companies

The following table shows total rural advances outstanding to pastoral finance companies at the end of June for the five years 1963 to 1967 :

VICTORIA—RURAL ADVANCES* OF PASTORAL FINANCE COMPANIES

($m)

At End of June—	Advances Outstanding
1963	35.6
1964	39.0
1965	43.9
1966	40.9
1967	50.2

* Held by branches located in Victoria which is not necessarily the State of residence of the borrower.

Improvement Purchase Leases

Crown land can be made available for application under improvement purchase lease conditions. All applications received are dealt with by a Local Land Board and no person is eligible to obtain a lease if the unimproved value of the area applied for together with the unimproved value of the land already owned by the applicant exceeds $15,000.

The essential conditions of an improvement purchase lease are as follows :

(1) That the lessee will make such land improvements within the first six years as are specified. Land improvements means the clearing, draining or grading of land, the preparation of land for the sowing of crops and pasture, and soil improvement and maintenance.

(2) That the lessee will commence to carry out the land improvements within one year and will complete one quarter within three years.

(3) That the lessee will not sell, assign, or part with possession of the leasehold during the first six years.

(4) That the lessee will not mortgage his interest in the leasehold during the first six years without first obtaining the consent of the Department.

(5) That the lessee will establish his permanent home on the land before the end of the sixth year. If the land is not considered to be capable of being developed into a living area, then the lessee may reside on other land within 20 miles owned by him.

The purchase money is payable in twenty annual instalments and on satisfactory compliance with the conditions of the lease and on payment of the balance of purchase money and fees, a Crown grant will be issued at any time after the first six years.

Since the inception of improvement purchase leases in 1956 and up to 31 December 1966, 730 allotments comprising 257,037 acres of Crown land have been proclaimed available for settlement.

Water Supply and Land Settlement

History

For practical purposes, the history of water supply in Victoria—outside the Metropolitan Area—can be taken up in the early 1880s when the miners who had left the goldfields to settle on the northern plains began to assess after a few exceptionally favourable years the true nature of the arid lands which they were pioneering. It was their agitation which led to the *Irrigation Act* 1886 providing for elected local trusts to construct water supply works with Government loan funds.

Between 1886 and 1900, about 90 Trusts were set up under this Act, but for a variety of reasons they all proved a failure. By 1900, the need for a State-wide approach to the water supply problem was apparent and in 1905 the Water Act was passed. This revolutionary

Victorian Act, which has since provided the basis for practically all of the rest of Australia's water supply development, had three main features :

(1) It abolished all but one of the Trusts (Mildura) and wrote off their debts ;

(2) it set up the State Rivers and Water Supply Commission to develop and control water supply and conservation throughout the State, with the exception of the Melbourne Metropolitan Area ; and

(3) it completed the nationalisation of water resources commenced in the 1886 Act and vested in the Crown the right to the use and control of the water in the State's rivers, streams, etc., thus avoiding the litigation which has clouded the history of water supply elsewhere.

Control of Surface Waters and Other Functions

One of the State Rivers and Water Supply Commission's main functions is to exercise the Crown's rights to the control and use of rural surface waters, and to act on any infringement of these rights. The Crown's interest is to see that limited resources are distributed fairly and productively between users. This is done by licences and permits for private diversions from streams, and by the apportionment of resources to authorities constituted under the Water Act.

The Commission also investigates water resources and plans works. It operates 292 gauging stations on streams and publishes the information obtained. Records of river flows extend back to the 1860s. Investigation and planning require surveys, and there are thirty-five surveyors working from ten centres. Other Commission investigatory services are its Testing Laboratory and Irrigation Research Section at Head Office, and its Hydraulic Research Station at Werribee.

Irrigation

Most irrigation is carried out in districts directly controlled by the Commission, although there is an increasingly large proportion of " private diverters ", irrigators who are authorised to take water from streams, lakes, etc., but who do not come within the boundaries of an irrigation district. (See page 308.)

A feature of the districts is the system of " water rights ". Under this system a certain quantity of water is assigned to each district and allotted to the lands commanded and suitable for irrigation. The irrigators pay a fixed sum for this water each year, whether they use it or not, and also pay a general rate. The irrigators get this water right in all except the very driest years and they can also buy water in excess of the water right in most seasons. The water right system assures irrigators of a definite quantity of water each year, and the Commission can rely on fairly constant revenue to meet the cost of district operation. Water usage varies according to seasonal conditions and the water right system provides a constant minimum income.

A feature of Victorian irrigation policy has been the development of closer settlement by intensive irrigation, that is, by allocating relatively large quantities of water per holding instead of limiting the

allocation of water to a portion of each holding. This has meant that Victorian irrigation is predominantly devoted to dairying, fruit, and vegetables, rather than to sheep raising. The advantage of intensive irrigation is that much higher returns are available from a given quantity of water and, consequently, a much greater rural population is supported.

Major storages devoted principally to irrigation are shown in the following table :

VICTORIA—MAJOR IRRIGATION STORAGES

River	Name	Capacity	Principal System or District Served
		acre ft	
Goulburn ..	Lake Eildon ..	2,750,000	Goulburn–Loddon
	Goulburn Reservoir..	20,700	,, ,,
	Waranga Reservoir ..	333,400	,, ,,
Campaspe ..	Lake Eppalock ..	252,860	,, ,,
Loddon ..	Cairn-Curran Reservoir	120,600	,, ,,
	Tullaroop Reservoir..	60,000	Maryborough town supply; private diverters ; and Goulburn–Loddon System
Murray ..	Lake Hume ..	1,240,000*	Murray
	River Murray Weirs..	111,575*	,,
Macalister ..	Lake Glenmaggie ..	154,300	Macalister
Werribee ..	Pykes Creek Reservoir	19,400	Bacchus Marsh District
	Melton Reservoir ..	15,500	Werribee District
		5,078,335†	

* Victoria's half share under the River Murray Agreement, subject to certain obligations to South Australia.

† In addition to the storages named, there is a system of natural lakes in the Kerang–Swan Hill Area forming part of the Torrumbarry System. The Coliban River storages are used for both irrigation and town supply around Bendigo and Castlemaine. A limited irrigation area is also supplied from the Wimmera–Mallee System.

The following table compiled by the Commission shows the total areas of the various irrigation systems and the areas under irrigated culture during 1966–67 :

VICTORIA—AREA OF SYSTEMS AND LANDS IRRIGATED, AND WATER DELIVERED, 1966–67

System or District	Total Area within Constituted District	Area Irrigated (Acres)								Water Deliveries
		Pastures		Lucerne and Sorghum	Vineyards	Orchards	Market Gardens	Others	Total	
		Native	Sown							
Goulburn–Loddon System	1,351,862	22,897	458,824	30,930	355	24,970	5,711	37,946	581,633	acre ft 891,432
River Murray System—										
Torrumbarry System* ..	372,342	24,163	240,643	12,810	4,250	1,568	721	10,531	294,686	328,069
Murray Valley Area ..	301,749	657	107,660	9,091	116	6,591	454	392	124,961	219,551
Pumped Supply Districts†	80,615	311	304	1,041	38,982	3,279	157	1,525	45,599	146,660
Total River Murray	754,706	25,131	348,607	22,942	43,348	11,438	1,332	12,448	465,246	694,280
Macalister District ..	129,939	2,833	58,649	475	..	..	137	55	62,149	90,401
Werribee–Bacchus Marsh	16,341	2	5,699	1,003	..	638	4,207	54	11,603	21,438
Other Northern Systems ..	‡	807	12,777	1,144	..	3,196	496	85	18,505	31,693
Other Southern Systems ..	‡	..	..	..	..	..	1,650	258	1,908	..
Private Diversions ..	‡	3,043	125,447	11,848	3,715	6,352	13,084	9,355	172,844	400,809
Grand Totals ..	2,252,848§	54,713	1,010,003	68,342	47,418	46,594	26,617	60,201	1,313,888	2,130,053

* Includes 31,406 acres irrigated by private diversion.

† Including First Mildura Irrigation Trust (16,288 acres irrigated), supervised by the Commission.

‡ Not available.

§ Incomplete.

Private Irrigation

Private irrigation by diversion of water from rivers, lakes, etc., has increased in recent years. From 1942–43 to 1966–67, the area watered privately increased from 23,462 acres to 172,844 acres, the latter being 13 per cent of the total area irrigated. The number of private diversions authorised during 1966–67 was 8,360 and the water delivered was used mainly to produce annual and perennial pastures and fodder, as well as potatoes, tobacco, hops, citrus, and cotton. About half the area privately watered is supplied from streams regulated by storages, the other half being from streams wholly dependent on rainfall. Many private storage dams are being built, frequently at substantial cost, on individual properties to insure against low flows in the streams normally used.

Town Supplies

The Commission operates major works for town water supplies outside the Melbourne Metropolitan Area—the Coliban System supplying Bendigo, Castlemaine, and other towns in that area; the Mornington Peninsula System supplying towns extending from Longwarry to portion of Dandenong, the bayside towns from Seaford to Portsea, and the Westernport towns from Hastings to Somers; the township of Wonthaggi; the Bellarine Peninsula System supplying water to the towns extending from Portarlington to Anglesea; and the Otway System supplying water from the Otway Ranges to Camperdown, Cobden, Terang, and Warrnambool. The total towns supplied by the Commission are 144 and their total population is 315,250. (For other town supplies and sewerage—see page 233.)

Finance

Acting as a government authority, the Commission constructs its works with funds provided for the purpose by Parliament—amounting to date to about $300m including contributions by the State of Victoria towards works carried out for the River Murray Commission. A further $90m of Government loan moneys has been provided for expenditure by local authorities under the supervision of the Commission. In recent years the rate of expenditure on construction of State works has been about $13.5m annually, and the Commission also supervises the expenditure of about $5m annually by local authorities.

The Commission administers, supplies water to, and collects revenue from, nearly 120 separate districts, each of which is run financially as a separate undertaking. Revenue from its ten irrigation districts exceeds $5m; from its urban districts about $3m; from its ten rural waterworks districts about $1m, and from its three flood protection districts about $100,000—the total annual revenue, including other minor sources, being nearly $9.5m.

Administration

The Commission is served by a decentralised organisation, designed to carry out diverse functions all ultimately related to water. Central administrative, engineering, and clerical functions are carried out by a staff of 500 in the Head Office at Armadale. At the many country

centres throughout the State, there are 1,050 other officers and some 1,750 casual employees. Together they are engaged in planning, building, maintaining, and operating waterworks vital to the prosperity of rural Victoria.

Water Conservation

In 1963, a ten year plan was introduced for the construction of nine large water storages by the State Rivers and Water Supply Commission and its participation in a tenth storage on the River Murray for the River Murray Commission.

Devilbend Reservoir on the Mornington Peninsula, opened in January 1965, is filled by aqueduct and pipe from the headwaters of the Tarago and Bunyip Rivers. Water from Devilbend is released through pipelines to the eastern and western sides of the Peninsula; the projected industrial development at Hastings will also be supplied from Devilbend.

Lake Bellfield of 60,000 acre ft capacity in the Grampians was completed in 1966. It will serve as a reserve storage for very dry years in maintaining supplies to the extensive stock and domestic system in the Wimmera and Mallee wheat growing areas.

The third project is the harnessing of the Ovens River by a two stage development on the Buffalo River south of Myrtleford. Lake Buffalo, the first stage reservoir of 20,000 acre ft was completed in 1965, and provided an assured water supply to the rich agricultural lands in the river valley between the dam and Wangaratta.

The second stage reservoir of 800,000 acre ft will augment supplies to irrigated areas in the lower Ovens and Murray Valleys. Site investigations for the large dam are now in progress.

The Corop Lakes storage is north of Colbinabbin and adjacent to the Waranga Western Channel, which forms the main artery for irrigation supplies from Waranga Reservoir west to the Loddon River and beyond. The first stage is complete and water has been diverted into Green's Lake from the main channel. Pumps of 100 cu ft per second capacity have been installed to deliver water from the Lake back into the channel during periods of peak demand. Further pumps of similar capacity will be installed and available during 1968.

Lake Nillahcootie, on the Broken River 20 miles south of Benalla, commenced storing water in May 1967. Work began in late 1965 as the construction force formerly employed on the Buffalo Dam moved in. The flow of this river can now be regulated in the best interests of primary production in the Broken River Valley, while the threat of floods to the city of Benalla will be greatly lessened.

Another well advanced project is the Tarago River storage, near Neerim South, north of Warragul, where an earth-and-rock-fill dam will create a storage of 20,000 acre ft to augment urban and industrial supplies to the Mornington Peninsula. Until this reservoir

is operating in 1968, flow in the aqueducts taking water from the headworks depends on the natural flows of the Bunyip and Tarago Rivers, which can fall to a low level during a dry summer and autumn. The reservoir was ready for storage during winter 1968.

The proposed water storage on Coimadai Creek near Bacchus Marsh to be known as Lake Merrimu, will secure irrigation supplies for the Werribee District. This project has commenced and a contract has been let for the first stage diversion tunnel. The whole project will be divided into three stages comprising :

(1) A 15,000 acre ft capacity storage and a diversion tunnel from Goodmans Creek ;

(2) a diversion tunnel from the Lerderderg River to Goodmans Creek ; and

(3) an increase in the capacity of the storage to at least 40,000 acre ft.

The second and third stages will provide for increases in demand for urban and industrial needs in adjacent areas.

Preparations are being made for commencing the construction of the Lake Mokoan Storage. This is an off-river storage at Winton Swamp for the further conservation of the flow of the Broken River. An essential part of this project is the large diversion channel from the river south of Benalla into the Swamp.

These works will be operated to obtain the best possible use of the water in irrigation areas served largely by the Goulburn River system. This will be done by diverting the higher river flows into the comparatively shallow reservoir and releasing them early in the season, thus saving water in Lake Eildon where the evaporation losses are smaller.

Of the nine water storages included in the Ten Year Plan, five are operating, and the sixth storage was due to operate in 1968. Two further projects at Coimadai Creek and Lake Mokoan are now getting under way, to be followed shortly by the second stage Buffalo River storage. Already the most pressing needs of water conservation for the years that will follow completion of the first 10-year plan are being considered and a further plan is rapidly taking shape.

No survey of progress with water conservation work would be complete without reference to the parallel development which is taking place in the provision of recreational facilities at the man-made lakes which the storages create. Many of these lakes are situated in delightful natural surroundings and attract increasing numbers of tourists. In most cases the lakes are open for aquatic sports and this aspect of planning, although incidental to the primary theme, forms an important part of the whole.

Irrigation, 1962 ; Wimmera–Mallee Region Water Supply and Flood Protection, River Improvement, and Drainage, 1963 ; Underground Water, 1964 ; Water Supply in Victoria, 1964 ; Goulburn–Murray Irrigation District, 1965 ; Spray Irrigation in Agriculture and Dairying, 1965 ; Private Irrigation Development, 1966 ; Water Research Foundation, 1966 ; River Improvement, 1967 ; Rivers and Streams Fund, 1967 ; Dandenong Valley Authority, 1968

Agricultural Education, Research, and Extension Services

Tertiary Agricultural Education

Agricultural Colleges

The legislation of 1884, which provided for the establishment of agricultural colleges, set up a Council of Agricultural Education for their administration. Its revenue was derived from the rentals of endowment lands, sales of farm produce, and students' fees, and it continued to administer the Colleges until 1944 when, with the passing of a new Agricultural Colleges' Act, control passed to the Department of Agriculture in which a new Division of Agricultural Education was established. This move has provided adequate finance for maintenance and capital expenditure, the latter including a complete rehabilitation programme for both Dookie and Longerenong Agricultural Colleges in the period from 1959 to 1963.

The main purpose of the Colleges is to train agricultural technologists in the basic technical and scientific principles underlying all aspects of agriculture. Lectures on all topics are complementary with demonstrations, tours, laboratory work and practical farm work, the latter being given on large farm areas attached to each College—6,048 acres at Dookie and 2,386 acres at Longerenong. Although the emphasis is placed on training technologists to assist in agricultural research and extension, intending farmers will gain a sound technical and scientific background to enable them to make best use of modern agricultural and economic developments in operating their own properties.

In 1966, a revised syllabus was introduced at Dookie and Longerenong and after successful completion of the three-year course, students gain a Diploma of Agricultural Science. The minimum entrance standard is a pass in five subjects including English and Chemistry at the Leaving or Leaving technical examination.

The development of post-secondary education in all technical fields which has taken place since 1967 has made it essential that the agricultural colleges raise the entrance standard to the Matriculation level, as has been done in other Australian States. The Colleges will offer an Associate Diploma in Agricultural Science, and it is anticipated that this will be effected not later than February 1970. This is timed to coincide with the opening of a third agricultural college at Glenormiston which will provide a two-year course in production and management for the future practising farmer.

Short intensive courses for farmers, farmers' sons, and others engaged in rural pursuits are provided at Dookie Agricultural College.

In 1967, the three-year course for the Diploma of Horticultural Science was introduced at the Burnley Horticultural College, with the same pre-requisite entrance requirements as for the agricultural colleges. This replaced the Diploma of Horticulture course introduced in 1958. The new course is comprehensive, giving tuition and practical experience in fruit and vegetable production, ornamental horticulture, nursery management and landscape design, as well as training in the basic physical, biological, and applied sciences.

Part-time evening classes in horticultural, agricultural, and associated science subjects are also conducted at Burnley. The Agricultural Education Division also administers the Government Grant to the Senior Young Farmers of Victoria.

University of Melbourne School of Agriculture

The Faculty of Agriculture was set up in its present form by the *Agricultural Education Act* 1920, which provided for permanent staff, for a building, and for the employment of graduates as scientific officers in the State Public Service. (There had been less permanent arrangements for teaching agriculture in the University earlier in the century.) The first full-time Professor took up his appointment in 1926.

The primary purpose of the four-year University course has been to give all students a common basic training in applied biology. The first year is devoted to pure science subjects. This is followed by three years in which the scientific principles upon which agriculture is based are presented and in which students learn of their application to the practice of agriculture. The subjects of the later years include more advanced chemistry and biochemistry, plant physiology and pathology, soils, microbiology, genetics, animal physiology and husbandry, agronomy, economics, and land utilisation. The students in Agricultural Science also attend courses in engineering subjects, while a full-time degree in Agricultural Engineering is conducted elsewhere in the University.

The second year of the course is spent in residence at the University's field station at Mount Derrimut (near Deer Park). This is a property of 800 acres on which the students are shown the regular farm operations and live through a farming year, while spending their mornings on regular lecture classes and coming to Melbourne University for one day a week.

Since the establishment of the Faculty of Agriculture, 900 graduates have entered the profession. A quota of 70 is now placed on the numbers in the first year of the course, and the number of graduates is between 40 and 50 per annum. There are now eighteen students for higher degrees (M.Agr.Sc. and Ph.D.) working either at the University or at Mount Derrimut. Substantial buildings have been established at Mount Derrimut from various industrial research funds for the study of beef cattle, poultry, sheep and wool, and wheat.

Further Reference, 1967; Research, 1967

Research and Extension Activities of the Department of Agriculture

The research and extension activities of the Department of Agriculture have greatly helped Victoria's agricultural productivity. Today, these activities overshadow the Department's original and still important function of administering agricultural legislation enacted by the Victorian Parliament.

Research work began in the early days of the Department, and received a great stimulus in 1912 with the establishment of the State Research Farm at Werribee and the Rutherglen Research Station. The pattern set by this development has continued to the present time, where there are now seventeen research stations with a total area of about 10,000 acres. These research stations are strategically located throughout the State and conduct research on a wide range of problems associated with all the major farming industries. Some of the research is, necessarily, of a basic nature, but for the most part, the stations undertake applied research aimed at finding a solution to a particular farm problem.

In co-operation with farmers, the Department also conducts field experiments on many properties. This work, together with the experiments at the research stations, makes the Department the regional research authority for Victoria.

The Pastoral Research Station, Hamilton, is an excellent example of Victoria's newer research stations. Although established only ten years ago to investigate problems of sheep and beef cattle husbandry on permanent pasture under typical Western District conditions, it is recognised now as one of the foremost regional research centres of its type in Australia. Experiments are being conducted on reproduction and pasture use by sheep, growth and fattening of steers on pasture and pasture productivity. The research stations are backed by well equipped laboratories in central locations. The Victorian Plant Research Institute at Burnley is fully equipped and staffed to carry out research on pests and diseases of plants.

The aim of the Department of Agriculture's extension service is to advise primary producers and to encourage them to adopt methods which contribute to progress in the agricultural, pastoral, and horticultural industries of Victoria. Special attention is being given these days to the development of a modern and efficient extension service because it is seen as an important adjunct to research.

Agricultural research can be costly : research stations are expensive to establish and maintain ; scientific equipment demands a large budget ; scientific personnel need to receive intensive training before they can fulfil their tasks adequately. Research has already paid great dividends and will continue to do so if the results are adopted by the appropriate primary producers. The link between research and the farmer is provided by an extension service. The extension service aims to provide recommendations based on findings which have been proved both practical and economical. Led by trained scientists, it is decentralised throughout the State with technical and informational support being given from Melbourne. Some country-based extension officers serve an industry such as sheep and wool or dairying ; others are specialists in crops such as cereals or fruit and vegetables.

To get advice to farmers, extension officers make farm visits, use publications, radio, films, and television, and participate in field days and meetings. In these ways, the extension service plays its part in helping Victorian primary producers continue to increase their important contribution to the national economy.

Further Reference, 1968

Size Distribution of Rural Holdings in Victoria

Victoria has a total area of 56·3 mill. acres but at no time in the history of land settlement has the area occupied for rural purposes exceeded 41·3 mill. acres recorded in 1940–41. Prior to that time, with the exception of a small fall in the early 1930s, the area occupied had shown an annual increase. As would have been expected, this increase was rapid in the early period of settlement and more gradual in the later periods. Over the period 1860 to 1890 the increase totalled 30 mill. acres but in the period 1910 to 1940 an increase of only 3·3 mill. acres was recorded. After 1940–41, the rising trend was reversed and a gradual decline in area occupied for rural purposes began. By the 1960s the total appeared to have stabilised at a figure of slightly under 38 mill. acres which is close to the level recorded 50 years previously. This reduction in total area available for rural purposes reflects the recognition of the necessity to reserve land for water conservation and timber production and the withdrawal of Crown leases in some areas previously used for grazing, as a means of conserving natural resources. The reduction has taken place despite the fact that the Rural Finance and Settlement Commission has developed significant areas of Crown land which have subsequently been made available for settlement. It is to be expected that further areas will be developed but because most of existing Crown land is required for other purposes or because it is unsuitable for rural development, it is unlikely that there will be any marked change in the area available in the future.

Victoria, then, appears to have reached a stabilised position so far as the availability of additional land is concerned. This means that neither total rural production nor individual farm size can be substantially increased by further allocation of Crown lands and so far as farm size affects the position, any problems related to productivity or low farm incomes can only be overcome by adjustment to the existing property size structure in the State. These problems as they relate to prosperity of individual farmers have been accentuated in recent years by a weakening in world markets for certain rural products. Adjustment in farm size spontaneously by farmers with or without Government assistance appears inevitable in many cases and the following brief description of past trends and the present property size distribution will give some background to consideration of these problems.

As was the case with area occupied, the total number of rural holdings in Victoria increased rapidly in the early stages of settlement. The 13,600 rural holdings recorded in 1860 had increased to 49,600 by 1880. The rate of increase declined markedly after the turn of the century and the total reached a peak of close to 80,000 in the mid 1920s which was almost 20 years before the peak figure occurred in the total area occupied. There was a rapid decline in the total number of holdings to a figure close to 74,000 by 1930 and since then an almost constant gradual decline to the present level of about 69,000. There have been a number of factors concerned in the changes which have taken place. Although the changes appear to have resulted largely from individual action by land holders in property amalgamation or

fragmentation, the intensive periods of Closer Settlement (1906 to 1913) and Soldier Settlement after the two world wars have no doubt been important influences. The following table shows trends in size distribution since 1925 :

VICTORIA—PROPERTY SIZE DISTRIBUTION : NUMBER OF RURAL HOLDINGS CLASSIFIED IN AREA SERIES

As at March—	Acres								
	1 to 49	50 to 99	100 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 19,999	20,000 and over	Total†
	Number of Holdings ('000)								
1925*	22·1	9·2	28·5	12·5	6·4	0·3	0·1	0·01	79·1
1929*	19·8	8·4	26·0	12·4	6·9	0·3	0·1	0·02	73·9
1934*	19·3	8·5	26·7	12·2	7·4	0·3	0·1	0·02	74·5
1938*	18·6	8·0	26·0	11·0	7·8	0·3	0·1	0·02	71·8
1948	17·1	7·7	26·4	10·7	8·3	0·4	0·1	0·09	70·9
1950	16·3	7·7	26·7	10·8	8·4	0·4	0·1	0·08	70·5
1956	14·5	7·6	27·3	11·2	8·4	0·4	0·1	0·07	69·5
1960	14·5	7·3	27·6	11·3	8·6	0·4	0·1	0·06	69·8
1966	14·5	6·9	27·5	11·0	8·8	0·3	0·1	0·06	69·2

* Earlier figures relate to privately owned land and exclude Crown land not held in conjunction with that privately owned. In 1925 there were 935 additional holdings on Crown land. Figures for the other years concerned were : 1929—974 holdings, 1934—931 holdings, and 1938—968 holdings. Size distribution for these holdings is not available. Later figures incorporate holdings of this kind in the size distribution shown above.

† Totals are rounded to the nearest decimal.

The table shows that there has been a decline in the number of properties in all size groups below 1,000 acres since 1925 with the most marked decrease (from 22,100 to 14,500) being in the number of holdings below 50 acres and a substantial decrease in the 50 to 99 acre size group. The number of properties in the 1,000 to 4,999 acre group has increased and it is apparent that overall, the fragmentation effects of property subdivision have been more than offset by amalgamation of holdings. The 1965–66 figures are the latest available and some small changes no doubt have taken place since then. However, these changes would have only a small effect on size distribution and there have been no factors in operation which would have resulted in marked change. The 1965–66 figures would, therefore, give a reasonably accurate picture of the present situation.

There were 465 holdings in Victoria of above 5,000 acres in 1966. Of these 335 were between 5,000 and 9,999 acres, 70 between 10,000 and 19,999 acres, 50 between 20,000 and 100,000 acres, and 10 of over 100,000 acres. Five of these very large holdings (above 100,000 acres) were in the Mallee ; three were in the North Eastern District ; and two were in Gippsland. It is likely that they include very substantial areas of undeveloped natural vegetation. The table shows

that the greatest number of holdings, some 27,500 or 39 per cent of the total, are classified in the 100 to 499 size group. Some 14,500 (21 per cent) are in the under 50 acre classification and 11,000 (15 per cent) are in the 500 to 999 acre group. The distribution of property size in the various districts is, of course, related to the suitability of environmental conditions, in particular, soils, climate, and availability of irrigation to the more or less intensive forms of agriculture. The dry (non-irrigated) areas of the Mallee have low rainfall and are unsuited to intensive agriculture. Since productivity on a per acre basis is low, farm size tends to be higher than in other areas. The following table shows some details of property size distribution in the various Statistical Divisions in Victoria :

VICTORIA—PROPERTY SIZE DISTRIBUTION BY STATISTICAL DIVISIONS, 1965–66: NUMBER OF RURAL HOLDINGS CLASSIFIED IN AREA SERIES

Statistical Division	Acres						
	1 to 49	50 to 99	100 to 499	500 to 999	1,000 to 4,999	More than 5,000	Total
	Number of Holdings						
Metropolitan ..	2,385	346	398	41	10	..	3,180
Central ..	3,566	1,775	4,661	786	319	11	11,118
North-Central	964	415	1,633	704	530	21	4,267
Western ..	1,354	1,009	6,548	2,651	1,527	82	13,171
Wimmera ..	300	128	1,106	2,146	1,974	66	5,720
Mallee ..	2,415	342	328	607	1,787	154	5,633
Northern ..	2,152	1,292	4,402	2,038	1,525	38	11,447
North-East ..	549	373	2,818	1,395	746	50	5,931
Gippsland ..	734	1,241	5,627	669	418	43	8,732
Total ..	14,419	6,921	27,521	11,037	8,836	465	69,199

The influence of the availability of irrigation water, when combined with climatic factors suitable to a particular type of production in modifying size distribution, is illustrated by the large number of farms in the under 50 acre size group in the Mallee. Irrigation settlements in these areas are mainly used for vine fruit and citrus production which are highly intensive industries and are usually carried out on areas falling within this size classification. In the Wimmera there is no large scale development of irrigation and rainfall is not adequate for intensive forms of production. As a result, less than 10 per cent of properties are in the groups below 100 acres and more than 70 per cent of holdings have an area greater than 500 acres. On the other hand, Gippsland generally has environmental conditions well suited to growth of perennial pastures and to dairy production which under

these conditions are highly productive on a per acre basis. In this Division some 87 per cent of properties are of less than 500 acres in area and almost 74 per cent are of less than 300 acres. Size distribution in the Metropolitan and Central Divisions is influenced by proximity to Melbourne and the large proportion of small holdings in these districts is related to supply of produce to Melbourne markets. Other Divisions are more varied environmentally and production in these Divisions is also varied. In consequence, property distribution tends to be more even between the size groups.

Future changes in size distribution are likely to take place slowly but the trend shown since 1925 for the number of small holdings to decrease is likely to continue. As has been indicated, these holdings are used for intensive forms of production and several of the industries concerned are facing marketing difficulties with consequent low unit prices for the products concerned. Under these circumstances, the need to maintain farm family living standards can only result in change to other forms of production or farm amalgamation for the same form of production. Both involve increase in farm size and an overall decrease in the number of small holdings.

Bureau of Agricultural Economics, 1966; Farm Management, 1967; Agricultural Extension Services, 1968

Farming

Introduction

Collection of Statistics

Prior to 1904, the statistics were collected by the municipal authorities who were required by statute to furnish information on such forms and in such manner as was required by the Governor in Council. During the period 1904 to 1966 police officers were required to collect agricultural, pastoral, and dairying statistics from land holders in Victoria. Commencing with the 1966–67 Farm Census, the collection of these statistics has been carried out on a direct postal basis.

The rural statistics contained in this chapter are mainly compiled from annual returns of agricultural, pastoral and dairying production collected from some 70,000 rural holdings in Victoria, at 31 March each year. Statistics from these schedules are compiled for each county and municipality.

Every holding of 1 acre and upwards used for the production of agricultural products or for the raising of livestock and the production of livestock products is required to supply full particulars of the area occupied, the rural population, the number of persons employed, the area and yield of each kind of crop cultivated, artificial fertilizer usage, numbers of certain items of farm machinery, the number and description of livestock, the quantity of wool clipped, and other relevant matters.

Data relating to area sown, production, yield per acre, and number of holdings growing crops are for the season ended 31 March, thus including crops which are sown and harvested, or harvested, during the twelve months ended 31 March.

In cases where harvesting of certain crops has not been completed by 31 March (potatoes, fruit, vines, etc.), supplementary collections are made later in the year.

Livestock numbers, farm machinery on rural holdings, and the number of persons working are reported at 31 March, while wage and salary payments relate to the twelve months ended 31 March.

Summary of Australian Statistics

The following table, which summarises the principal farming activities in Australia during the 1966–67 season, shows the position of farming in Victoria relative to other States :

AUSTRALIA—PRINCIPAL ITEMS OF FARM ACTIVITY, 1966–67

Particulars	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	N.T. and A.C.T.	Australia
Rural Holdings—								
Number	76,246	**68,466**	43,858	28,957	23,181	10,641	504	251,853
Area ('000 acres)	171,649	**38,653**	379,977	161,510	274,765	6,507	170,368	1,203,428
Principal Crops—								
Wheat—								
Area ('000 acres) ..	7,135	**3,138**	1,227	2,960	6,347	13	3	20,823
Production ('000 bush) ..	202,501	**70,896**	35,730	53,816	103,195	385	87	466,610
Oats—								
Area ('000 acres) ..	1,363	**1,079**	66	509	1,204	36	2	4,258
Production ('000 bush) ..	40,904	**31,248**	1,467	10,276	22,117	948	47	107,008
Barley—								
Area ('000 acres) ..	385	**228**	384	1,107	373	21	..	2,497
Production ('000 bush) ..	11,780	**5,421**	13,194	23,698	6,707	771	..	61,571
Hay—All Types—								
Area ('000 acres) ..	823	**1,558**	129	482	295	203	5	3,496
Production ('000 tons) ..	1,481	**2,982**	314	729	417	437	11	6,370
Tobacco—								
Area (acres)	1,794	**8,455**	12,134	..	..	..	..	22,383
Production (dried leaf '000 lb)	2,133	**10,953**	14,916	..	..	..	..	28,002
Onions—								
Area (acres)	1,256	**3,295**	3,495	1,631	366	120	*	10,163†
Production (tons) ..	10,809	**22,375**	27,033	17,933	4,762	898	*	83,810†
Potatoes—								
Area (acres)	23,590	**37,167**	16,227	5,948	6,167	10,278	14	99,391
Production (tons) ..	126,183	**225,186**	93,738	60,271	64,857	73,300	120	643,655
Other Vegetables–Area (acres)	41,192	**55,244**	37,332	9,847	9,227	18,349	329	171,520
Fruit—Area (acres) ..	96,482	**73,519**	50,058	44,157	26,458	22,343	171	313,188
Vineyards—Area (acres) ..	21,257	**49,164**	3,304	57,080	7,945	..	..	138,750
Grapes for Table (tons) ..	8,201	**11,381**	4,193	1,027	2,088	..	..	26,890
Wine Made ('000 gals) ..	7,893	**3,555**	37	29,638	705	..	..	41,828
Currants (tons) ..	643	**3,578**	..	3,773	1,353	..	..	9,347
Sultanas and Raisins (tons)	14,108	**69,601**	..	13,544	67	..	..	97,320
Livestock Numbers, 31 March 1967—								
Sheep ('000)	63,848	**31,239**	19,305	17,864	27,370	4,321	289	164,236
Cattle ('000)	4,145	**3,528**	6,919	687	1,357	522	1,111	18,269
Pigs ('000) ..	514	**351**	468	222	161	86	3	1,805
Livestock Slaughtered for Human Consumption—								
Sheep ('000)	4,476	**7,310**	1,850	1,911	1,630	566	42	17,785
Lambs ('000)	5,559	**5,875**	387	1,343	854	614	48	14,680
Cattle ('000)	1,021	**1,090**	1,342	188	284	122	78	4,125
Calves ('000) ..	452	**647**	355	77	14	51	2	1,598
Pigs ('000)	820	**699**	662	317	208	149	11	2,866
Wool Production ('000 lb) ..	622,745	**378,457**	203,664	239,202	273,379	43,153	2,542	1,763,142
Whole Milk Production—								
All Purposes ('000 gals) ..	329,060	**790,941**	234,653	98,930	55,585	91,418	1,192	1,601,779
Principal Items of Machinery on Rural Holdings—								
Tractors (No.)	85,038	**79,566**	67,553	35,829	33,997	12,171	516	314,670
Shearing Machines (Stands)	72,872	**43,510**	19,197	29,343	23,431	4,559	314	193,226
Milking Machines (Units)	41,433	**108,664**	40,878	18,143	9,664	16,414	129	235,325
Gross Value of Production—								
Agriculture ($'000) ..	551,493	**325,461**	317,164	184,085	219,463	45,029	957	1,643,652
Pastoral ($'000)	454,018	**376,196**	275,784	169,226	165,105	37,416	12,829	1,490,574
Dairying ($'000)	151,468	**210,345**	75,490	39,034	21,874	26,349	661	525,221

* Not available for publication.

† Incomplete.

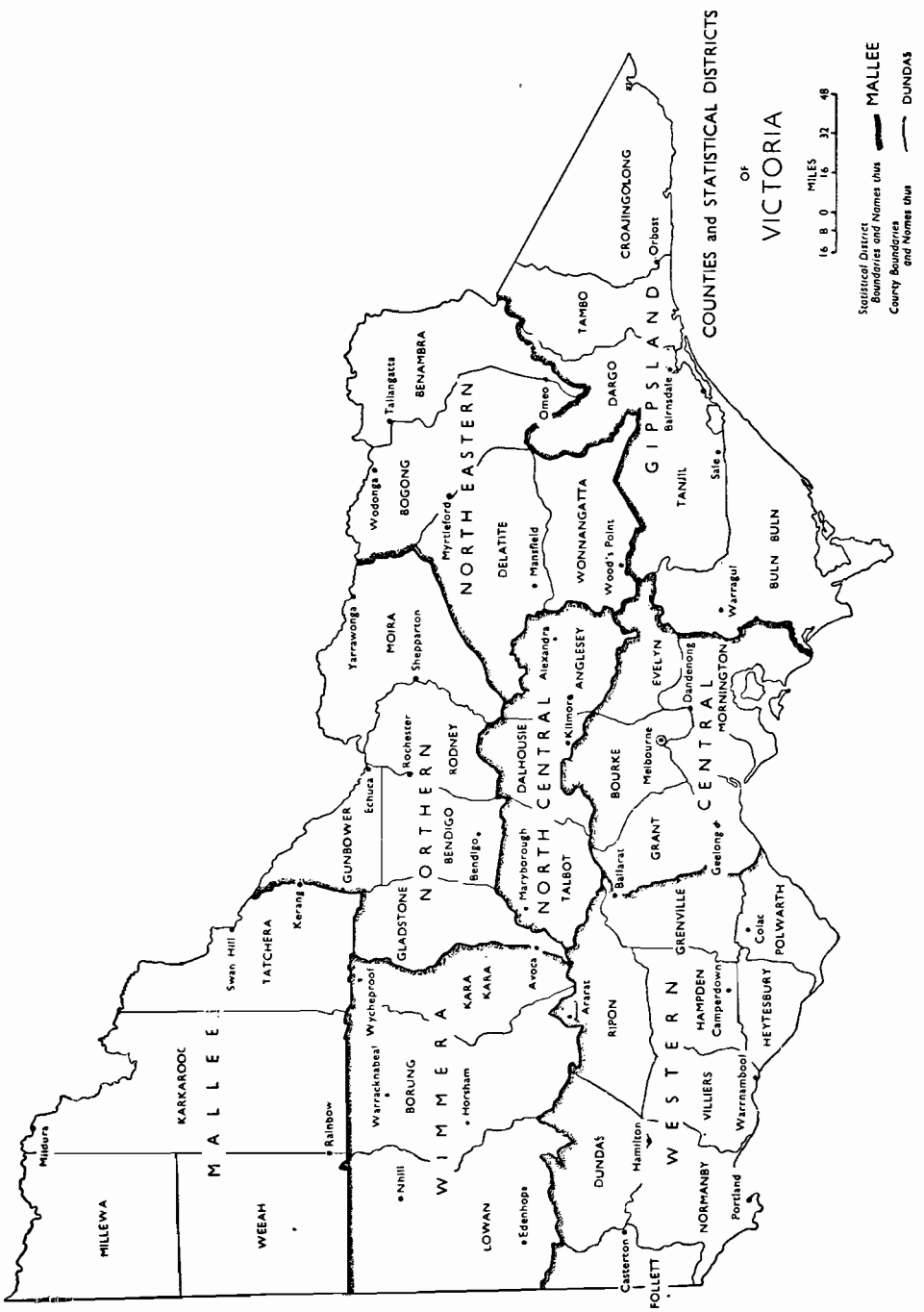


FIGURE 8. Counties and Statistical Districts of Victoria

Land Occupied in Different Districts, 1966–67

For the season 1966–67, the number of occupiers of rural holdings was 68,466, the area devoted to agriculture 7,894,994 acres, and the total area occupied 38,652,943 acres.

It should be noted that statistics in this part of the *Year Book* have been compiled for statistical districts, which are groups of counties, namely, land areas with immutable boundaries. A map defining the boundary of each statistical district appears on the previous page.

VICTORIA—LAND IN OCCUPATION IN EACH DISTRICT, SEASON 1966–67

(Areas of 1 acre and upwards)

Statistical District	Total Area of Districts (Acres)	Number of Holdings	Acres Occupied				
			For Agricultural Purposes*	For Pasture		Unproductive	Total
				Sown Grasses, Clover, or Lucerne†	Natural Grasses		
	'000		'000				
Central	4,065	13,718	283	1,557	604	190	2,634
North-Central ..	2,930	4,304	112	941	899	120	2,071
Western ..	8,775	12,659	402	4,785	1,162	367	6,716
Wimmera ..	7,395	6,017	2,191	2,134	1,352	394	6,070
Mallee	10,784	6,031	3,197	1,311	2,428	686	7,622
Northern ..	6,337	11,757	1,477	2,286	1,711	141	5,615
North-Eastern ..	7,220	4,948	142	1,360	1,812	467	3,781
Gippsland ..	8,739	9,032	92	1,743	1,640	669	4,144
Total ..	56,246	68,466	7,895	16,116	11,608	3,034	38,653
	PERCENTAGE OF ABOVE TO AREA OCCUPIED						
Central	..	..	10·75	59·11	22·93	7·21	100·00
North-Central ..	..	..	5·41	45·40	43·40	5·79	100·00
Western ..	..	..	5·99	71·25	17·30	5·46	100·00
Wimmera ..	..	..	36·09	35·15	22·27	6·49	100·00
Mallee	..	..	41·94	17·20	31·86	9·00	100·00
Northern ..	..	..	26·31	40·71	30·47	2·51	100·00
North-Eastern ..	..	..	3·76	35·97	47·92	12·35	100·00
Gippsland ..	..	..	2·22	42·06	39·58	16·14	100·00
Total ..	..	..	20·43	41·69	30·03	7·85	100·00
	PERCENTAGE IN EACH DISTRICT OF TOTAL IN STATE						
Central	7·23	20·04	3·58	9·66	5·20	6·26	6·81
North-Central ..	5·21	6·28	1·41	5·84	7·74	3·96	5·36
Western ..	15·60	18·49	5·09	29·70	10·01	12·10	17·38
Wimmera ..	13·14	8·79	27·75	13·24	11·65	12·99	15·70
Mallee	19·17	8·81	40·49	8·13	20·92	22·61	19·72
Northern ..	11·27	17·17	18·71	14·18	14·74	4·64	14·53
North-Eastern ..	12·84	7·23	1·80	8·43	15·61	15·39	9·78
Gippsland ..	15·54	13·19	1·17	10·82	14·13	22·05	10·72
Total ..	100·00	100·00	100·00	100·00	100·00	100·00	100·00

* Excludes area of clover and grasses cut for hay and seed.

† Includes oats and barley sown for grazing and lucerne fed off.

Classification of Rural Holdings by Size and Type of Activity

Tabulations classifying rural holdings by principal characteristics have, in the past, been undertaken at irregular intervals. Since the Second World War they have been prepared for each of the years

1947–48, 1949–50, 1955–56, 1959–60, and 1965–66. The second detailed classification of holdings by principal type of activity was carried out in conjunction with the size classification of rural holdings, 1965–66. The following tables show some of the information, in summary form, from the 1965–66 classification of rural holdings by size and type of activity :

VICTORIA—HOLDINGS CLASSIFIED ACCORDING TO SIZE OF HOLDING : NUMBER AND TOTAL AREA OF HOLDINGS, 1965–66

Size of Holding	Number of Holdings	Total Area of Holdings
acres		acres
1– 99	21,340	805,121
100– 199	12,219	1,742,700
200– 299	6,693	1,623,245
300– 399	5,312	1,803,816
400– 499	3,297	1,470,439
500– 999	11,037	7,797,393
1,000–1,399	3,738	4,404,898
1,400–1,999	2,573	4,255,922
2,000–2,999	1,599	3,817,242
3,000–4,999	926	3,453,964
5,000 and over	465	6,668,863
Total	69,199	37,843,603

VICTORIA—NUMBER OF HOLDINGS GROWING WHEAT, AND NUMBER OF HOLDINGS ON WHICH LIVESTOCK WERE DEPASTURED, CLASSIFIED ACCORDING TO SIZE OF HOLDING, 1965–66

Size of Holding	Holdings with—				
	Wheat	Sheep	Cattle for		Pigs
			Milk Production	Beef Production	
acres	No.				
1– 99	159	2,544	6,958	5,057	2,259
100– 199	327	3,199	8,521	4,037	2,031
200– 299	418	2,926	4,259	3,046	1,127
300– 399	781	3,245	2,703	2,716	849
400– 499	705	2,483	1,417	1,947	467
500– 999	4,311	9,615	3,577	6,866	1,341
1,000–1,399	1,998	3,472	1,045	2,348	414
1,400–1,999	1,494	2,423	654	1,644	272
2,000–2,999	1,031	1,529	621	1,059	293
3,000–4,999	599	890		638	
5,000 and over	246	418	103	343	56
Total	12,069	32,744	29,858	29,701	9,109

VICTORIA—HOLDINGS CLASSIFIED ACCORDING TO TYPE OF ACTIVITY : NUMBER AND TOTAL AREA OF HOLDINGS AND AREA USED FOR VARIOUS PURPOSES, 1965–66

Type of Activity	Number of Holdings	Total Area of Holdings	Area Used for—				
			Fruit	Crops (Excluding Fruit)	Fallow	Sown Grasses and Clovers	Balance of Holding
			acres				
Sheep—Cereal Grain ..	6,160	8,285,531	26	2,215,984	1,074,082	2,411,438	2,584,001
Sheep	13,093	13,039,405	536	483,573	122,617	6,871,486	5,561,193
Cereal Grain	3,453	4,712,777	262	1,903,412	1,187,381	580,179	1,041,543
Beef Cattle	3,111	3,497,707	193	38,122	16,082	929,783	2,513,527
Dairying	20,087	4,474,207	1,500	239,007	57,339	2,781,603	1,394,758
Vineyards	2,165	85,878	48,803	3,694	1,526	7,546	24,309
Fruit (Other than Vine) ..	2,131	144,005	64,244	3,891	2,845	27,125	45,900
Vegetables—							
Potatoes	923	140,138	228	37,444	5,225	56,408	40,833
Other and Mixed ..	1,528	265,154	2,549	76,149	8,236	113,765	64,455
Poultry	1,008	53,321	683	5,798	2,915	18,674	25,251
Pigs	273	33,337	33	2,718	2,925	8,959	18,702
Tobacco	284	65,887	60	10,285	1,182	16,469	37,891
Other	353	27,370	504	5,006	2,075	6,158	13,627
Multi-Purpose	2,193	1,525,082	2,368	227,300	68,613	668,373	558,428
Total Classified Holdings	56,762	36,349,799	121,989	5,252,383	2,553,043	14,497,966	13,924,418
Unclassified Holdings—							
Sub-Commercial ..	7,848	750,292	1,964	19,802	25,885	215,197	487,444
Unused, Special, etc. ..	4,589	743,512	797	1,294	41,398	90,710	609,313
Total All Holdings ..	69,199	37,843,603	124,750	5,273,479	2,620,326	14,803,873	15,021,175

Artificial Fertilizers

Fertilizers have played a major role in the development of Australian agriculture in recent years. Superphosphate, which was first used in Australia early this century, lifted production in wheat areas dramatically and later allowed the establishment of clover pastures. More recently, research has shown that increased yields of pastures can be achieved by the use of elements such as molybdenum, potassium, copper, and zinc.

The main elements which can be added to soils by the use of fertilizers are phosphorus, potassium, and nitrogen. There are also various trace elements.

Most of Australia, including Victoria, is deficient in phosphorus. Irrespective of how the soil was formed, the story is much the same—a natural supply of 200 parts per million in the surface soil with less in the sub-soil. Notable exceptions include the Darling Downs area of Queensland and small areas of volcanic soil in the Victorian Western District. The addition of one cwt of superphosphate, which contains 11 lb of elemental phosphorus, is equivalent to the amount of phosphorus removed from the area by the sale of 27 prime lambs or 75 bushels of wheat.

Soil reserves of potassium are adequate in the drier wheat areas. However, in the wetter areas where leaching has taken place, deficiencies occur. This particularly applies to sandy soils. Clovers are generally the first plants to show visible symptoms of potassium deficiency and this often shows first in the outer paddocks of dairy farms or in paddocks continually cut for hay.

Very little nitrogen fertilizer is applied to crops other than high value crops such as fruit and vegetables. The less intensive agricultural pursuits rely on the fixation of atmospheric nitrogen by the nitrogen fixing bacteria associated with leguminous plants.

The significance of trace elements has become more apparent in recent years following the development of more refined experimental techniques. Some of the more important of these elements include molybdenum and copper.

Experiments have shown that substantial increases in clover growth can be obtained by spreading two ounces of molybdenum an acre in superphosphate, particularly in the high land of the Dividing Range. Recent work has shown that this application may have to be repeated after five to seven years.

Copper deficiencies are common in Victoria on the sandy podsolic soils, particularly in the coastal areas.

In 1966–67 artificial fertilizers were used on 3,057,222 acres of wheat; 1,381,648 acres of other cereal crops; 82,555 acres of vegetables; 84,154 acres of orchards; 166,642 acres of other crops; and 12,502,432 acres of pastures. Superphosphate is the main fertilizer used on both crops and pastures and in 1966–67 amounted to 211,625 tons or 79·1 per cent of the total artificial fertilizer used on all crops and 778,269 tons or 92·0 per cent of that used on pastures.

A summary of the area fertilized, quantity used, and number of holdings on which artificial fertilizers were used is shown below for each of the years 1962–63 to 1966–67 :

VICTORIA—ARTIFICIAL FERTILIZERS

Year	Crops			Pastures		
	No. of Holdings	Area Fertilized	Quantity Used	No. of Holdings	Area Fertilized	Quantity Used
		'000 acres	'000 tons		'000 acres	'000 tons
1962–63 ..	32,028	4,530	227	40,144	9,940	596
1963–64 ..	31,224	4,478	225	39,531	10,525	656
1964–65 ..	31,181	4,703	248	40,291	11,496	741
1965–66 ..	30,582	4,664	255	40,637	11,730	800
1966–67 ..	29,771	4,772	267	40,658	12,502	846

Aerial Agriculture

The aerial agriculture industry in Victoria has grown rapidly and aircraft are now extensively used for topdressing and sometimes for seeding, crop spraying with weedicides and insecticides, and the control of rabbits by the dropping of poisoned carrot baits. A more recent

phase of aerial development is the dropping of young fish into Victorian lakes and streams. A full description of aerial agriculture will be found on page 494 of the *Victorian Year Book* 1966.

Prior to 1 January 1967, statistics on aerial agriculture were collected by the Department of Civil Aviation who developed the series in 1956. Since 1 January 1967 these statistics have been compiled from quarterly returns collected by the Bureau of Census and Statistics from operators of aircraft engaged in aerial topdressing, seeding, spraying and allied activity such as rabbit and dingo baiting. Details for each of the years 1962–63 to 1966–67 are shown in the following table :

VICTORIA—AERIAL AGRICULTURE

Particulars	Unit	Year Ended 31 March—				
		1963	1964	1965	1966	1967
Total Area Treated * †	'000 acres	924	1,513	1,896	2,472	2,424
Topdressed or Seeded.. ..	'000 acres	660	1,165	1,429	1,630	1,945
Sprayed or Dusted	'000 acres	207	281	386	702	‡
Materials Used—						
Superphosphate ..	tons	44,403	71,382	92,213	110,550	‡
Seed	'000 lb	2	39	162	56	139
Aircraft Utilisation (Flying Time) ..	hours	8,238	11,190	14,649	19,832	19,107

* Areas treated with more than one type of material on one operation are counted once only.
† Includes 57,090 acres baited for rabbit destruction in 1963, 66,305 acres in 1964, 81,200 acres in 1965, and 139,910 acres in 1966.
‡ Not available for publication.

Farm Machinery

The numbers of the principal items of farm machinery on rural holdings at 31 March during each of the five years from 1963 to 1967 are given in the table below :

VICTORIA—FARM MACHINERY ON RURAL HOLDINGS

Particulars	Number at 31 March—				
	1963	1964	1965	1966	1967
Milking Machines—Units ..	97,372	98,321	101,994	105,004	108,664
Shearing Machines—Stands ..	39,162	39,433	41,112	41,689	43,510
Tractors—Wheeled Type ..	66,479	68,954	71,950	73,668	76,678
—Crawler Type ..	1,936	2,451	2,574	2,493	2,888
Rotary Hoes	9,899	10,205	11,757	12,016	12,305
Fertilizer Distributors and Broadcasters	29,188	28,757	29,212	28,219	30,948
Grain Drills—Combine	} 28,957	28,785	{ 19,442	19,604	20,392
—Other			{ 9,846	9,586	9,574
Maize Planters	*	*	756	762	747
Headers, Strippers and Harvesters	14,646	14,131	14,177	13,963	14,319†
Pick-up Balers	10,107	10,789	11,405	11,972	12,965
Forage Harvesters	1,289	1,284	1,305	1,625	1,913

* Not collected. † Subject to revision.

NOTE.—Details of items which have not been collected since 1955 are published in the *Victorian Year Book* 1954–58, page 88.

Mechanisation of Farming, 1962

Progress of Cultivation

The first Statistical Register of Victoria published in 1854 shows that in 1836 there were 50 acres of land under cultivation in the Colony of Victoria. By 1840 this figure had increased to 3,210 acres. This progress continued until 1852 when 57,471 acres were under cultivation. With the discovery of gold in Victoria, agricultural progress received a temporary setback, the area of land cultivated declining to 34,816 acres in 1854. However, with the influx of population came a demand for agricultural products and, by the end of 1860, the area of land under cultivation amounted to 407,740 acres.

The following table shows the annual average area under cultivation in each decennium from 1856 to 1965 and the actual area for each of the five seasons 1963 to 1967 :

VICTORIA—ACREAGE CULTIVATED ANNUALLY

Period or Year (Ended March)	Annual Average Area in Each Decennium, 1856–1965, and Actual Area Each Year 1963–1967, under—		
	Crop*	Fallow	Total Cultivation*
		acres	
1856–65	325,676	12,146	337,822
1866–75	624,377	57,274	681,651
1876–85	1,306,920	137,536	1,444,456
1886–95	2,109,326	364,282	2,473,608
1896–1905	3,022,914	524,197	3,547,111
1906–15	3,756,211	1,276,148	5,032,359
1916–25	4,594,244	1,852,145	6,446,389
1926–35	5,233,894	2,501,357	7,735,251
1936–45	4,435,645	2,142,953	6,578,598
1946–55	4,635,982	2,311,401	6,947,383
1956–65	4,222,393	2,191,000	6,413,393
1963	5,036,686	2,521,355	7,558,041
1964	4,899,557	2,524,863	7,424,420
1965	5,019,479	2,484,423	7,503,902
1966	4,969,436	2,620,326	7,589,762
1967	5,143,495	2,751,499	7,894,994

* Until 1960 the area of crop included pasture cut for hay and seed. For the decennium 1956–65 and 1961 onwards, area of pasture cut for hay and seed is excluded in the above table.

Crops and Growers

The following table shows the area under, the yield from, and the gross value of each of the principal crops in Victoria for the season 1966–67 :

VICTORIA—AREA, YIELD, AND GROSS VALUE OF CROPS, 1966–67

Crop	Area	Yield	Gross Value*
	acres		$'000
Cereals for Grain—			
Barley—			
2 row	213,380	5,065,927 bushels	6,630
6 row	14,270	354,618 bushels	630
Maize	1,407	72,118 bushels	115
Oats	1,078,877	31,248,286 bushels	19,033
Rye	11,608	77,722 bushels	106
Wheat	3,138,029	70,896,266 bushels	104,471
Hay—			
Barley and Rye	9,556	17,452 tons	364
Lucerne	99,361	217,406 tons	7,779
Meadow	1,207,003	2,326,418 tons	57,652
Oaten	213,109	374,520 tons	7,238
Wheaten	29,453	45,751 tons	1,117
Green Fodder	94,799	..	1,720
Grey and Other Field Peas	16,432	264,156 bushels	539
Grass and Clover Seed	36,340	69,192 centals	2,249
Industrial Crops—			
Broom Millet	169	893 cwt fibre 595 cwt seed	22 3
Linseed	5,012	92,752 bushels	302
Hops	714	10,234 cwt	963
Mustard	918	3,436 cwt	44
Tobacco	8,455	97,792 cwt	11,938
Vegetables—			
Onions	3,295	22,375 tons	1,464
Potatoes	37,167	225,186 tons	15,291
Other	55,244	265,482 tons	23,838
Stock Fodder—			
Pumpkins and Root Crops	9,859	..	463
Vineyards—			
Grapes—			
Table	2,758	11,354 tons	1,918
Wine	5,112	20,531 tons	764
Drying	37,511	294,751 tons	..
		63,346 tons of sultanas	17,699
		6,254 tons of raisins	1,653
		3,578 tons of currants	1,302
Vines, Unproductive	3,783		..
Orchards—			
Produetive	56,677	..	32,327
Unproductive	16,842	..	..
All Other Crops	9,039	..	5,826
Total Crops	6,416,179	..	325,461

* The gross value is based on the wholesale price realised in the principal markets. The places where primary products are absorbed locally or where they become raw materials for a secondary industry, are presumed to be principal markets.

The following table shows the numbers of growers of certain primary products, in each statistical district of the State, for the season 1966–67.

The information has no relation to the number of rural holdings in the State, as numbers of occupiers are engaged in the cultivation of more than one of the crops enumerated.

VICTORIA—GROWERS OF CERTAIN CROPS, SEASON 1966–67

Crops Grown	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Grain Crops—									
Wheat ..	609	352	618	3,756	2,677	3,432	464	45	11,953
Oats ..	703	656	2,256	2,823	1,389	2,941	840	67	11,675
Barley ..	503	89	277	513	672	817	89	90	3,050
Maize ..	5	..	3	..	..	4	33	82	127
Green Fodder—									
Maize ..	250	20	97	2	4	11	31	361	776
All Other ..	891	363	1,287	62	89	538	405	812	4,447
Other—									
Potatoes ..	1,324	377	485	10	16	16	103	440	2,771
Onions ..	229	1	211	2	25	3	1	11	483
Other Vegetables	1,276	26	389	39	350	464	50	211	2,805
Orchards ..	1,627	146	55	86	1,458	1,024	111	56	4,563
Vineyards ..	3	2	1	5	2,349	156	22	..	2,538
Grass and Clover Seed	28	86	142	40	12	104	211	10	633
Tobacco ..	..	..	..	..	..	23	288	..	311*

* Excluding share-farmers.

A summary of the area under cultivation in each statistical district of the State for the season 1966–67 is given in the following table :

VICTORIA—AREA UNDER CULTIVATION, SEASON 1966–67 (Acres)

Crop	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Grain Crops—									
Wheat ..	43,561	24,362	50,548	933,016	1,437,117	594,994	49,698	4,733	3,138,029
Oats ..	33,256	30,467	185,457	291,980	217,695	279,568	37,655	2,799	1,078,877
Barley ..	37,838	2,062	8,959	36,625	81,107	53,260	3,077	4,722	227,650
Maize ..	17	..	6	..	..	60	512	812	1,407
Field Peas ..	5,067	416	2,319	5,421	2,204	290	299	416	16,432
All Hay ..	209,458	89,145	452,976	133,690	46,152	332,977	97,113	196,971	1,558,482
Green Fodder	18,246	7,639	34,084	1,421	2,282	10,819	6,517	13,791	94,799
Grass and Clover for Seed ..	1,546	5,409	8,542	1,832	1,450	5,691	11,547	323	36,340
Tobacco ..	..	..	..	..	..	430	8,025	..	8,455
Potatoes ..	19,485	5,265	5,867	40	146	43	654	5,667	37,167
Onions ..	1,089	12	2,026	2	46	7	10	103	3,295
All Other Vegetables ..	22,002	234	16,526	207	3,788	4,800	682	7,005	55,244
Vines ..	5	70	100	853	45,943	849	1,344	..	49,164
Orchards ..	23,344	2,269	472	2,324	8,469	34,428	1,671	542	73,519
All Other Crops	5,446	442	8,556	634	11,371	4,271	1,794	4,805	37,319
Total Area under Crop ..	420,360	167,792	776,438	1,408,045	1,857,770	1,322,487	220,598	242,689	6,416,179
Land in Fallow	43,524	16,964	38,756	862,038	1,362,140	389,641	12,476	25,960	2,751,499
Total Area under Cultivation ..	463,884	184,756	815,194	2,270,083	3,219,910	1,712,128	233,074	268,649	9,167,678

The following table shows the yields, in statistical districts, of the principal crops for the season 1966–67 :

VICTORIA—YIELDS OF PRINCIPAL CROPS, SEASON 1966–67

Crop	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Grain Crops—									
Wheat bush	1,309,341	707,409	1,450,039	23,076,029	25,661,531	16,859,340	1,688,677	143,900	70,896,266
Oats ,,	1,277,966	1,114,411	9,000,591	7,461,315	2,687,578	8,174,014	1,461,385	71,026	31,248,286
Barley ,,	1,334,000	60,219	272,834	728,018	1,332,215	1,463,734	83,619	145,906	5,420,545
Maize ,,	605	..	135	..	..	2,760	19,540	49,078	72,118
Field Peas ,,	123,063	8,337	61,473	31,716	23,943	3,072	4,662	7,890	264,156
All Hay tons	434,758	180,396	869,799	175,961	55,524	614,666	200,894	449,549	2,981,547
Grass and Clover for Seed centals	2,118	11,947	16,817	1,887	1,766	8,966	25,339	350	69,190
Tobacco cwt	..	..	..	..	..	3,714	94,078	..	97,792
Potatoes tons	113,307	32,467	38,837	288	861	174	2,981	36,271	225,186
Onions ,,	7,031	30	14,004	4	353	32	62	859	22,375
Wine Made gal	*	*	*	*	*	*	*	*	3,554,934
Dried Vine Fruits—									
Raisins ton	..	..	..	..	6,254	..	..	..	6,254
Sultanas ,,	..	..	..	..	63,346	..	..	..	63,346
Currants ,,	..	..	..	..	3,578	..	..	..	3,578

* Details for individual districts are confidential.

Principal Crops

General

The cereals wheat, oats, and barley are the principal crops grown in Victoria and these, together with hay, represent about 90 per cent of the total area sown, although there is some variation from year to year. The growing of potatoes, grapes, and apples is also important.

In the following section some detailed descriptive and statistical information is given of all main crops grown in the State including those mentioned above.

Wheat

The acreage sown to wheat in recent years has been a little more than 3 mill. acres. This is about half the total area under crop in the State. Virtually all the wheat crop is used for grain production, only about 1 per cent being cut for hay. The average annual production for the five years ended 1966–67 was about 71 mill. bushels of which about 65 per cent was exported. Grain yields during the past five years averaged about 22 bush (60 lb per bush) per acre, but yields as high as 60 bush per acre are harvested on individual farms in most seasons. The highest officially recorded yield is 78·8 bush per acre for 50 acres grown near Murtoa in 1960.

The main wheat belt lies in the northern part of the State, in the Mallee, Wimmera, and Northern Districts, where about 94 per cent of the crop is grown. The average annual rainfall varies from about 12 in in the north-west of the State to about 20–23 in at the eastern and southern margins. About three-quarters of the wheat crop is sown on bare fallowed land.

Superphosphate is applied at seeding to virtually all crops. Zinc sulphate is added in the Wimmera District, applications normally being made to each third or fourth wheat crop. Small amounts of nitrogenous fertilizers have been used in particular circumstances, especially in view of the more favourable wheat/nitrogen fertilizer price relationships now existing. Diseases are not normally a major problem, but occasionally some heavy losses occur due to foot rot. Stem rust rarely causes much loss. Ball smut is effectively controlled by pickling with fungicide powder which is done at the same time as the seed is graded. Weeds are controlled by fallow cultivation or by crop spraying. The crop is harvested from mid-November in the early districts to January under late conditions.

Wheat is grown in rotation with fallow, other cereal crops, and pastures. The use of subterranean clover and medic leys has greatly improved soil fertility, with resultant benefit to wheat yields and quality. (See *Victorian Year Book* 1963, pages 517 to 519.) Sheep grazed on these, and on native pastures, contribute materially to the State's wool and prime lamb production, especially to the production of early prime lambs.

Wheat is grown on three major soil types: (1) Mallee soils referred to as solonised brown soils; (2) self-mulching grey soils of heavy texture and high fertility in the southern Wimmera; and (3) red-brown earths of varying texture in the northern Wimmera and the Northern District.

Most wheat varieties grown in Victoria are of the soft white class. The environment generally does not favour the production of wheat of the harder types, but increased areas of a semi-hard variety are being sown in the eastern Mallee where wheat with protein content above the Victorian f.a.q. is usually produced. Substantial improvement in wheat quality has been achieved by plant breeding during the past 30 years, and one of the leading soft wheats at present is in the medium to strong class. The adoption of clover and medic ley rotation systems has led to a substantial improvement in the protein content, and thus the quality, of Victorian wheat.

Virtually the whole of the wheat crop is handled, stored, and transported in bulk. The crop is marketed through the Australian Wheat Board. The greater part of the crop is marketed as one grade known as f.a.q. (fair average quality). A small amount of the semi-hard wheat grown in the eastern Mallee is segregated for separate sale.

Grain Elevators Board

In 1934, an Act was passed to provide for the handling of wheat in bulk in Victoria. The Act gave the Government power to constitute a Board of three members to implement the provisions of the Act. On submissions made by the Board to, and approved by, the Government, 220 country receiving elevators and a shipping terminal have been constructed, the necessary finance being obtained from loans totalling $27,159,000. Repayment of the principal and interest are guaranteed by the Victorian Government. In 1963, the Act was amended to provide for the handling of barley in bulk by the Grain Elevators Board.

The Grain Elevators Board first received and shipped Victorian wheat in bulk for the 1939–40 season and first received barley in bulk for the 1963–64 season.

The Board's Geelong Terminal is operated by push-button remote control with operational indicator lights appearing on a diagram panel of the whole terminal. Grain can be received from rail trucks at the rate of 1,600 tons per hour and can be shipped from the terminal at the rate of 1,600 tons per hour, either direct from the terminal storage bins or by a combination of storage bins and rail receivals.

The Grain Elevators Board has under its control storage for 107·5 mill. bushels of wheat. A record was established during the 1964–65 season when 79,492,687 bushels were delivered. In addition, during the 1964–65 season, 1,355,691 bushels of bulk barley were delivered to the Board. During the 1967–68 season, 26,850,000 bushels of bulk wheat and 825,000 bushels of bulk barley were delivered which is the smallest quantity received since the 1945–46 season.

The following statement shows the revenue and expenditure of the Grain Elevators Board in Victoria :

VICTORIA—GRAIN ELEVATORS BOARD : REVENUE, EXPENDITURE, ETC.

($'000)

Particulars	Year Ended 31 October—				
	1963	1964	1965	1966	1967
REVENUE					
Operating and Maintenance Expenses	1,484	1,726	1,763	1,731	1,974
Capital Facilities Allowance	930	1,258	1,946	2,205	2,401
Interest on Investments	340	326	358	373	437
Other	..	13	..	..	..
Total Revenue	2,754	3,324	4,067	4,309	4,812
EXPENDITURE					
Operating and Maintenance Expenses	890	1,023	1,362	1,317	1,517
Administration Expenses	270	336	400	414	457
Depreciation and Renewals	324	392	421	504	544
Interest on Loans	682	826	1,058	1,230	1,348
Sinking Fund Charges	128	158	212	231	255
Appropriations to Reserves	446	637	293	493	788
Other	..	..	3	45	2
Total Expenditure	2,740	3,372	3,749	4,234	4,911
Net Surplus	14	−48	318	75	−99
Fixed Assets (At 31 October)	14,524	19,157	23,880	26,611	28,909
Loan Indebtedness (At 31 October)—					
State Government	1,804	1,780	1,755	1,729	1,706
Public	12,192	15,099	20,424	22,202	23,723

Australian Wheat Board

History

After the outbreak of the Second World War, the Australian Wheat Board was established in September 1939 under National Security legislation. When the war ended in 1945, the Board continued to operate until 1948 as an agent for the Commonwealth Government under " transitional legislation ".

In 1948, agreement was reached between the Commonwealth and States for the first of the Wheat Industry Stabilisation Schemes. For constitutional reasons, it was necessary for each State to pass legislation accepting the Australian Wheat Board as the central marketing authority, and to permit it to operate within the States. Prior to the outbreak of the War, progress had been made in Federal/State Conferences towards a comprehensive stabilisation scheme. The war intervened and full control over the sale of Australian wheat was given to the Board under the exigencies of war-time conditions.

The marketing experience of the Board, and the desires of the growers were finally combined in the wheat stabilisation legislation of 1948 and renewed under successive five-year schemes ever since. The Australian Wheat Board now functions under the present Wheat Stabilisation Act of 1963. This expires in October 1968.

Constitution

The Board comprises fifteen members, two growers from each of the five mainland States together with the Chairman, a finance member, a millers' representative, a commercial member, and an employees' representative.

Functions and Operations

Under complementary Commonwealth and State legislation:

(1) The Board is sole authority for the marketing of wheat in Australia and for both wheat and flour for export;

(2) growers are required to deliver to the Board all wheat grown by them except that required as seed or feed on the farms where it is grown; and

(3) the Board becomes the owner of all wheat delivered to it.

The Board employees, the various bulk handling authorities and wheat merchant/shippers are employed by the Board for the receival of bagged wheat.

The bulk of local sales of wheat are made to flour millers under agreements which provide for the Board to keep mills stocked with sufficient wheat to meet their trade requirements. The mills account to the Board for all wheat delivered to them. The local trade in wheat for stock and/or poultry feeding is arranged through distributing agents who lodge orders through the Board for their clients' requirements. The local price of wheat f.o.r. (free on rail) ports is a uniform home consumption price in all States established by legislation based on an annual review of the cost of production plus a surcharge to cover the cost of transporting the wheat from the mainland to Tasmania.

Export sales are negotiated by Head Office for all markets except those negotiated by the Australian Wheat Committee in London for the U.K., European countries, and certain other markets in the Middle East. Sales of export flour are made by Head Office where the purchasers are Government controlled instrumentalities, but mills and approved exporters are able to negotiate sales to private buyers subject to purchase of the flour from the Board. All export prices are determined by the Board on a competitive basis with other exporting countries.

The current five year Wheat Industry Stabilisation Plan commenced with the 1963–64 crop and provides for a guaranteed price to wheat growers on up to 150 mill. bushels of exports from each season's wheat. The guaranteed price of wheat of a particular season is an amount equal to the cost of production of wheat of that season as determined in accordance with the Commonwealth Wheat Industry Stabilisation Act and for seasons 1963–64, 1964–65, 1965–66 and 1966–67, it was fixed at $1.44, $1.46, $1.52, and $1.55 per bushel, respectively. For the fifth year (1967–68) of the Stabilisation Plan the cost of production and thus the guaranteed price was determined at $1.64 per bushel. The prices referred to are on a bulk wheat basis f.o.r. ports.

Total deliveries by wheat growers to the Victorian Branch of the Australian Wheat Board during season 1966–67 were 74,614,000 bushels including 5,896,000 bushels of southern New South Wales wheat delivered to railway stations operated by Victorian Railways in New South Wales, and 2,114,000 bushels of southern New South Wales wheat delivered to Victorian stations.

Except in the eastern section of the Northern District of the State, which received adequate rainfall during the 1966–67 season, the seasonal break to enable sowing did not eventuate until July, and crops in the Wimmera and Mallee then faced a critical period due to lack of rainfall in August–early September. Fortunately the position improved in mid-September, and continued to do so through to December. Excessive rainfall during the harvest period in the Northern District resulted in bushels being downgraded and separately stored as No. 1 Off Grade.

The State yield per acre during 1966–67 was 22·6 bushels and the f.a.q. was fixed at 63¼ lb per bushel.

Wheat Standard

The fair average quality (f.a.q.) standard is fixed each season by a State Committee and is the basis for sales of each crop.

Samples of wheat from various districts are obtained each year and mixed to obtain a representative sample of the whole crop. The f.a.q. weight is then determined by use of the Schopper 1-litre scale chondrometer.

Farmers Growing Wheat for Grain, Area Sown, Production, Gross Value, and F.A.Q.

In the following table the number of holdings growing 20 acres or more of wheat for grain, the area, production, average yield, gross value of production of wheat, and the f.a.q. standard determined in Victoria for each of the seasons 1962–63 to 1966–67 are shown :

VICTORIA—WHEAT STATISTICS

Season	Holdings Growing Wheat (20 Acres and over)	Area	Production	Yield per Acre	Gross Value	Weight of Bushel of Wheat, f.a.q.
	No.	'000 acres	'000 bush	bush	$'000	lb
1962–63 ..	12,166	3,125	67,899	21·73	98,910	65½
1963–64 ..	11,370	3,109	76,302	24·54	108,498	65½
1964–65 ..	11,981	3,237	78,166*	24·15	109,396	64
1965–66 ..	10,714	3,074	60,591	19·71	89,939	63¾
1966–67 ..	11,202	3,138	70,896	22·59	104,471	63¼

* Record production.

Wheat Breeding

The objective of wheat breeding in Victoria is to produce new varieties which will give higher yields of better baking quality grain than existing varieties. Included in the yield objective is the reduction of losses due to drought and various diseases which include stem rust, leaf rust, septoria, loose smut, and eye spot lodging. The breeding work is a function of the Victorian Department of Agriculture, which undertakes plant breeding, field testing, and quality evaluation. In current breeding programmes, selections are being made from crosses between semi-dwarf and dwarf imported varieties of high yielding ability, and Victorian varieties.

The wheat breeding activities of the Department are centred on the State Research Farm at Werribee where the hybridisation is carried out, the early generations raised, and the primary quality and disease testing done. This station is supplemented by regional selection centres in the main wheat growing districts.

Field testing is undertaken in all districts at Departmental research stations and colleges and on farmers' properties. There are about forty centres for varietal testing in Victoria. Disease testing is carried out at research stations in appropriate areas and at the Victorian Plant Research Institute at Burnley. Early generation quality testing is done at the State Research Farm, Werribee, but final evaluations, including test baking, are undertaken at the Department's cereal laboratories in Melbourne.

The wheat breeding work of the Department has been very successful. During the past fifty years, over forty new varieties of wheat have been released for cultivation by farmers. The most widely grown of these have been Free Gallipoli (1923), Ghurka (1924), Ranee 4H (1930), Magnet (1939), Quadrat (1941), Insignia and Pinnacle (1946), Sherpa (1953), and Olympic (1956). Over 90 per cent of the wheat acreage in Victoria is sown to varieties bred by the Department, and for some years, Insignia has been the most widely grown variety in Australia.

Since 1930, the baking quality of Victorian wheat has improved markedly. This has been due partly to varietal improvement and partly due to improved soil fertility by the use of legume leys with a resultant perpetual effect on grain protein content.

The varieties released for sowing since 1946 are : 1946—Insignia, 1946—Pinnacle, 1947—Diadem, 1953—Sherpa, 1956—Olympic, 1957—Beacon, 1960—Stockade, 1963—Emblem, and 1966—Summit.

The following table shows the areas under the principal varieties of wheat, including wheat for hay, for the seasons 1964–65, 1965–66, and 1966–67. Varieties are tabulated in order of popularity for the last mentioned season.

VICTORIA—PRINCIPAL VARIETIES OF WHEAT SOWN

Variety (In Order of Popularity), Season 1966–67	1964–65		1965–66		1966–67	
	Acres Sown	Percentage of Total Area Sown	Acres Sown	Percentage of Total Area Sown	Acres Sown	Percentage of Total Area Sown
Insignia ..	1,691,276	51·89	1,465,356	47·06	1,531,146	48·34
Olympic ..	583,900	17·92	722,294	23·19	744,798	23·51
Pinnacle ..	610,348	18·73	583,162	18·73	522,294	16·49
Heron ..	89,721	2·75	82,306	2·64	112,102	3·54
Emblem ..	28,686	0·88	57,114	1·83	87,421	2·76
Insignia 49 ..	73,344	2·25	66,537	2·14	61,729	1·95
Sherpa ..	62,561	1·92	46,922	1·51	33,426	1·06
Beacon ..	22,888	0·70	20,384	0·65	16,257	0·51
Falcon ..	12,410	0·38	13,077	0·42	15,557	0·49
Quadrat ..	28,483	0·87	18,269	0·59	12,546	0·40
Stockade ..	26,347	0·81	10,384	0·33	7,623	0·24
All Other Varieties ..	29,296	0·90	28,069	0·91	22,583	0·71
Total ..	3,259,260	100·00	3,113,874	100·00	3,167,482	100·00

Oats

Oats are the second most widely grown crop in Victoria, and in recent years the area of this cereal has averaged about 1·3 mill. acres. Nearly 72 per cent of this is harvested for grain, some of it after winter grazing. Although oaten hay was important in the past, only about 15 per cent of the acreage is now harvested for this purpose, the remainder (13 per cent) of the area being used solely for grazing.

As the land on which oats are grown is normally not fallowed or as well prepared as that intended for wheat, oat production shows greater fluctuations than wheat production. This seasonal variability is particularly marked in the northern parts of the State. The average annual grain production is about 24 mill. bushels (40 lb per bushel), ranging in the last ten years from 9·5 mill. bushels in 1957–58 to 31 mill. bushels in 1966–67.

Over half the oat grain produced in Victoria is held on farms or is used within Victoria for stock feed. Large quantities are retained for feeding during periods of seasonal shortage or in drought conditions. About a quarter of the crop goes to mills, but only a relatively small proportion is used to manufacture foods for human consumption. Milling quality oats usually command a premium of 2 cents to 10 cents per bushel above feed oats. The other uses of the grain by the mills are for the manufacture of stock foods and for the manufacture of unkilned rolled oats, mainly for export. The remaining quarter of the crop is exported as grain. More than 95 per cent of the oats exported are sold as " Victorian No. 1 " grade. Oat grain is sold in an open market through merchants or through the voluntary oat pool, and prices fluctuate widely according to seasonal conditions and supplies available. The merchants and the oat pool provide facilities for bulk deliveries at most main centres.

During the past ten years, the area cut for hay has fluctuated around 200,000 acres with an average production of about 335,000 tons. The hay may be cut either for farm use or for sale (mainly to chaff mills near Melbourne, Ballarat, and Maryborough).

Most of the area fed-off completely is grazed by sheep in the winter, but in dairying districts oats are sometimes sown for autumn and winter grazing to supplement pasture growth. About 30 per cent of the oats completely grazed are in the Mallee District.

The main oat grain producing areas are in the Mallee, Wimmera, Northern, and Western Districts. The popularity of varieties has undergone marked changes in recent years. After having held supremacy for more than 40 years, Algerian was superseded as the leading variety by Orient in 1962, while Avon now holds this position. The area sown to the five leading varieties—Avon, Orient, Algerian, Kent, and Ballidu—is about 90 per cent of the total oat acreage in the State.

The area harvested (season 1966–67) for hay was 213,109 acres, and for grain 1,078,877 acres, which produced 374,520 tons of hay, and 31,248,286 bushels of grain, respectively. The area of oats sown for

grazing purposes amounted to 176,752 acres. The following table shows the area, yield, and gross value of oats for grain for each of the five seasons 1962–63 to 1966–67 :

VICTORIA—OATS FOR GRAIN

Season	Area	Production	Yield per Acre	Gross Value
	'000 acres	'000 bush	bush	$'000
1962–63	932	27,042	29·01	18,412
1963–64	910	19,885	21·85	13,849
1964–65	966	22,446	23·23	16,237
1965–66	966	17,784	18·42	15,287
1966–67	1,079	31,248*	28·96	19,033

* Record production.

Barley

The maximum barley production was in 1958–59, when about 362,000 acres (2- and 6-row) were sown, with a production of approximately 8·6 mill. bushels (50 lb per bushel), but, since then, area and production have declined. About 95 per cent of the barley grown in Victoria is of 2-row or malting type. The remainder is sown with 6-row varieties, which are used primarily for feed.

Although some barley is grown in all districts, the main production is centred in two distinct areas where high quality grain is produced. The largest production is in the south-western Mallee and the adjacent area of the north-western Wimmera. While wheat is the main cereal throughout the cereal growing districts, the barley crop occupies second position in the areas noted above, whereas, in most other portions of northern Victoria, oats occupy this position.

In this northern barley growing area, the best quality barley is grown on the sandier soil types. The crop is sown either on ley land cultivated in the autumn just prior to sowing or on wheaten stubble land. The variety Prior is almost exclusively sown in this area, and superphosphate is the standard fertilizer applied. Average district yields are about 19 bushels per acre.

The other important area is in southern Victoria between Melbourne, Geelong, and Bacchus Marsh. Here, barley is the main crop, and the normal practice is to sow it with superphosphate on fallowed land. The main variety has been Research, but Resibee and Anabee, released by the Department of Agriculture in 1962 and 1963, respectively, are now being grown to an increasing extent. While Research produced very good malting quality grain in this area, the new varieties

have quality characteristics slightly superior to those of the older variety. Yields are considerably higher than those obtained in the north, the average yield being about 32 bushels per acre. This region is close to the main barley shipping terminals, and growers' freight costs are considerably lower than in the northern areas.

The Victorian Grain Elevators Board has provided a bulk handling scheme for barley since 1963. The provision of extra facilities, including special aerated storages at Hopetoun, Rainbow, and Jeparit, and terminal storages at Geelong and Sunshine, with the use of existing elevators on a throughput basis before the wheat harvest, have made it possible for the crop to be handled in bulk in almost all the districts where it is grown.

Barley is marketed through the Australian Barley Board, which operates in Victoria and South Australia and provides an orderly marketing system for barley grown in those States. The barley is classified to suit specific purposes on delivery. Classification is, firstly, on varietal type—Chevalier (Prior and similar varieties) and Research (Research, Resibee, Anabee)—and, secondly, on quality—Malting, Milling (No. 3), and Feed (Nos. 4 and 5). There are price differentials between each grade.

Practically all the barley produced in Victoria is used within the State. The Victorian malting industry takes all of the malting quality grain for malt for local use and also uses much of the lower grade grain for producing malt for export—principally to Eastern Asia, the Pacific Islands, and Africa. The balance is used for stock feeding as whole grain and manufacturing in the distilling, pearling, and prepared stock feed industries.

The following table shows the area, yield, and gross value of barley for each of the five seasons 1962–63 to 1966–67 :

VICTORIA—BARLEY PRODUCTION

Season	Area		Production		Yield per Acre			Gross Value
	Malting (2 row)	Other (6 row)	Malting (2 row)	Other (6 row)	Malting (2 row)	Other (6 row)	Total	
	'000 acres		'000 bush		bush			$'000
1962–63 ..	180	14	5,129	340	28·45	24·22	28·14	5,310
1963–64 ..	180	10	3,833	192	21·32	18·67	21·17	3,802
1964–65 ..	177	10	4,140	194	23·36	20·01	22·65	4,828
1965–66 ..	181	11	3,038	179	16·77	16·16	16·73	3,662
1966–67 ..	213	14	5,066	355	23·74	24·85	23·81	7,260

Maize

Maize is grown in Victoria both for grain and for green fodder and cultivated mainly in Gippsland. The area, yield, and gross value of maize for each of the five seasons 1962–63 to 1966–67 are given in the following table :

VICTORIA—MAIZE PRODUCTION

Season	For Green Fodder	For Grain							
		Area			Production			Yield per Acre	Gross Value
		Hybrid	Other	Total	Hybrid	Other	Total		
		acres			bush				$'000
1962–63 ..	15,970	3,138	496	3,634	197,376	18,788	216,164	59·48	286
1963–64 ..	11,741	3,108	291	3,399	194,585	8,820	203,405	59·84	273
1964–65 ..	5,793	2,148	205	2,353	107,911	6,271	114,182	48·53	213
1965–66 ..	4,161	1,497	186	1,683	93,938	7,551	101,489	60·30	121
1966–67 ..	3,421	1,261	146	1,407	67,044	5,074	72,118	51·26	115

Rye

Cereal rye is of minor importance in Victoria and is not usually grown as a cash crop. European migrants to Australia have created a small demand for this cereal for human consumption, thus helping to stabilise the market for rye grain.

The chief purpose for which rye is grown is the stabilisation of loose sand or sandhills in the Mallee District. There is some interest in it for winter grazing in cold districts during the winter months.

The following table shows the area, yield, and gross value of rye for each of the five seasons 1962–63 to 1966–67 :

VICTORIA—RYE PRODUCTION

Season	Area	Production	Yield per Acre	Gross Value
	acres	bush		$'000
1962–63	17,551	114,639	6·53	171
1963–64	15,275	95,200	6·23	155
1964–65	13,581	109,162	8·04	139
1965–66	13,409	65,821	4·91	87
1966–67	11,608	77,722	6·70	106

Hay

The pattern of hay production in Victoria changed considerably in the post-war period. More complete mechanisation and the virtual disappearance of the working horse removed the previous emphasis from cereal hay. The harvesting of large areas of cereal crops, particularly oats, grown specifically for the production of hay for the maintenance of horse teams, is no longer necessary and so there has been a marked decline in the amount of cereal hay produced.

On the other hand, there were spectacular increases in the production of other forms of fodder. The annual production of meadow hay increased from about 400,000 tons to over 2 mill. tons during this period. There was also a substantial increase in the amount of lucerne hay conserved. Ensilage made mainly from pasture growth increased from about 25,000 tons annually to over 300,000 tons in the post-war period, yet it still supplies something under 10 per cent of the dry nutrients in Victoria's fodder reserves.

This increase in fodder conservation has resulted in more efficient utilisation of the extra herbage grown as the result of pasture improvement in all districts. Large numbers of livestock are now being maintained with greater safety following the conservation of portion of the surplus spring growth for feeding out during periods of seasonal shortage or in drought.

As pastures have been improved and livestock production intensified, the provision of supplementary fodder has become an important factor in the Victorian grazing industry. The conservation of meadow hay fits in well with farm management routine and is a convenient method of ensuring continuity of fodder supplies.

Further information on fodder conservation will be found on pages 354–6.

Particulars of areas harvested and production of the several kinds of hay appear in the following table :

VICTORIA—HAY PRODUCTION, 1966–67

Kind	Area	Production	Yield per Acre
	acres	tons	tons
Wheaten	29,453	45,751	1·55
Oaten	213,109	374,520	1·76
Lucerne	99,361	217,406	2·19
Barley, Rye, etc.	9,556	17,452	1·83
Meadow	1,207,003	2,326,418	1·93
Total	1,558,482	2,981,547	1·91

The following table shows, in respect of each statistical district of the State, the quantity of ensilage made during the 1966–67 season, and the stocks of ensilage and hay held on rural holdings at the 31 March 1967 :

VICTORIA—ENSILAGE MADE AND FARM STOCKS OF ENSILAGE AND HAY

(Tons)

Statistical District	Ensilage Made, 1966–67	Stocks at 31 March 1967	
		Ensilage	Hay
Central	84,579	57,414	308,844
North-Central	10,769	8,651	104,522
Western	35,918	27,006	521,120
Wimmera	1,526	6,077	136,450
Mallee	960	7,307	46,975
Northern	12,069	16,138	495,105
North-Eastern	38,456	34,069	197,470
Gippsland	149,747	77,317	365,245
Total	334,024	233,979	2,175,731

Potatoes

Victoria is the largest producer of potatoes in Australia, contributing a little more than one-third of the total annual requirement. Potatoes are generally used as a fresh vegetable, but substantial quantities are processed into dehydrated flakes and prepared forms such as crisps and chips. Generally regarded as a summer crop, potato planting goes on in one district or another for ten months of the year, while harvest extends over the whole year.

Early crops are grown in favoured localities where the risk of frost is not great, such as in the Bellarine Peninsula and the market garden areas south-east of Melbourne. These are lifted from October (or sooner) to December. Mid-season crops come on the market in January, February, and March from districts such as Koroit, Gembrook, Koo-Wee-Rup, and parts of Gippsland. The late or main crop is produced in the Central Highlands (Ballarat to Trentham), Kinglake, the Otways, and the Gippsland hill country. Its harvest commences in April and runs on until October.

Spray irrigation is common in most districts and is useful in tiding crops over the short but critical dry periods that occur in mid-summer in the State's higher rainfall areas. Potato growing has become increasingly mechanised and production has, therefore, tended to pass into the hands of specialist growers having larger individual areas.

The following table shows the area, yield, and value of potatoes for each of the five seasons 1962–63 to 1966–67 :

VICTORIA—POTATO PRODUCTION

Season	Area	Production*	Yield per Acre	Gross Value
	acres	tons		$'000
1962–63	43,024	254,473	5·91	6,612
1963–64	39,626	200,384	5·06	15,586
1964–65	32,931	183,665	5·58	24,820
1965–66	34,333	240,786	7·01†	11,050
1966–67	37,167	225,186	6·06	15,291

* Includes amounts held on farms for seed, stock feed, etc., as follows : 32,688 tons in 1962–63 ; 22,897 tons in 1963–64 ; 23,795 tons in 1964–65 ; 27,851 tons in 1965–66 ; and 26,394 tons in 1966–67.

† Record average yield.

Onions

The principal onion growing areas are in the Central and Western Districts. In the season 1966–67, these areas were responsible for 94 per cent of the total onion production of the State. The following table shows the area, yield, and gross value for each of the five seasons 1962–63 to 1966–67 :

VICTORIA—ONION PRODUCTION

Season	Area	Production	Yield per Acre	Gross Value
	acres	tons		$'000
1962–63	4,634	26,175	5·65	1,390
1963–64	3,756	17,946	4·78	1,138
1964–65	3,825	22,963	6·00	1,440
1965–66	2,955	17,115	5·79	1,814
1966–67	3,295	22,375	6·79	1,464

Linseed

Linseed is the major oil producing crop grown in Victoria. Its commercial production, which began in 1947, has increased to over 25,000 acres in suitable years, with an output in excess of 300,000 bushels. In wet seasons, however, such as 1963–64, weather and soil conditions seriously cut the intended acreage. Since 1964 acreage has been restricted following a reduction in demand due to the introduction of synthetic paints and floor coverings.

Linseed has proved to be well adapted to broad acre production over a wide area of mixed farming and pastoral country in the 20 to 30 in rainfall zone in the western part of Victoria. Initially, the industry was developed on imported varieties, and, in the period up to 1955, yields were low because these varieties were not fully suited to Victorian conditions and because of their susceptibility to disease.

Greater stability has been given to the industry with the release by the Victorian Department of Agriculture of disease resistant and better adapted varieties.

Victorian linseed contains 38 to 40 per cent of oil of satisfactory quality. Linseed oil is one of the main components of paints, varnishes, and linoleum, and also has many other industrial uses. The meal or press cake which remains after the oil has been extracted is a valuable stock food.

The following table shows the area, yield, and value of linseed for each of the five seasons 1962–63 to 1966–67 :

VICTORIA—LINSEED PRODUCTION

Season	Area	Production	Yield per Acre	Gross Value
	acres	bush		$'000
1962–63	25,232	327,216	12·97	1,145
1963–64	16,240	190,322	11·72	666
1964–65	9,953	106,824	10·73	394
1965–66	7,370	101,536	13·78	358
1966–67	5,012	92,752	18·50	302

Tobacco

Flue-cured Virginia tobacco is the only type produced in quantity in Australia and is mainly absorbed in the manufacture of cigarettes. The use of domestic leaf is encouraged by a statutory mixing percentage applied in conjunction with concessional rates of import duty. The statutory percentage is currently set at 50 per cent and at the present high level of usage, it is important that only leaf of desirable smoking quality is produced. Such leaf can be grown with some certainty only in areas having sandy friable soils and, during the summer months, appreciable rainfall, moderate temperatures, and high atmospheric humidity.

The Victorian crop usually accounts for rather more than one-third of the total Australian tobacco production. Suitable growing conditions are found in the north-eastern river valleys, and the industry is concentrated at present along the Ovens and King Rivers and their tributaries, with small outlying areas in the northern part of the State. Recent trends disclose a concentration of production in the higher parts of these valleys, with some contraction at certain climatically less favoured downstream centres and in the inundated area above the Buffalo River dam. The Mount Beauty district in the upper Kiewa Valley has latterly become established as a reliable centre for the production of good quality leaf.

Tobacco growing in Australia has traditionally been regarded as a rather speculative proposition due to wide fluctuations in production and market conditions, and it is only in the past decade that any degree of stability has become apparent due to a consistent upward trend in average yield which has resulted in the Victorian figure approaching a level comparable to that achieved by the world's major tobacco producing countries.

The fungus disease, blue mould, has often brought about drastic reduction of yield and has been the prime cause of most short Victorian crops in the past. At present growers are able to control this disease by implementing newly developed fungicidal spray programmes, and this is perhaps the main factor in current yield improvement.

The implementation in 1965 of a Tobacco Stabilisation Scheme, whereby a market is guaranteed for the annual sale of up to 26 mill. lb of leaf meeting certain quality standards, has promoted further stability in the industry.

Victorian tobacco producers are assisted in their efforts to increase yield and improve leaf quality by the Department of Agriculture, which conducts research in agronomy, plant pathology, and plant breeding at the Tobacco Research Station at Myrtleford and its sub-station at Gunbower, and also provides an intensive farm to farm advisory service for growers.

The following table shows the area, yield, and gross value of tobacco in each of the five seasons 1962–63 to 1966–67 :

VICTORIA—TOBACCO PRODUCTION

Season	Area	Production	Yield per Acre	Gross Value
	acres	cwt (dry)		$'000
1962–63	9,844	84,351	8·57	10,210
1963–64	10,519	129,096	12·27	14,060
1964–65	9,720	107,855	11·10	11,678
1965–66	9,230	98,953	10·72	12,377
1966–67	8,455	97,792	11·57	11,938

Further Reference, 1963

Marketing of Tobacco

General

Tobacco produced in Victoria is offered for sale by auction at a series of sales which usually take place between late June and 30 September each year. The tobacco is presented for sale in bales of approximately 180 lb weight, and the sale is conducted over the bale. The normal selling rate is 1,700 bales per day and the number of selling days in each season averages about thirty-two.

Since April 1964, the Victorian Tobacco Leaf Marketing Board, constituted under the *Marketing of Primary Products Act* 1958, has been responsible for the marketing of all tobacco leaf grown in Victoria. Since May 1966, however, when the *Tobacco Leaf Industry Stabilisation Act* 1966 came into operation, an Australian Tobacco Board has been constituted which is empowered under Section 5 of the Act to give directions in writing to the Victorian Board about the sale or other disposal of Australian grown tobacco. In particular, the Australian Tobacco Board may direct the State Board not to sell leaf of a specified grade at a price less than the specified price for that grade.

Subject only to any directions issued by the Australian Tobacco Board, the State Board receives, handles, and offers for sale all quota tobacco leaf produced in Victoria, and may also receive and handle non-quota leaf, but may not offer such leaf for sale except with the approval of the Australian Tobacco Board.

The pooling provisions of the "Marketing of Primary Products Act" do not apply to tobacco leaf, and each grower receives the proceeds of sale of his own leaf after deduction of administration, levy, and other charges.

Tobacco Industry Stabilisation Scheme

Between 1958–59 and 1963–64, the tobacco industry in Australia expanded very rapidly. Victorian production in this period grew from 4,885,000 lb to 14,459,000 lb, and similar increases occurred in New South Wales and Queensland. This rapid increase in quantity of leaf, allied to quality problems that often are associated with an expanding industry, caused recurring marketing problems of some magnitude.

Combined efforts by the various segments of the industry to overcome these problems resulted in the formulation of a Tobacco Industry Stabilisation Scheme to be based on complementary Commonwealth and State legislation by each of the tobacco leaf producing States of New South Wales, Victoria, and Queensland. The necessary legislation was passed by the Commonwealth in 1965, by Queensland in 1965, by Victoria in 1966, and by New South Wales in 1967. Pending the passing of this legislation, the Scheme was observed voluntarily by growers and administered by a series of interim committees.

Under the Scheme, the Commonwealth Government will ensure the sale, if available, of 26,000,000 lb of Australian grown tobacco leaf of acceptable grades from each of the four crop years 1964–65 to 1967–68. This quota has been allocated between the tobacco leaf producing States as follows: Queensland, 14,000,000 lb; Victoria, 9,662,000 lb; and New South Wales, 2,338,000 lb.

The allocation is pro-rata to each State's leaf sales over the five-year period ending 1963–64. The Commonwealth has also undertaken to ensure that such leaf will be sold at a minimum average price of 104.17c per lb determined on the normal fall-out of grades, taking the three crop years ending with the 1963–64 season as the base period.

For the purpose of determining disputes which may arise concerning the correct grade of any bale of tobacco leaf, an arbitrator, who is a qualified tobacco appraiser, has been appointed by the Australian Tobacco Board. The Board also has approved a grade and price schedule which establishes a minimum price for each grade.

The tobacco growing States on their part have agreed to allocate their respective shares of the 26,000,000 lb Australian quota among the State tobacco growers. In Victoria, this has been effected by the appointment of a Tobacco Quota Committee to determine the amount of quota allotted to each Victorian grower, and a Tobacco Quota Appeals Tribunal to hear appeals from growers who may be aggrieved by a decision of the Tobacco Quota Committee. In general, the amount of quota allotted to each Victorian grower is related to his average leaf sales over the two years 1962–63 and 1963–64.

The Tobacco Quota Committee consists of four persons, of whom one, who is the Chairman, is a person who the Minister of Agriculture is satisfied is familiar with the administration of the tobacco industry in Victoria, and three are representatives of tobacco producers appointed after consultation with the State Board.

Relationship Between Quotas and Sales

Each tobacco grower who has been allotted a " grower's basic quota " can feel assured before he plants his crop that, provided the leaf harvested from it is of acceptable quality, he can sell leaf each year to the extent of his quota allocation at a satisfactory price level. If, in any year, he produces more than his quota, but the total amount of marketable leaf in Australia in that year is less than 26,000,000 lb, he can sell all leaf which fits into quota grades at the price applicable to that grade.

In any year in which the total amount of marketable leaf in Victoria is less than the State market quota, a Victorian grower can sell as quota leaf all leaf that fits into quota grades at the price applicable to that grade, even though he has produced in excess of his quota.

In circumstances in which each of the three tobacco producing States has produced its State marketing quota, it is unlikely that any individual Victorian grower will have an opportunity to sell as quota tobacco an amount of leaf appreciably in excess of that quantity allotted

as a grower's basic quota. He can elect, however, to store surplus leaf of quota grades from one season and offer it as part of his quota for the following season.

In any year in which the total Australian production for marketable leaf is in excess of 26,000,000 lb, the sale of the surplus, irrespective of the State or States in which it was produced, is subject to direction from the Australian Tobacco Board. The effect of the Board's current policy is that surplus leaf offered for sale is sold, if possible, for use outside Australia. Prices obtained for leaf to be used outside Australia are very much less than the prices obtained for comparable grades which fall within a grower's basic quota allocation. This tends to restrict over production by individual growers.

The Australian Tobacco Board, to which reference has been made in this article, is appointed under Commonwealth legislation—the *Tobacco Marketing Act* 1965–66.

In any one year, there are approximately 370 quota holders in Victoria. The size of individual quotas ranges from 4,000 to 174,000 lb.

Fruit Industries

Victoria is a major producer of a wide variety of fruit and over 120,000 acres are used for orchards or vineyards. The three most important districts are the area within 50 miles of Melbourne (apples, dessert tree fruits, and berries), the Goulburn Valley (canning fruit), and the Mallee region (dried vine fruit and citrus).

Most of the fruit growing districts south of the Dividing Range receive an annual rainfall of between 25 and 35 in. This rainfall is fairly evenly spread, but in many areas additional irrigation is essential during January–March. This water is supplied from natural catchments, rivers, or town supplies. The north-eastern section of the State has a rainfall of from 20 to 40 in, but the average rainfall in the Goulburn Valley is 19 in and in the Mallee only 10 in. In these districts elaborate irrigation schemes of the Lower Murray Valley and of the Goulburn and Campaspe Rivers make possible the large scale development of the fruit industry. The distribution of water is effected mainly by gravity except for small areas of citrus under spray irrigation.

Because of the high capital expenditure invested in orchard land and equipment and with the keen competition for local and overseas markets, most Victorian growers realise that they have to produce increased quantities of better quality fruit without increasing costs. To achieve this, labour expenses are cut by high capacity spraying units for pest control and by bulk handling of the crop. Many orchardists use fruit thinning sprays to make hand thinning less time consuming. The increasing use of weedicides in orchards and vineyards has reduced

the need for cultivations. Lighter pruning of apples is showing promising results in southern Victoria and this trend could also become an important factor in reducing labour costs.

Statistics on fruit growing are collected from all persons who grow fruit for sale (for all purposes). Particulars of fruit production (excluding vines) for the five seasons 1962–63 to 1966–67 are given in the following table :

VICTORIA—FRUIT GROWING

Particulars	1962–63	1963–64	1964–65	1965–66	1966–67
Number of Growers	4,807	4,769	4,486	4,435	4,563
Area .. .. .. acres	75,855	76,796	75,509	75,001	73,519
Gross Value of Fruit Produced ($'000)	23,546	26,396	28,433	34,977	32,327
Kind of Fruit—					
Apples .. .. .. bushels	4,059,045	3,298,851	4,394,197	4,206,028	4,356,989
Pears .. .. .. „	3,848,614	4,771,604	4,025,455	5,453,339	4,700,818
Quinces .. .. .. „	22,017	29,909	19,915	21,946	25,089
Apricots .. .. .. „	535,235	352,557	293,497	545,547	529,551
Cherries .. .. .. „	116,920	109,783	117,721	140,207	120,731
Nectarines .. .. .. „	20,713	21,717	28,910	33,323	36,723
Peaches .. .. .. „	1,811,799	1,827,910	2,362,620	2,602,822	2,731,525
Plums .. .. .. „	141,953	137,431	144,069	154,453	147,643
Prunes .. .. .. „	24,346	19,332	28,360	20,397	21,421
Lemons and Limes .. .. „	212,693	105,115	148,237	120,554	147,881
Oranges—					
Navels .. .. .. „	531,249	479,580	541,371	437,318	454,929
Valencias .. .. „	586,991	605,916	662,585	537,940	660,194
Other Oranges .. .. „	45,495	48,879	40,337	36,389	28,647
Mandarins .. .. .. „	41,297	36,410	46,668	41,207	64,350
Grapefruit .. .. .. „	97,217	88,596	83,650	82,399	73,273
Figs .. .. .. „	2,264	2,462	1,362	1,314	1,127
Passion-fruit .. .. „	3,601	5,762	3,844	3,520	3,914
Olives .. .. .. „	14,845	36,367	11,004	36,471	15,030
Gooseberries .. .. cwt	865	606	722	735	872
Loganberries .. .. „	1,684	1,451	1,193	1,098	909
Raspberries .. .. „	2,848	3,018	2,827	3,268	2,859
Strawberries .. .. „	15,172	16,817	20,112	19,947	24,387
Youngberries .. .. „	4,891	3,607	4,221	4,711	4,044
Other Berries .. .. „	964	978	657	666	903
Almonds .. .. .. lb	64,599	69,366	45,750	51,322	32,522
Filberts .. .. .. „	6,608	14,750	11,420	12,060	11,680
Walnuts .. .. .. „	146,020	150,982	99,270	138,930	69,606

The production of the principal kinds of dried tree-fruits for each of the last five seasons is shown in the following table. Particulars in respect of dried vine-fruits appear on pages 350–1.

VICTORIA—DRIED TREE-FRUITS
(lb)

Year Ended 31 March—	Apricots	Peaches	Pears	Prunes	Others	Total
1963	31,421	2,278	4,652	590,323	1,988	630,662
1964	19,810	5,390	6,714	481,648	309	513,871
1965	27,170	28,125	16,665	380,803	..	452,763
1966	6,824	2,340	2,467	447,760	3,332	462,723
1967	16,175	716	250	306,958	215	324,314

Information on the number of trees of each variety is collected triennially; the latest figures available are for the season 1964–65. The extent of cultivation of each important class of fruit and nuts on holdings of 1 acre and upwards during the seasons 1961–62 and 1964–65 is shown in the following table :

VICTORIA—FRUIT TREES, PLANTS, ETC., IN ORCHARDS AND GARDENS

Fruit and Nuts	Number of Trees, Plants, etc.					
	1961–62			1964–65		
	Bearing	Not Bearing	Total	Bearing	Not Bearing	Total
Apples	1,531,839	664,194	2,196,033	1,622,392	642,444	2,264,836
Pears	1,189,246	548,139	1,737,385	1,269,225	491,594	1,760,819
Quinces	13,099	481	13,580	8,269	716	8,985
Plums	137,450	48,047	185,497	125,662	41,901	167,563
Prunes	26,990	8,575	35,565	21,652	6,086	27,738
Cherries	117,078	65,327	182,405	121,270	94,184	215,454
Peaches	842,117	634,192	1,476,309	1,176,184	291,910	1,468,094
Apricots	317,157	68,495	385,652	298,434	37,010	335,444
Nectarines	13,252	12,219	25,471	21,937	14,593	36,530
Oranges—						
Navels	175,563	60,572	236,135	180,459	82,914	263,373
Valencias	208,758	89,498	298,256	226,765	123,886	350,651
Other Oranges ..	18,904	2,874	21,778	13,751	6,453	20,204
Mandarins	13,049	23,144	36,193	29,611	28,032	57,643
Grapefruit	21,898	4,663	26,561	20,988	5,640	26,628
Lemons and Limes ..	80,162	27,326	107,488	71,284	26,531	97,815
Figs	3,402	1,294	4,696	1,830	842	2,672
Raspberries	223,000	32,250	255,250	221,500	30,000	251,500
Loganberries	49,890	1,395	51,285	72,146	1,590	73,736
Strawberries	6,877,500	686,250	7,563,750	8,302,500	495,000	8,797,500
Gooseberries	40,500	9,000	49,500	28,500	5,100	33,600
Youngberries	79,489	9,532	89,021	64,883	3,536	68,419
Other Berries	19,737	2,127	21,864	10,106	..	10,106
Olives	73,931	53,660	127,591	86,032	51,830	137,862
Passion-fruit	9,011	3,657	12,668	8,484	4,282	12,766
Almonds	23,568	3,247	26,815	15,307	1,264	16,571
Walnuts	6,134	1,054	7,188	5,895	1,623	7,518
Filberts	5,592	120	5,712	4,876	282	5,158

The distribution of the fruit industry over the State is set out in the following table, where the number of trees of each kind in each statistical district is given for the season 1964–65 :

VICTORIA—NUMBER OF FRUIT TREES, PLANTS, ETC., SEASON 1964–65

Particulars	Statistical District								
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	Total
Growers .. No.	1,716	155	54	99	1,276	1,030	112	44	4,486
Area .. .. acres	24,866	2,509	569	3,757	8,274	33,310	1,698	526	75,509
Apples .. trees	1,595,254	167,799	52,327	17,026	18,673	272,736	104,246	36,775	2,264,836
Pears .. ,,	199,594	64,896	795	6,754	3,722	1,482,229	523	2,306	1,760,819
Peaches .. ,,	274,021	2,625	107	19,308	26,420	1,140,933	1,347	3,333	1,468,094
Apricots .. ,,	30,485	556	556	10,675	57,619	234,845	344	364	335,444
Plums .. ,,	73,096	4,871	556	2,449	30,081	56,071	178	261	167,563
Prunes .. ,,	413	..	831	10,504	8,569	7,394	19	8	27,738
Cherries .. ,,	185,807	4,377	..	1,117	372	15,072	7,489	1,220	215,454
Quinces .. ,,	5,540	126	..	341	90	2,835	35	18	8,985
Nectarines .. ,,	17,571	261	18	168	10,674	7,050	375	413	36,530
Figs .. .. ,,	830	4	5	45	272	1,496	13	7	2,672
Olives .. ,,	542	35	..	107,800	26,658	1,005	1,822	..	137,862
Oranges .. ,,	223	..	..	183	494,651	137,167	2,004	..	634,228
Mandarins .. ,,	3	..	..	11	53,987	3,570	72	..	57,643
Grapefruit .. ,,	257	..	..	2	20,186	6,002	181	..	26,628
Lemons and Limes ,,	60,151	45	..	307	18,807	17,883	572	50	97,815
Passion-fruit .. vines	2,144	..	..	..	66	2,473	3,303	4,780	12,766
Strawberries .. plants	8,677,500	41,250	..	3,750	48,750	26,250	..	..	8,797,500
Raspberries .. bushes	248,000	1,000	..	..	..	500	..	2,000	251,500
Loganberries .. ,,	73,338	..	..	..	..	199	199	..	73,736
Gooseberries .. ,,	30,600	3,000	..	..	..	..	..	..	33,600
Youngberries .. ,,	67,957	..	..	..	..	154	308	..	68,419
Other Berries .. ,,	9,780	..	..	..	..	..	326	..	10,106
Almonds .. trees	310	92	..	1,544	7,047	2,364	5,214	..	16,571
Walnuts .. ,,	280	3	..	6	421	370	5,195	1,243	7,518
Filberts .. ,,	189	..	..	..	100	..	4,869	..	5,158

Cool Storage

The fruit industry has been well aware of the importance of refrigeration since the end of the last century. Before the First World War several co-operative and privately owned cool stores had been built, beside the first Government Cool Stores, at Flinders Street, Melbourne. The Government also built and operated five other stores situated in the fruit growing districts close to Melbourne. These have been gradually handed over to growers' co-operatives.

The extension of electric power to rural areas throughout the State has resulted in the construction of numerous small private cool stores. More efficient refrigeration techniques and insulating materials have also helped to spread the idea of cool storage. Since the Second World War there has been a rapid increase of cool store capacity in

Victoria, mainly because of the very rapid development of small cool stores built in individual orchards as illustrated by the following table :

VICTORIA—FRUIT GROWERS' COOL STORES, 1948 TO 1963

Year	Number	Capacity
		'000 bush
1948	72	600
1958	218	1,500
1961	311	1,800
1963	357	2,600

Including co-operative and proprietary stores, the total for 1963 was 432 stores with a capacity of 5·8 mill. bushels.

Many of the small orchard cool stores are used to pre-cool highly perishable soft fruits (apricots, peaches, plums, and berries) and tomatoes before they are forwarded to Melbourne or interstate markets. These fruits ripen in the summer and at high summer temperatures often become over-ripe and worthless in the interval between picking and marketing, unless pre-cooled at the orchard within a few hours of picking.

Most of the orchard cool stores situated within 50 miles of Melbourne are used together with the larger co-operative and proprietary stores to achieve a more gradual marketing of Victoria's apple and pear crop. This supply of good quality fruit from store at regular intervals for a period of 6–9 months calls for considerable skill and knowledge. The fruit picked is still alive and it continues its living processes for a certain time, influenced by the variety, its ripeness at the time of harvesting ("picking maturity"), interval between harvesting and beginning of cool storage, temperature and humidity of cool chambers, and other factors. Cool storage behaviour of the fruit and the type of storage provided are also of great importance with the fruit exported to overseas markets.

To assist the industry with cool storage research, Experimental Cool Chambers were set up at the Government Cool Stores, Victoria Dock, in 1923. In 1956, these were transferred to the Scoresby Horticultural Research Station, where large and better experimental chambers were constructed for this purpose.

Vine Fruits

Most vine fruits grown in Victoria are marketed as dried fruits (currants, sultanas, and raisins). Smaller quantities are sold as fresh fruit or are used for wine production. Some 40,000 acres of vines are grown in the irrigated districts of the River Murray at Mildura, Robinvale, and Swan Hill. The climate at Mildura and Robinvale provides the high temperatures and clear sunny conditions during the growing season and drying period which are essential for the production of first quality dried fruit. The Swan Hill district with slightly lower temperatures and higher rainfall is less suitable than Robinvale and Mildura.

After dipping and sun drying by the grower, the dried fruit is processed and packed in packing houses. The production of dried fruits in Victoria for season 1966–67 amounted to 63,346 tons of sultanas, 3,578 tons of currants, and 6,254 tons of raisins. Approximately 70 per cent of this produce was exported to the United Kingdom, Canada, and New Zealand.

During recent years the growing of grapes for table use has expanded rapidly and with some growers has become a specialised industry. The main varieties are Waltham Cross, Purple Cornichon, Ohanez, Sultanas, and Muscats. Melbourne and Sydney are the main market outlets, but Indonesia, Colombo, and Singapore may grow in importance as export markets.

Grapes are grown specifically for wine production at Rutherglen, Great Western, and Nagambie. While the wine growing area around Rutherglen is gradually declining, increasing quantities of grapes for winemaking are produced in the River Murray Irrigation districts. In 1966–67, 3·6 mill. gals of wine were produced.

Grapes for Wine, 1964; Dried Fruits Industry, 1967; Wine, 1968

Particulars of vine production for the five seasons, 1962–63 to 1966–67, are given in the following table :

VICTORIA—VINE-FRUIT PRODUCTION

Season	Number of Growers	Area		Production				
		Bearing	Not Bearing	Grapes Gathered	Wine Made	Dried Fruits		
						Raisins	Sultanas	Currants
		acres		'000 cwt	'000 gals	cwt		
1962–63 ..	2,547	42,734	2,928	4,271	2,433	94,777	786,410	50,728
1963–64 ..	2,583	43,485	3,016	6,274	3,705	122,352	1,200,415	78,676
1964–65 ..	2,601	44,203	3,793	6,435	3,656	131,179	1,191,888	89,535
1965–66 ..	2,561	44,788	3,829	5,660	3,152	141,206	1,047,149	62,545
1966–67 ..	2,538	45,381	3,783	6,530	3,555	125,085	1,266,927	71,552

Vegetables

The climate of Victoria is such that practically every kind of vegetable can be grown in some part of the State during the favourable season in each area. Consequently, there is a plentiful supply of fresh vegetables on the market for the whole year in normal years. These vegetables (excluding potatoes and onions), worth about $24m to Victoria, are harvested from about 55,000 acres.

Over half the area under vegetables is within 50 miles of Melbourne. Other vegetable producing centres south of the Dividing Range are in the Western District (the centre of processed pea production) and in Gippsland (the centre of the stringless bean growing industry for processing and also for seed bean production). These areas are fairly free of frosts and have a well distributed rainfall ranging from 20 to 35 in. Vegetables are grown on a wide variety of soils (sand, sandy loam, clay loam, peat, and volcanic). Many vegetable growers use irrigation from town water supplies, storage catchments, streams, and dams to supplement rainfall.

North of the Dividing Range the summer is longer and hotter, but winter frosts are more frequent. Many areas along the Lower Murray are ideal for growing early spring crops and efficient transport enables produce to be shipped to both Melbourne and Sydney. In some instances intercropping in orchards and vineyards is practised. Tomato production for processing is now largely concentrated in the Goulburn Valley but other important production areas are situated along the Murray and Loddon Rivers and in the Maffra irrigation district in Gippsland. The greatest part of the Victorian crop comes from the Goulburn Valley.

Returns from vegetable growing can fluctuate greatly according to weather and market conditions and production methods have to be highly efficient. Market gardens near Melbourne may grow two and sometimes three crops in the one year. While a number of hand operations are still essential, mechanisation and the use of selective weedicides have greatly reduced labour costs. Peas, beans, and onions can be harvested mechanically and a number of mechanical aids are used for harvesting other crops. New varieties and improved storage and transport techniques have also increased production efficiency.

While most crops reach the consumer as fresh vegetables, an increasing amount of produce is being processed and a feature of the Victorian industry is the rapid increase in the production of peas and beans for freezing.

Details of the area, production, and gross value of vegetables are given in the table below for all the more important types, including potatoes and onions which are shown in greater detail under separate headings on pages 340–1 :

VICTORIA—VEGETABLES FOR HUMAN CONSUMPTION, 1966–67

Type	Area Sown	Production	Gross Value
	acres	tons	$'000
Potatoes	37,167	225,186	15,291
Onions	3,295	22,375	1,464
Carrots	2,089	29,860	2,639
Parsnips	634	9,453	1,429
Beetroot	240	2,458	283
Tomatoes	5,485	77,228	4,798
French Beans	3,607	7,474	1,567
Green Peas—			
Sold in Pod	4,712	5,211	1,524
Canning, etc. (Pod Equivalent)	25,762	35,832*	3,198
Cabbages	1,947	28,458	986
Cauliflowers	2,481	32,149	1,695
Brussels Sprouts	746	3,753	912
Lettuce	1,985	7,147	1,211
Pumpkins	1,720	9,177	868
Other Vegetables	3,836	17,282	2,728
Total	95,706	513,043	40,593

* Shelled weight 16,124 tons.

Minor Crops

There are other crops cultivated in Victoria in addition to those enumerated on pages 326–8. The most important of these are nursery products, cut flowers, Japanese millet, sunflowers, agricultural seeds, vegetable seeds, and safflower.

Pastoral and Dairying

Progress of Stock Breeding

The first great development in Victoria, or as it was then known, the district of Port Phillip, was the pastoral interest. Millions of acres of lightly timbered land lay at the feet of the newcomers, and the quickest way to wealth was evidently by the division of the land into runs and the depasturing of sheep and cattle. Settlers and stock, at first from Tasmania and eventually from New South Wales, came from the very first year of settlement.

According to early statistical records, there were 26,000 sheep, 100 cattle, and 57 horses in the Colony on 25 May 1836. On 1 January 1841, as a result of five years of livestock importation and breeding, there were 782,283 sheep, 50,837 cattle, and 2,372 horses. By 1 January 1851, the livestock population had increased to 6,032,783 sheep, 378,806 cattle, 21,219 horses, and 9,260 pigs.

The following table shows the number of livestock in Victoria at decennial intervals since 1861 to 1961 and the numbers of livestock on rural holdings for each of the five years 1963 to 1967. As from 1957 no allowance has been made for the small number of livestock not on rural holdings.

VICTORIA—LIVESTOCK
('000)

Year	Horses (Including Foals)	Cattle*		Sheep	Pigs
		Dairy	Beef		
1861 at 31 March ..	77	722		5,781	61
1871 „ „ ..	167	721		10,762	131
1881 „ „ ..	276	1,286		10,360	242
1891 „ „ ..	436	1,783		12,693	282
1901 „ „ ..	392	1,602		10,842	350
1911 at 1 March ..	472	1,548		12,883	333
1921 „ „ ..	488	1,575		12,171	175
1931 „ „ ..	380	1,430		16,478	281
1941 „ „ ..	318	1,922		20,412	398
1951 at 31 March ..	186	1,489	727	20,012	237
1961 „ „ ..	64	1,717	1,147	26,620	319
1963 „ „ ..	58	1,858	1,367	27,472	298
1964 „ „ ..	56	3,301		28,413	322
1965 „ „ ..	56	3,316		30,437	378
1966 „ „ ..	†	3,397		30,968	384
1967 „ „ ..	55	3,528		31,239	351

* Separate figures for beef and dairy cattle are not available for years prior to 1943 or for 1964 onwards.

† Not Collected.

A table showing the sizes of holdings and the numbers of holdings depasturing stock at March 1966, appears on page 321. Dot maps showing the distribution of livestock on rural holdings in Victoria at 31 March 1962, appear on pages 577 to 580 of the *Victorian Year Book* 1964.

Following an investigation into the adequacy of the wording and layout of the cattle sections of the Agricultural, Dairying, and Pastoral Statistics form, changes were introduced to the 1963–64 form.

Prior to 1964, farmers were asked to classify their herds as either " beef cattle " or " dairy cattle ". As these two terms tended to confuse breed and purpose, farmers were asked in the new design to classify their cattle, with the exception of bulls, according to the two main purposes of (i) milk production and (ii) meat production, irrespective of breed, and to report separately the number of cows and heifers kept for their own domestic milk supply ; bulls were to be reported according to their breed and age, i.e., dairy or beef and over or under one year of age. Consequently, detailed statistics of cattle for 1967, set out in the following table, are not comparable with those for years prior to 1964.

VICTORIA—DISTRIBUTION OF LIVESTOCK, MARCH 1967 ('000)

Particulars	Statistical District								
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	Total
Cattle—									
Bulls for Service—									
Bulls, 1 Year and over—									
Dairy Breeds ..	6	1	9	1	1	9	3	11	40
Beef Breeds ..	5	2	10	1	1	4	5	6	35
Bull Calves—Under 1 Year—									
Dairy Breeds	2	*	3	*	*	3	1	4	15
Beef Breeds ..	2	1	4	1	*	2	2	2	13
Cows and Heifers for Milk and Cream—									
Cows in Milk ..	135	13	164	7	11	237	43	281	889
Cows Dry ..	49	7	115	5	3	33	40	70	322
Heifers—1 Year and over ..	55	7	79	3	4	78	25	96	347
Heifer Calves—Under 1 Year	45	6	70	3	4	80	24	93	326
House Cows and Heifers	4	2	6	4	3	4	3	3	28
Other Cattle and Calves for Meat Production—									
Cows and Heifers ..	115	43	228	19	10	69	131	135	750
Calves—Under 1 Year ..	69	28	119	14	9	57	79	92	467
Other	44	17	60	5	4	38	60	66	295
Total Cattle ..	532	128	866	63	50	613	416	859	3,528
Pigs	60	10	31	17	19	111	40	63	351
Sheep	2,865	2,621	11,732	4,218	1,513	4,031	2,147	2,112	31,239

* More than nil but less than half the final digit shown.

Changing Patterns in Animal Husbandry, 1963

Fodder Conservation

The intensification of fodder conservation has been a natural development in farm management following pasture improvement and increased capacity for the carrying of livestock.

Even the best pastures do not provide a full ration for grazing animals throughout the year because of seasonal variations in their growth. In addition, droughts and other circumstances, such as floods

or fires, have serious effects on the amount of grazing available. In most cases, these feed shortages must be met by fodder conservation and hand feeding. Fodder conservation is, therefore, a highly important farm activity without which stable livestock production could not be maintained at high levels.

In Victoria, meadow hay is the main fodder conserved, being cheaply and readily available from surplus spring pasture growth in most seasons. In fact, this source of fodder is not fully exploited, since, while individual farms may cut 25 per cent or more of their farms for hay, on average less than 10 per cent of the State's improved pastures are cut each year. Nevertheless, Victoria produces some 60 per cent of Australia's meadow hay, although it has only about 30 per cent of Australia's sown grasses and clovers. Cereal hay (mainly oaten) is also made in large quantities, especially in drier districts and in drier years, i.e., in circumstances where good pasture production may be irregular, or low due to poor spring rains.

Lucerne hay is generally produced as a quality fodder intended for cash sale, and considerable quantities are conserved, especially in irrigated areas. However, the excellent quality of much of the clover and grass hay made from improved pastures has lessened interest in this fodder. Oat grain, which is easily stored, transported, and rationed is an important livestock fodder favoured for sheep in both cereal growing and grazing districts. Silage occupies a relatively minor position in the fodder conservation of the State, although important to dairy farmers meeting whole milk supply contracts in dry farming areas. Silage is also used successfully for feeding beef cattle, and has special value as a drought reserve.

Most hay in Victoria is made with the mower, side-delivery rake, and pick-up baler. About one in six farms has a baler. After mowing, the crop dries for a time in the swath, and is then raked for further drying in the windrow before it is baled. Some farmers are using systems of loose hay handling and self-feeding based on simple low cost equipment, especially in northern areas or where short-term storage of hay is involved for early feeding needs.

Sometimes baled hay intended for summer or early autumn feeding is left in the paddock for self-feeding by the stock. Provided the hay is well made and, preferably, stored in stooks, there is little wastage in such temporary storage, especially if feeding is controlled. Long-term storage requires adequate protection, such as is given by a well constructed shed.

In recent years, increasing interest has been taken in new machines and techniques aimed at faster drying of hay. This is a most significant development, since it makes possible further increases in hay production as well as the production of higher quality hay because better use is made of the limited drying time available when the crop is at its best. The types of machines used include tedders, which loosen and aerate the hay lying in swath or windrow; conditioners, which crush or crimp fresh hay between rollers and enable internal moisture to move faster through the fractured cuticle of the plants; and rotary slashers and flail mowers, in which cutting by high speed impact replaces conventional mowing and the drying rate may increase as a result of the bruising and cuticle damage that the crop experiences.

Ensilage

Most ensilage is still made in open stacks using a mower and buckrake. This is simple, but wastage is high. The flail-type forage harvester is popular because of simple cutting action and relative cheapness. It consists of swinging blades which rotate at high speed on a horizontal shaft. The crop is thrown or blown into an accompanying trailer or truck for transport for storage. Flail cutting has opened the way to more effective ensilage making because the process may be better controlled. Improved storage and feeding techniques are leading to more effective use of ensilage, generally, than is possible with high wastage open stack methods.

Further References, 1963, 1964, 1966, 1967

Dairying Industry

In strong contrast to the days of small, mostly independent butter factories and, in smaller numbers, cheese factories, the dairy manufacturing industry is now organised mainly into larger units manufacturing a range of products according to market opportunities. The amalgamation of factories still continues.

An exception to this general trend is the development of new, sometimes small, units for the making of non-cheddar varieties of cheese. The market for these cheeses has increased with the influx of new settlers, but substantial amounts of non-cheddar cheeses are still imported to meet the new consumer demands.

In all, there are some 113 dairy manufacturing establishments in Victoria, these being in the hands of about sixty-four separate managements. Butter, cheese (cheddar and other varieties), casein, skim milk powder, and buttermilk powder are the main products manufactured, but some eighteen other products are made, including various types of powdered and concentrated milk, bread powder, co-precipitate, butter oil, sterilised milk, ice cream mix, and stock foods.

As more than half the nation's dairy production comes from Victoria, manufacturers in this State are making strong efforts to meet the high quality standards imposed by some of the developing overseas markets. In this they are assisted by the general use of stainless steel equipment and the design of modern plants to take advantage of cleaning-in-place techniques.

The opening in 1968 of the enlarged Gilbert Chandler Institute of Dairy Technology and the inauguration of a new course there for a Diploma in Dairy Technology will give staff in factories the training required to improve quality control and factory efficiency. There is a growing consciousness of the need to improve the training of staffs at all levels.

Dairy farming in Victoria is being intensified and concentrated into the more suitable environments. From 1960 to 1967 the number of licensed dairy farms dropped by more than 13 per cent but in the same period the number of milking cows rose by 16 per cent and the average production for each cow gained. This has been

brought about by improvement of pastures, by their more efficient use through increased grazing pressure, by more skilled farm management directed towards ensuring supplies of farm feed throughout the year, and by breeding better dairy cows through location of superior bulls and their widespread use in artificial breeding.

The following table shows the numbers of cow-keepers and cows, the estimated total production of milk, and the gross value of dairy produce for each of the last five years :

VICTORIA—DAIRYING

At 31 March—	Number of Cow-keepers	Number of Dairy Cows	Estimated Total Production of Milk for All Purposes (Year Ended 30 June)	Gross Value of Dairy Produce*
		'000	'000 gals	$'000
1963	41,866	1,294	670,788	157,136
1964†	28,181	1,184	694,775	172,560
1965	27,704	1,187	745,896	194,988
1966	‡	1,192	751,564	190,141
1967	‡	1,211	790,941	210,345

* Includes subsidy.

† Details of cow-keepers and dairy cows from 1964 onwards are not comparable with those for earlier years. Prior to 1964 these statistics were based on numbers of cows (in milk or dry) and springing heifers and included cows kept for the farmer's own domestic milk supply. Commencing with 1964, details of cows kept for the farmer's own domestic milk supply have been excluded. See page 354.

‡ Not Collected.

The quantities of butter, cheese, condensed and powdered full-cream milk, and casein produced during the last five years were as follows :

VICTORIA—BUTTER, CHEESE, CONDENSED AND POWDERED MILK, AND CASEIN MADE

('000 lb)

Year Ended 30 June—	Butter*	Cheese*	Condensed Milk	Powdered Full-cream Milk	Casein
1963	228,167	57,468	104,518	20,635	32,907
1964	232,394	56,446	132,225	22,328	34,967
1965*	247,924	60,975	146,167	25,291	36,685
1966	251,268	58,158	122,650	24,506	48,531
1967	266,907	67,753	113,559	24,188	38,509

* Commencing with the year ended 30 June 1965, small quantities of butter and cheese made on farms are excluded from the above table. For the year ended 30 June 1964, there were 895,000 lb of butter and 49,000 lb of cheese made on farms.

The following table shows the number of dairy herds in Victoria, grouped, according to the number of cows, for each of the five years 1961 to 1965 :

VICTORIA—DAIRY HERDS, CONTAINING FIVE COWS OR MORE, GROUPED ACCORDING TO SIZE

At 31 March—	Number of Herds—							
	5 to 9 Cows	10 to 14 Cows	15 to 19 Cows	20 to 29 Cows	30 to 49 Cows	50 to 99 Cows	100 Cows and over	Total
1961.. ..	4,213	2,149	1,545	2,738	5,915	8,723	1,549	26,832
1962.. ..	4,092	2,064	1,454	2,712	5,667	9,271	1,838	27,098
1963.. ..	3,660	1,904	1,405	2,537	5,486	9,569	2,015	26,576
1964* ..	2,459	1,596	1,183	2,507	5,660	9,339	1,646	24,390
1965.. ..	2,281	1,462	1,025	2,202	5,342	9,462	1,759	23,533

* Details from 1964 onwards are not comparable with those for earlier years. See footnote to the first table on page 357.

Eradication of Tuberculosis, 1962; Dairying Industry, 1967; Sharefarming in the Dairying Industry, 1967

Pig Industry

Until recently, the pig industry of Victoria used waste and surplus human foods. Most pig herds were small (less than fifty head) and were on dairy farms to salvage the separated milk where cream was sold for making butter. Generally they produced not more than 25 per cent of the total net income of the farm. Larger pig herds were kept to eat the buttermilk and whey by-products from the milk product factories, or other food wastes from processing factories, markets, and eating establishments. On most farms, cereal grains were fed to pigs as supplements to the major salvage part of the diet.

Now, the milk industry is using more milk for human consumption in several forms and many dairy farmers, who previously sold cream and fed separated milk to pigs, are now selling whole milk and have ceased pig raising. This has resulted in a reduction in the number of pig herds. However, as the demand for pig meat continues to grow, those farmers who continue to raise pigs are increasing the size of their herds and some new producers are entering the industry.

This trend has resulted in fewer but larger pig herds, producing more pigs than previously and has been achieved by using cereal grains as the major part of the pigs' diet as against the earlier practice of using them only as a supplement to the salvaged foods.

Most pig raising units now provide the major part of the income from the farms concerned. More capital and skilled management are involved in the individual units.

The number of pigs in Victoria at 31 March 1967, was 350,591. About 76 per cent of these are held in the Central, Western, Northern, and Gippsland districts. The following table shows classifications (in statistical districts) of pigs, together with the numbers of pig-keepers :

VICTORIA—PIGS AND PIG-KEEPERS, 31 MARCH 1967

Statistical District	Boars	Breeding Sows	All Other	Total Pigs	Pig-keepers
Central	911	8,741	50,616	60,268	1,009
North-Central ..	221	1,497	7,897	9,615	384
Western	705	4,551	26,166	31,422	972
Wimmera	441	2,629	13,832	16,902	907
Mallee	502	2,699	15,334	18,535	825
Northern	1,849	16,836	92,000	110,685	1,574
North-Eastern ..	918	6,092	32,853	39,863	1,000
Gippsland	1,292	8,814	53,195	63,301	1,270
Total	6,839	51,859	291,893	350,591	7,941

The following table shows the latest statistics available of the number of dairy herds (in size groups) separated into those where pigs are held, and those where no pigs are held. The sizes of pig herds are also shown.

VICTORIA—PIG-KEEPING IN CONJUNCTION WITH DAIRYING : NUMBER OF HOLDINGS AT MARCH 1966

Size of Dairy Cattle Herd (Numbers)	Size of Pig Herd (Numbers)								Holdings with Pigs	Holdings with No Pigs	Holdings with Dairy Cattle
	1–4	5–9	10–14	15–19	20–29	30–49	50–99	100 and over			
1–4	241	58	54	18	47	46	37	20	521	3,611	4,132
5–9	177	78	41	31	42	33	28	8	438	1,853	2,291
10–14.. ..	103	58	34	22	28	30	26	10	311	1,133	1,444
15–19.. ..	79	39	41	17	22	27	17	8	250	804	1,054
20–29.. ..	139	92	74	41	52	53	30	19	500	1,269	1,769
30–49.. ..	167	149	144	109	144	141	82	25	961	2,195	3,156
50–69.. ..	106	137	114	95	184	254	128	39	1,057	2,477	3,534
70–99.. ..	83	102	128	123	252	364	356	105	1,513	4,063	5,576
100–149 ..	44	45	50	53	124	243	396	179	1,134	3,724	4,858
150 and over ..	12	14	12	13	37	72	178	164	502	1,542	2,044
Total ..	1,151	772	692	522	932	1,263	1,278	577	7,187	22,671	29,858

Sheep Industry

Breeds of Sheep

Victoria and Tasmania are the only two Australian States in which the Merino does not comprise over 50 per cent of the sheep population. In 1965, Victoria's sheep population consisted of 46 per cent Merinos; 15 per cent Corriedales; 4 per cent Polwarths; 29 per cent Comebacks and Crossbreds; and 6 per cent British breeds (mainly pure Dorset Horn, Romney Marsh, Border Leicester, and Southdown).

The Corriedale and the Polwarth were both developed in Victoria to meet a special need in the southern high rainfall area for a dual purpose breed which combined the production of good style Comeback or Crossbred wools with good meat conformation.

The pure British breeds are mostly run in small stud flocks which produce rams for use in cross breeding for prime lamb or Crossbred wool production. Some common crosses used in fine Crossbred and Comeback wool production are Merino by Corriedale, Merino by Polwarth, and Corriedale by Polwarth. The common crosses used to produce strong Crossbreds for wool and prime lamb production are Border Leicester by Merino, Romney Marsh by Corriedale, and Romney Marsh by Merino. The most important breeds for siring prime lambs are the Dorset Horn (and the Poll Dorset), the Southdown, and the Border Leicester.

Information on the number of sheep of each breed is collected triennially.

The following table shows the breeds of sheep in Victoria (by statistical districts) at 31 March 1965:

VICTORIA—BREEDS OF SHEEP (INCLUDING RAMS), 31 MARCH 1965

('000)

Statistical District	Merino	Corriedale	Polwarth	Dorset Horn	Romney Marsh	Border Leicester	Southdown	Merino Comeback	Crossbred	Other	Total
Central	718	490	210	54	44	52	22	222	953	16	2,781
North-Central ..	1,249	322	32	42	9	45	14	167	551	13	2,444
Western ..	4,761	2,449	817	62	427	49	30	935	1,108	54	10,691
Wimmera ..	3,585	410	21	28	28	42	1	112	363	15	4,605
Mallee	921	113	7	44	3	58	1	160	580	7	1,894
Northern ..	1,493	375	41	120	9	94	20	262	1,813	26	4,253
North-Eastern ..	642	256	82	40	32	26	6	158	727	17	1,986
Gippsland ..	779	169	14	34	41	28	13	144	549	13	1,784
Total ..	14,148	4,582	1,224	424	592	395	109	2,160	6,643	160	30,437

The following table shows the breeds of rams in Victoria (by statistical districts) at 31 March 1966 :

VICTORIA—BREEDS OF RAMS, 31 MARCH 1966

Statistical District	Merino	Corriedale	Polwarth	Dorset Horn	Border Leicester	Southdown	Other	Total
Central	4,089	4,617	1,748	10,148	1,409	5,260	4,146	31,417
North-Central	7,730	3,515	542	6,171	3,135	2,505	1,718	25,316
Western	51,046	29,384	10,094	9,350	2,862	4,450	17,502	124,688
Wimmera	25,764	6,141	194	4,468	4,545	103	3,356	44,571
Mallee	3,709	1,212	66	8,291	6,764	58	1,970	22,070
Northern	9,610	3,625	420	24,673	11,222	2,262	4,046	55,858
North-Eastern ..	4,372	2,435	767	9,264	3,668	1,812	3,480	25,798
Gippsland	4,726	1,941	158	4,226	2,461	3,389	4,457	21,358
Total ..	111,046	52,870	13,989	76,591	36,066	19,839	40,675	351,076

The numbers of sheep in Victoria in selected years since 1861 are shown in the table on page 353. The distribution of all livestock is shown in the table on page 354.

The increase in sheep numbers in recent years has been due to pasture improvement and intensification of stocking rates on established improved pastures.

However, factors such as seasonal conditions, prices of wool, mutton, lamb, and to a lesser degree, wheat, affect the number of sheep in the State in any given year. In an adverse season flocks may be reduced by lack of fodder or water, by the increase in the slaughtering of fat stock, or by the decrease in lambing. Decreased imports from other States are another factor. In addition to the seasonal movements of sheep from New South Wales and South Australia for agistment, there is a regular importation of sheep from those States for slaughtering purposes.

Lambing

Climatic conditions also play a large part in determining the proportion of lambs marked to ewes mated, and thus the natural increase from season to season may vary considerably. The following table shows the number of ewes mated or intended to be mated, the number actually mated, and lambs marked, in each of the five seasons 1963 to 1967 :

VICTORIA—LAMBING

Season	Ewes Intended for Mating	Ewes Actually Mated	Lambs Marked	Proportion of Lambs Marked to Ewes Mated
		'000		%
1963	11,436	11,369	9,795	86
1964	11,633	11,611	9,853	85
1965	12,560	12,501	10,556	84
1966	12,674	12,605	10,626	84
1967	13,205	12,476	10,101	81

Sheep and Lambs in Statistical Districts

The following tables set out the number of rams, ewes, wethers, and lambs depastured in each statistical district of the State at 31 March 1967, and the numbers of ewes mated classified according to whether the progeny is intended for wool or for fat lamb production :

VICTORIA—SHEEP AND LAMBS IN EACH STATISTICAL DISTRICT AT 31 MARCH 1967
('000)

Particulars	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Rams ..	33	25	123	41	20	52	25	24	343
Ewes ..	1,414	1,103	5,428	1,830	935	2,267	1,126	1,067	15,171
Wethers ..	857	1,034	3,578	1,484	208	807	576	528	9,072
Lambs ..	561	459	2,603	864	349	905	420	493	6,654
Total Sheep and Lambs ..	2,865	2,621	11,732	4,218	1,513	4,031	2,147	2,112	31,239

VICTORIA—LAMBING, 1966 SEASON

Particulars	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Ewes Mated '000 ..	1,199	928	4,164	1,482	909	2,057	1,000	866	12,605
Lambs Marked '000 ..	1,078	810	3,386	1,167	758	1,798	856	773	10,626
Percentage ..	90	87	81	79	83	87	86	89	84

VICTORIA—LAMBING FORECAST, 1967 SEASON
(As Advised by Farmers at 31 March 1967)
('000)

Breed of Rams Used	Ewes Mated or Intended to be Mated (For Lambing during 1967 Season)								
	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Merino ..	176	293	1,497	830	143	330	191	223	3,682
Corriedale or Polwarth ..	252	137	1,571	219	48	154	127	112	2,620
Shortwool Breeds ..	733	391	657	186	420	1,180	526	439	4,532
Longwool Breeds ..	102	163	743	276	258	440	186	203	2,371
Total ..	1,262	984	4,468	1,511	869	2,104	1,031	977	13,205

Production of Wool

Statistics of wool production are obtained direct from growers, from fellmongeries and, for wool exported on skins, from the Department of Customs and Excise.

VICTORIA—SHEEP AND LAMBS SHORN, SEASON 1966–67

Statistical District	Shorn		Wool Clipped (Including Crutchings)		Average	
	Sheep	Lambs	Sheep's	Lambs'	Per Sheep	Per Lamb
	'000		'000 lb		lb	
Central ..	2,613	667	26,389	2,064	10·10	3·09
North-Central ..	2,532	537	26,411	1,549	10·43	2·88
Western ..	11,221	2,876	107,011	8,384	9·54	2·92
Wimmera ..	4,217	986	42,851	2,778	10·16	2·82
Mallee ..	1,377	426	14,480	1,254	10·52	2·94
Northern ..	3,719	1,054	37,760	3,035	10·15	2·88
North-Eastern ..	2,077	489	20,152	1,338	9·70	2·74
Gippsland ..	1,796	570	17,574	1,678	9·79	2·94
Total ..	29,553	7,605	292,627	22,080	9·90	2·90

VICTORIA—SHEEP SHORN AND WOOL CLIPPED

Season	Shorn		Wool Clipped (Including Crutchings)		Average	
	Sheep	Lambs	Sheep's	Lambs'	Per Sheep	Per Lamb
	'000		'000 lb		lb	
1962–63 ..	25,376	6,235	243,238	17,561	9·59	2·82
1963–64 ..	26,009	6,836	262,472	18,863	10·09	2·76
1964–65 ..	28,315	7,024	285,407	20,871	10·08	2·97
1965–66 ..	29,668	8,003	285,564	21,779	9·63	2·72
1966–67 ..	29,553	7,605	292,627	22,080	9·90	2·90

VICTORIA—WOOL PRODUCTION AND VALUE

Season	Clip	Stripped from and Exported on Skins, etc. (Greasy)	Total Quantity (Greasy)	Gross Value	Average Price per lb
	'000 lb			$'000	cents
1962–63 ..	260,799	55,906	316,705	158,013	49.89
1963–64 ..	281,335	52,953	334,288	208,700	62.43
1964–65 ..	306,278	55,252	361,530	176,041	48.69
1965–66 ..	307,343	59,601	366,943	193,797	52.81
1966–67 ..	314,707	63,750	378,457	180,946	47.81

Wool Growing Districts, 1962, 1967; Wool Marketing, 1963; History of Pastoral Industry, 1963

Meat Industry

The farm lands of Victoria have proved most suitable for meat production and about 30 per cent of Australia's red meat is produced in Victoria.

The American market has brought big changes to the beef industry, since the United States is mostly interested in lean meat. The demand created to supply this market has lifted the prices of bulls, dairy cows, and what are known to the trade as store cattle. The prices for these cattle have increased considerably and are now close to the prices per 100 lb dressed weight (chilled carcass) of the traditionally prime cattle, used extensively in supplying the local trade.

The local market for lamb has always been good but the demand for export lambs has been irregular, largely because of overfatness. Grading is largely a matter of fatness and the leaner, meatier types used locally are the most profitable to produce in areas where the season favours marketing from February to September. Marketing of lambs from the drier parts of the State has to be done during October, November, and December when, because of the large offerings, lamb prices are at export parity.

Boneless mutton exports to the United States have provided a large market for old sheep which at one time brought low prices for canning and small goods. A proportion of old sheep is still allowed to die on properties but the waste has been greatly reduced in recent years and is reflected in greater mutton production.

There have been more pigs in Victoria than at present but, with faster growth and more rapid turnover, pig meat production has remained high. Most pig meats are consumed locally and a small increase in production is reflected in a big drop in prices and vice versa. Since prices improved following the almost complete cessation of exports during the Second World War, pig meat production has tended to follow three year cycles. For about eighteen months, pig prices are low and many farmers go out of production. Then there is a shortage of pig meats and prices rise, attracting new farmers into pig meat production. When these new farmers have pigs to sell, the shortage is overcome and prices fall. The successful pig farmer has a cheap supply of good food and produces steadily all the time.

The American influence upon Victoria's standards of living has had a telling impact on table poultry production. Fewer people are keeping poultry for their own domestic requirements, and consequently, more poultry meat is purchased. This has resulted in a big increase of broilers, capons, and other table fowl, including ducks and turkeys.

Broiler Industry

The raising of chickens for meat on a large scale has emerged in Victoria since the mid-1950s. Chickens are most efficient in converting poultry feeds, grains, and protein supplements, to meat, and are also multiplied cheaply and rapidly through scientific breeding and modern artificial incubation methods.

It now takes approximately 2·6 lb of poultry feed to produce 1 lb of poultry meat, and a 3–3¼ lb chicken is grown in nine to ten weeks. There is every prospect of attaining current British and

American production figures of 2–2·4 : 1 feed conversion and a 3–3¼ lb chicken in seven to eight weeks. This efficient conversion and rapid growth has been achieved by extensive breeding programmes ; the use of " high energy " poultry feeds, highly supplemented with vitamins and minerals ; growth promoters and disease control drugs ; and by the development of enclosed, factory-like broiler houses, with controlled temperature, humidity, ventilation and light, conducive to fast growth.

The organisation of the broiler industry on a continuous, production-line, factory-like operation, has been a major factor in the great reduction in price to consumers. Breeders, hatcheries, contract growers, poultry processors and distributors, have all co-ordinated to ensure efficient and continuous production. Seasonal effects are no longer a consideration and prices do not fluctuate. As a result, poultry meat, once a luxury, is now cheap and a normal part of the diet.

The main production centres are located on the Mornington Peninsula and in areas south-east and east of Melbourne, near the processing works and the main centres of consumption. Most of Victoria's production is consumed locally ; very little is exported and some interstate broilers are imported.

Broiler houses are fully enclosed, each house grows a " crop " of about 10,000 broilers, about four times a year. Chickens are stocked at a rate of 0·6–0·8 sq ft of floor space per bird. A one-man or one-family farm raises approximately 80,000 to 120,000 birds a year. Growers are usually contracted to supply large broiler organisations which hatch and supply the specially bred meat chickens and receive broilers back for processing and distribution.

Egg Industry

The trend in the Victorian egg industry is towards large specialised farms—egg producers, hatcheries, and pullet growers—utilising modern poultry housing, equipment, and labour saving machinery.

The greater proportion of the State's estimated 4 mill. adult female fowls are now contained within the commercial egg industry. There are, however, large numbers of small household flocks in suburban and country areas.

The main areas of commercial production are centred on the outskirts of the Melbourne Metropolitan Area and in the Bendigo district, with large centres around Ballarat and Geelong, and substantial populations in the Wimmera, Goulburn Valley, and North-East.

One-man or one-family farms usually manage 2,000 to 3,000 layers. There are, however, many larger farms, employing labour, with up to 10,000 layers, and a smaller number of much larger farms.

Housing is largely planned on the intensive principle, with deep litter pens or single and multiple bird cage units and most of the new housing is on the laying cage system. A small proportion of layers is kept in fully enclosed, windowless houses under a fully controlled environment. Artificial lighting is used on almost all commercial egg farms to stimulate egg production.

Feeding is based on the grains (wheat, oats, and barley) and the by-products (bran and pollard). Meatmeal is the major protein supplement. Wide ranges of commercial, ready-mixed poultry rations are also available.

Laying stock consists mainly of a specially produced crossbred between the White Leghorn and Australorp breeds. The average State egg production is estimated at approximately 195 eggs per bird per year. Commercial stock of the local breeding farms and hatcheries is tested for profitability at the Department of Agriculture's Random Sample Laying Test at Burnley.

Chicks are hatched continuously throughout the year with an emphasis on the June–November period. Hatcheries are large and use modern incubators from 5,000 to 90,000 egg capacity. Most commercial egg-type chicks are sexed at a day old by machine or hand methods and the cockerels discarded.

The main power source used in the brooding of chicks is electricity, but gas brooders and hot water brooders fired by oil burners are also used.

The marketing of eggs is controlled by the Victorian Egg and Egg Pulp Marketing Board. Flocks with over twenty adult female fowls come within the Board's jurisdiction, and owners of flocks with over forty adult female fowls are required to market their eggs through the Board. Victoria produces a surplus of eggs which is exported through the Australian Egg Board.

Advisory and research services to the egg industry are provided by the Department of Agriculture, commercial firms concerned with sale of feed, drugs and equipment, and the University of Melbourne.

A monthly collection of statistics on chicken hatchings and poultry slaughterings was commenced in Victoria in January 1966 and the following table summarises the results for the years ended June 1966, 1967, and 1968 :

VICTORIA—CHICKEN HATCHINGS AND POULTRY SLAUGHTERINGS

('000)

Period	Hen Eggs Set and Chickens Hatched					
	Hen Eggs Set*	Chicks Hatched† Intended To Be Raised for :				Total Hatched
		Meat Production	Egg Production	Breeding		
				Pullets	Cockerels	
	MEAT STRAINS					
1965–66 ..	18,758	13,705	‡	20	3	13,727
1966–67 ..	19,626	14,486	‡	7	1	14,494
1967–68 ..	20,655	15,806	‡	1	1	15,809
	EGG STRAINS§					
1965–66 ..	10,956	2,135	3,710	202	41	6,087
1966–67 ..	12,206	1,509	4,114	217	30	5,869
1967–68 ..	12,578	1,567	4,251	209	31	6,059

* Includes eggs which failed to hatch.
† Excludes chicks destroyed.
‡ Not applicable.
§ Egg strain chicks reported as " unsexed " have been allocated half to chicks for meat production and half to chicks for egg production. Number so reported was 907,295 in 1965–66 ; 486,340 in 1966–67 ; and 410,129 in 1967–68.

POULTRY SLAUGHTERED FOR HUMAN CONSUMPTION ('000)

Period	Chickens (i.e., Broilers, Fryers or Roasters)	Hens and Stags	Ducks and Drakes	Turkeys
1965–66 ..	12,039	1,013	326	67
1966–67 ..	13,570	911	253	166
1967–68 ..	15,519	990	248	95

DRESSED WEIGHT OF POULTRY SLAUGHTERED*, AND INTENDED FOR SALE† ('000lb)

	Fresh	Frozen	Fresh	Frozen	Fresh	Frozen	Fresh	Frozen
1965–66.. ..	19,487	9,508	2,556	820	793	536	105	565
1966–67.. ..	20,020	14,742	2,520	449	728	169	131	1,487
1967–68.. ..	19,053	22,333	2,963	355	635	248	145	818

* Dressed weight of whole birds, pieces and giblets as reported by producers.

† Fresh.—Sold immediately after slaughter or chilled for sale soon after.
Frozen.—Frozen hard for storage of indefinite duration.

The above statistics have been compiled from returns submitted by all known Victorian hatchers, and all poultry slaughterers slaughtering more than 1,000 birds annually, and it is considered that they give a high level of coverage of chicken hatchings and poultry slaughterings in Victoria.

Stock Slaughtered

The following table shows the number of slaughtering establishments and details of the stock slaughtered in the State during each of the five years 1962–63 to 1966–67 :

VICTORIA—STOCK SLAUGHTERED

Particulars	Stock Slaughtered in Establishments and on Farms and Stations — Year Ended 30 June—				
	1963	1964	1965	1966	1967*
			'000		
Sheep	7,444	7,306	7,136	8,160	7,310
Lambs	5,408	5,342	5,433	5,205	5,875
Bulls and Bullocks ..	310	292	295	270	244
Cows	463	509	577	558	485
Young Cattle.. ..	255	312	365	359	361
Calves—Bobby ..	574	668	675	622	570
Other ..				44	77
Pigs	530	533	601	705	699
Number of Slaughter-houses	284	282	270	262	263

* Average dressed weights per carcass during 1966–67 were : Sheep 45·77 lb ; Lambs 36·12 lb ; Bulls and Bullocks 607·12 lb ; Cows 431·18 lb ; Young Cattle 325·72 lb ; Bobby Calves 42·08 lb ; Other Calves 90·63 lb ; Pigs 106·27 lb.

Frozen Meat Exported

The importance of the beef, mutton and lamb export trade is indicated by the export figures for the years 1962–63 to 1966–67, as shown in the table below. During 1966–67, the United States, the United

Kingdom, Canada, Japan, Greece, and Italy absorbed the largest quantities of frozen meats exported from Victoria. In that year, the United States took 67 per cent (in value) of beef and veal exports followed by the United Kingdom, 18 per cent. The United States purchased 43 per cent of mutton exports, followed by Japan (22 per cent), and Canada (17 per cent). Canada (30 per cent), the United Kingdom (28 per cent), and the United States (25 per cent) were the main purchasers of frozen lamb.

FROZEN MEATS EXPORTED FROM VICTORIAN PORTS

Year Ended 30 June—	Mutton		Lamb		Beef and Veal	
	'000 lb	$'000	'000 lb	$'000	'000 lb	$'000
1963	95,057	16,502	27,674	5,114	117,314	31,822
1964	104,409	16,591	20,877	3,658	122,323	33,637
1965	107,178	18.969	30,290	6,029	147,618	41,431
1966	108,353	22,661	17,954	4,430	132,791	41,026
1967	120,044	23,462	21,175	5,145	125,573	42,140

Honey Industry

There are some 1,250 apiarists in Victoria with five or more hives. These apiarists produce an average of 8 mill. lb of honey per annum. Hive yields are relatively good and range from 90 to 150 lb per annum. The larger commercial outfits would average 200 lb per annum.

The industry is, of necessity, migratory, whole apiaries with attendant plant being moved by road transport from one part of the State to another following the flowering of various species of honey flora in the forests and on the farm lands. Hives, trucks, and plant have been designed and modified to suit the requirements of mobility demanded by the industry.

Particulars relating to apiculture for the five years 1963 to 1967 are given in the following table. Since 1958 beekeepers with less than five registered hives have been excluded from the collection.

VICTORIA—BEE-HIVES, HONEY, AND BEESWAX

Season Ended 31 May—	Beekeepers	Hives	Production		Gross Value	
			Honey	Beeswax	Honey	Beeswax
	No.		'000 lb		$'000	
1963 ..	1,280	100,787	4,818	64	582	33
1964 ..	1,247	93,424	9,460	110	1,498	57
1965 ..	1,276	99,345	9,181	105	1,377	52
1966 ..	1,243	101,387	9,608	115	1,403	55
1967 ..	1,158	96,274	7,160	88	1,045	44

Primary Industries Other than Farming

Forestry

Forest Estate

Of the 56,245,760 acres in Victoria, the forest estate consists of 5,645,802 acres of reserved forest and over this area the Forests Commission has full control. Only a proportion of this reserved forest

produces commercial timber, as large areas come within the category of protection forests and are of value in safeguarding the State's water catchments. In addition, the State Forests Department has partial control over some 9 mill. acres of unoccupied Crown land which must, therefore, be included in the forest estate. These Crown lands include areas of Mallee scrub and alpine grass lands as well as good timbered country.

The Forests Commission of Victoria was established by the *Forests Act* 1918 and consists of a chairman and two commissioners. Subject to the Forests Act, the Commission has the exclusive control and management of all matters of forest policy, the granting of leases, licences, permits and authorities, and the collection of rents, fees, royalties, and other revenue. It is the duty of the Commission to carry out plans and works for the establishment, maintenance, improvement, and renewal of natural forests and plantations of indigenous and exotic trees. It is also responsible for the prevention and suppression of fires, the training of forest officers, conduct of research work, provision of facilities for public recreation, and the protection of native flora and fauna in State forests.

Forest Timber

The following table summarises the total output of all species from all forests in the State (including privately owned lands) for the years 1963 to 1967 :

VICTORIA—FOREST TIMBER
('000 Cu Ft)

Item	Year Ended 30 June—				
	1963	1964	1965	1966	1967
Logs for sawing, peeling, slicing, or pulping—					
Hardwoods	66,910	67,371	68,159	69,499	64,959
Softwoods—					
Indigenous Forest Pines ..	*	13	2	..	..
Plantation Grown Pines ..	9,615	10,853	12,398	14,377	15,232
Total Logs ..	76,525	78,237	80,559	83,876	80,190
Hewn and Other Timber (Not Included above) Estimated Volume—					
Firewood †..	33,557	35,335	33,331	33,278	26,858
Other §	4,152	4,684	4,805	5,475	4,793

* Output was only 524 cu ft.

† Excludes mill waste used as firewood.

§ Includes telephone and electric supply transmission poles, bridge and wharf piles and beams, fencing timbers, railway sleepers, and mining timbers from Crown lands. Similar information for private lands is not available.

Use of industrial wood showed a substantial increase during the twelve months ended 30 June 1967, when compared with the previous twelve months. The greater part of the increased volume was used by the sawmilling industry, with an equal proportional increase in the requirement of pulpwood for paper making and for manufacture of panel products.

After the very high consumption of "other" timbers in the previous year their use declined to more normal levels. The dry conditions in rural areas probably contributed to a decreased use of

fencing timbers but the greater part of the reduction in the overall use of unmanufactured timber was due to reduced purchases of sleepers and transmission poles by governmental and semi-governmental construction agencies.

Softwood Plantations

In recent years large scale plantings have been concentrated in the north-east and south-west adjacent to the South Australian border, where 3,000 and 1,500 acres, respectively, are being planted each year. The total net area of State softwood plantations at 31 December 1967, was 78,536 acres, the total annual planting being approximately 8,000 acres. It is proposed to increase this annual planting rate to 12,000 acres by 1971 under a State–Commonwealth financial assistance scheme.

Pinus radiata has proved itself adaptable to the sites available ; makes rapid growth; is hardy and relatively immune from insect and fungus attack ; and produces a good quality timber. While *Sirex noctilio,* the wood wasp, has been found within commercial plantations in Victoria, good management techniques have so far prevented it causing any losses of consequence in softwood plantations. The area planted in *P. radiata* comprises 68,868 acres or 88 per cent of the total softwood planting. Many of the unsatisfactory areas originally planted with other conifers are now being converted to this species.

The older stands are mainly fifteen to forty years old. Although larger areas are now being clearfelled and replanted, the bulk of the timber being utilised is coming from silvicultural thinnings in the form of logs for peeling and sawing and pulpwood for paper manufacture.

Privately owned softwood plantations were estimated to comprise 102,448 acres at 31 December 1967, and the areas are steadily increasing. Large industrial companies are planting *Pinus radiata* to provide sustained yields of softwood for sawmilling and wood-fibre industries. Private individuals plant small areas as long-term investments and many State schools maintain small endowment plantations.

The *Land (Plantation Areas) Act* 1959 is designed to encourage private establishment of softwood plantations by providing that Crown lands suitable for commercial plantations and unsuitable for agriculture may, with certain safeguards, be leased for timber growing purposes and subsequently sold to the lessee.

The output from State plantations is summarised below :

VICTORIA—OUTPUT FROM STATE PLANTATIONS OF SOFTWOOD LOGS AND PULPWOOD

('000 Cu Ft)

Year Ended 30 June—	Sawlogs and Peeling Logs	Pulpwood
1963	2,949	1,540
1964	3,274	1,385
1965	4,026	2,037
1966	4,412	2,408
1967	4 830	2,323

During 1964–65, an amendment to the *Forests Act* 1958 was passed enabling loans of up to $50 per acre to be advanced to landowners for planting softwood species on land approved by the Commission as being capable of producing an economic crop. The basic intention is to encourage farmers to establish farm woodlots by providing funds interest free for the first twelve years to cover expenses.

Fire Protection

Victoria is one of the most fire hazardous areas in the world. Disastrous fire seasons have occurred periodically since 1851.

The State is divided into seven divisions, comprising fifty-five forest districts. The Commission maintains a radio laboratory and a fire equipment workshop.

The Forests Commission is responsible for the prevention and suppression of fires in all State forests and National Parks and in certain alienated lands within one mile of State forest or National Park. This area of responsibility is legally designated the Fire Protected Area.

Legislation provides strict control over the lighting of fires, power to prohibit the use of fire, and to close down certain operations in the Fire Protected Area during any period of extreme fire danger.

Telecommunications

The radio system consists of forty-six main base stations, ten minor base stations, 175 mobiles, 160 hand held portables, and 250 portable/mobile radios. In addition, twenty stations are equipped with receivers for receipt of weather information and three trailer mounted base stations are held for use in fire emergencies. Three hundred and sixty-five miles of telephone lines erected by the Commission are maintained each year prior to and during the fire season.

Forest Fires

The causes of fires attended by Forests Commission personnel and the areas of State forests burnt in the period 1962–63 to 1966–67 were as follows :

VICTORIA—CAUSES OF FOREST FIRES

Cause	Number of Fires				
	1962–63	1963–64	1964–65	1965–66	1966–67
Grazing Interests	7	1	..	1	..
Landowners, Householders, etc. ..	149	117	91	115	90
Deliberate Lighting	44	45	38	57	104
Sportsmen, Campers, Tourists ..	61	49	41	63	33
Licensees and Forest Workers ..	22	12	14	20	15
Smokers	33	87	43	50	36
Lightning	53	143	153	83	41
Tractors, Cars, Trucks, Locomotives, and Stationary Engines ..	26	37	28	16	35
Children	18	37	25	21	9
Sawmills	3	18	11	8	8
Miscellaneous Known Causes ..	22	85	41	32	44
Unknown Origin	43	39	72	63	71
Total	481	670	557	529	486

VICTORIA—AREAS OF STATE FOREST BURNT
(Acres)

Year Ended 30 June—	Commercial Area	Non-Commercial Area	Total
1963	36,289	43,592	79,881
1964	16,620	274,820	291,440
1965	386,815	420,761	807,576
1966	20,313	50,733	71,046
1967	7,830	30,689	38,519

Laboratory and Field Research

Aerial seeding techniques have been successfully developed for use with fixed wing aircraft to provide adequate regeneration of logged over areas. Research is continuing in order to improve precision in the dropping of the fine eucalypt seed. Techniques are being developed to chemically desiccate scrubby growth to facilitate the change over to high quality eucalypts. The chemicals are aerially applied and good drift control has been obtained using invert spray emulsions.

Optimum stand densities for ash species eucalypts have been determined from thinning trial data. Thinning trials have been established to provide similar information for mixed species eucalypts.

The study of coniferous plantations includes research into nursery practice, factors affecting survival and growth of planted seedlings, chemical methods of controlling unwanted vegetation, the influence of site factors on tree characteristics, and the genetic improvement of the more important species.

Entomological studies are being carried out to control some serious insects including the sirex wasp, the phasmatid, and other defoliators and boring insects. Pathological studies have concentrated on various tree diseases and the mycorrhizal associations on the roots of *Pinus radiata*. Forest hydrology studies are being carried out in relation to quality and quantity of water from forested water supply catchments.

Laboratory studies of the viability and dormancy of tree seeds are being undertaken.

Commonwealth–State Reforestation Agreement

During 1967 the *Softwood Forestry Agreements Act* 1967 was passed. It is designed to finance a substantial expansion in the rate of plantations establishment being undertaken by the States.

Some States have a surplus of timber in terms of present population, but Victoria produces only about 80 per cent of its requirements. With the anticipated growth in population and *per capita* consumption

it is expected that this will have fallen to about 60 per cent by the end of the century, unless resources are greatly increased. As reliance on imports to cover the deficiency can be both costly and uncertain, supplies from local native forests are very desirable. Moreover, timber is a bulky item to transport and the favourable economics resulting from having it close to the market, rather than importing it from overseas, are greater than with many other products.

Following detailed investigations, the Forests Commission in 1961 commenced an expanded planting programme with the funds made available to it. This programme aimed at planting 6,000 acres per annum and this target was first achieved in 1966. However, this area is still inadequate and as similar large extensions are also necessary in the other States, the Australian Forestry Council comprising the Ministers responsible for forestry in the States and Commonwealth recommended " that the rate of softwood planting in Australia should be increased to 75,000 acres a year during the next thirty-five years ". Of this 75,000 acres, it was assumed that the State forest authorities would plant 65,000 acres and private interests 10,000 acres. To assist in achieving this objective an Agreement has been concluded between the Commonwealth and States for the five year period from 1 June 1966 to 30 June 1967 under which the States have agreed to expand their annual plantings to reach the following targets by 1971 : New South Wales, 19,600 acres ; Victoria, 12,000 ; Queensland, 10,000 ; South Australia, 6,000 ; Western Australia, 6,000 ; and Tasmania, 4,900 acres, totalling 58,500 acres of new plantations each year. Subject to satisfactory achievement it is anticipated that at the conclusion of the current period, the Agreement will be extended to attain the objective of 65,000 acres, of which Victoria's share may be increased to 15,000 acres.

The basis of the Agreement is that the States will finance a basic quota from their own resources with the additional being financed by the Commonwealth. Victoria's basic quota is 6,000 acres and any planting in addition to this will be financed by the Commonwealth with loans calculated on a pro-rata basis. For example, of the total cost of establishing 9,000 acres, two-thirds would be financed by the State and one-third as a loan from the Commonwealth. Loans will be interest free for the first ten years and repayable in full by 35 years from planting. The interest rate applicable will be that for the last long term loan raised by the Commonwealth by public subscription prior to the date on which the relevant advance was made. Loans may be used for the establishment, tending, protection and maintenance of the planted area and ancillary facilities such as land acquisition, camps (but not housing), stores, equipment, etc.

The Agreement applies only to the growing of softwoods and assumes that *Pinus radiata* will be the main species planted. This species has grown well in plantation formation and produces a large volume of good general purpose timber under a wide variety of growing conditions. Unlike most other trees it has a high growth rate which is reached much earlier than other species ; consequently, a saleable product is available between twelve and fifteen years from planting. This means that loan capital and accrued interest repayments

can be commenced within a comparatively few years and under normal conditions it is anticipated that all these would be repaid by about twenty-five to twenty-seven years from planting. Later returns, which in terms of volume would be more than half the total produced on the site, represent the profitability of the project. Cost benefit analyses by the State Treasury have also supported the favourable profitability of the project in relation to the community as a whole.

Forestry Laboratory Research and Field Research, 1965; Economic Aspects of Forests, 1967

Fisheries and Wildlife

General

Practical management of the fish and wildlife resources of Victoria is vested in the Department of Fisheries and Wildlife, which is responsible to the Chief Secretary for the administration of the Fisheries Act and the Game Acts, and for conservation, management, and research on native and introduced fishes, birds, and mammals.

The State Freshwater Fisheries Research Station and Native Fish Hatchery are located at Snobs Creek, near Eildon. A wildlife research centre is being developed at Lara, near Geelong. Fisheries and Wildlife officers (enforcement staff) are stationed at eighteen district centres throughout the State, and eight more district stations are proposed.

Tower Hill State Game Reserve

Situated beside the Prince's Highway, eight miles west of Warrnambool, Tower Hill State Game Reserve is one of Victoria's past volcanoes, a monument to the great volcanic eruptions which shaped the Western District plains. It is also an example of the destruction of wildlife habitat caused by intensive and unplanned agricultural development by settlers.

The scene now is quite different from that described by Dr. W. H. Harvey who visited Tower Hill in October 1854 : " On reaching the steep bank of the lake we looked down 200 ft in to what must have been an extensive crater in old times, but now is partly a lake and partly a marsh. In the midst is a wooded island, rising like a cone 300 ft above the lake. There are two or three summits in which there are said to be small craters. The borders all around the lake have similar marks of volcanic origin and all are beautifully wooded."

In 1855, James Dawson, of " Kangatong ", commissioned Eugene von Guerard to paint Tower Hill in oils. From contemporary reports, it is apparent that this is an accurate representation of Tower Hill as it then was.

The earliest comprehensive description of Tower Hill last century was written by Bonwick, who visited the area in 1857. " A stroll among the gigantic ferns of the valley, or a ramble among the cones

and craters, has peculiar attractions. But these are not comparable to the winding path at the foot of the basaltic rises close to the lake. There the graceful Fern tree waves . . . . . almost tropical reeds rustle in the breeze . . . . . leafy shrubs and trees form delightful bowers and alcoves . . . . . ."

Between 1857 and 1860 began the destruction by fire, grazing and woodcutters, which was complete by 1890. Quarrying on the crater banks and islands further despoiled the area and was not finally stopped until 1961.

Today, the hills and banks are bare of all virgin timber and covered by bracken fern with some plantations of exotic trees and 52,000 native trees planted since 1960. Tree planting will continue until the forest depicted and described so faithfully by the early visitors has been re-created to a condition which will support the greatest number and variety of wildlife.

As the variety of wildlife is primarily dependent on suitable living conditions, the abundance of vegetation and the fertility of the region as shown by the early records gives some indication of the original, rich fauna of the area.

In the past, the surrounding country was heavily wooded, as would be expected on the rich brown soil. These timbered areas abutted on to dense scrub which bordered a long marsh stretching to where Port Fairy now stands. Tower Hill was not an isolated lake but the deepest part of this marsh complex. With timber, scrub and adjacent fresh water there was a great variety of mammal and bird life. This is corroborated by the evidence that there were many Aboriginals in the area and that Tower Hill was one of their main feeding and camping grounds. Its importance is evidenced by the number of aboriginal names given to its salient features, and listed in all records.

Breeding stocks of waterfowl and bush birds now benefit from the planting programme by which native trees and shrubs are being restored. Duck nesting boxes have been erected along most of the quieter sections of shoreline and on the isolated mud banks. Native animals are also being reintroduced gradually.

Tower Hill presents a unique opportunity for education in wildlife conservation. Its beauty, its unique shape, and its location beside a main highway encourage visitors to explore it. A Natural History Centre has been built to show the public the work which is carried out in the Wildlife Reserves for the conservation of wildlife in Victoria. It also shows, specifically, details of the conservation work and historical records of Tower Hill itself, and the pioneers who tried to preserve it.

Further Reference, 1967; Wildlife, 1962; Introduced Fish, 1963; Commercial Fisheries, European Carp, 1964; Freshwater Research, 1965; Marine Fisheries, 1966; State Wildlife Reserves System, 1966; Scallop Fishery, 1967; Serendip Wildlife Research Station, 1968

Fisheries Statistics

The statistics of production shown in the following tables are in terms of recorded landed weight. Some species are landed in a headed, headed and gutted, or otherwise reduced condition; others are landed whole. In interpreting fisheries statistics, allowance should be made for the incomplete coverage. Returns are collected from licensed professional fishermen only, and as a result the published totals fall short of total fish production to the extent of the catch by amateur fishermen, the commercial catch by persons not licensed as professional fishermen, and unrecorded catch by professional fishermen.

The following table shows certain particulars about the fishing industry in Victoria for the years 1962–63 to 1966–67 :

VICTORIA—FISHERIES : MEN, BOATS, AND EQUIPMENT EMPLOYED

Year Ended 30 June—	Number of Men	Boats Employed		Value of Nets and Other Equipment
		Number	Value	
			$'000	$'000
1963	1,004	784	2,748	634
1964	1,541	917	3,825	763
1965	1,518	897	4,174	798
1966	1,566	910	4,432	821
1967	2,057	1,108	5,903	1,078

VICTORIA—FISHERIES : QUANTITY AND GROSS VALUE OF TAKE

Year Ended 30 June—	Recorded Production*							
	Fish		Crayfish		Prawns		Molluscs	
	Quantity †	Value	Quantity ‡	Value	Quantity ‡	Value	Quantity ‡	Value
	'000 lb	$'000	'000 lb	$'000	'000 lb	$'000	'000 lb	$'000
1963.. ..	12,611	2,938	1,531	766	4	2	930	58
1964.. ..	14,134	3,532	1,317	691	25	14	11,157	479
1965.. ..	13,530	2,030	1,291	903	8	5	22,232	695
1966.. ..	14,875	2,231	1,681	1,177	11	6	29,507	989
1967.. ..	13,063	1,960	1,721	1,033	10	6	32,674	1,981

* See footnote on page 377.

† Landed weight. ‡ Live weight.

The following table shows the production of the principal types of fish in Victoria for the years 1962–63 to 1966–67 :

VICTORIA—FISH : PRODUCTION OF PRINCIPAL TYPES
('000 lb Landed Weight)

Type of Fish	Year Ended 30 June—				
	1963	1964	1965	1966	1967
Marine Fish—					
Australian Salmon ..	1,023	1,649	1,223	1,805	1,252
Snoek	2,588	2,034	2,891	3,684	1,951
Bream	195	218	204	235	490
Flathead	1,832	2,213	1,527	1,482	1,603
Garfish	503	476	281	276	371
Morwong	277	505	426	427	272
Mullet	978	960	919	679	629
Pilchard	308	639	485	502	112
Shark*	2,731	2,987	3,193	3,312	3,581
Snapper	303	335	414	343	349
Whiting	300	255	267	213	481
Other†	1,369	1,630	1,416	1,581	1,555
Total Marine Fish..	12,407	13,901	13,246	14,539	12,646
Freshwater Fish ..	204	233	284	336	417
Total Fish ..	12,611	14,134	13,530	14,875	13,063

* Up to and including the year ended 30 June 1964, catch by Victorian fishermen in Tasmanian waters is included. For the year ended 30 June 1965, production has been based on the quantity of fish landed at Victorian ports.

† Includes quantities of shark livers for oil extraction for the years ended 30 June 1961 to 30 June 1964.

VICTORIA—CRUSTACEANS AND MOLLUSCS :
PRODUCTION OF PRINCIPAL TYPES
('000 lb Live Weight)

Species	Year Ended 30 June—				
	1963	1964	1965	1966	1967
CRUSTACEA					
Southern Crayfish ..	1,531	1,317	1,291	1,681	1,721
Prawns	4	25	8	11	10
Total	1,535	1,342	1,299	1,692	1,731
MOLLUSCA					
Abalone	..	47	393	961	3,379
Scallops	..	10,435	21,371	27,956	28,726
Mussels	683	410	334	425	260
Oysters	63	69	7	7	33
Octopus	17	11	8	31	31
Squid	167	185	119	126	245
Total	930	11,157	22,232	29,506	32,674

Mining

The most notable recent development in Victoria's mineral industry besides the exploitation of natural gas and oil discoveries offshore, is the continued expansion of the non-metallic minerals and the decline of the metallic minerals, especially gold. Significant progress has been made in open cut mining, especially in the extraction of brown coal and construction materials. Exploratory off-shore drilling on the Gippsland Shelf in Bass Strait has revealed the presence of considerable quantities of oil and natural gas. The principal oil and natural gas discoveries and plans for their development are described on pages 364–366 of the *Victorian Year Book* 1968. The major mineral resources of the State are described on pages 366–7 of the *Victorian Year Book* 1967.

Oil and Natural Gas in Victoria : Offshore Operations and Discoveries by Esso/BHP

B.H.P. (later Hematite) carried out a reconnaissance airborne magnetometer survey over the area of its permits in December 1960. This indicated a thickness of sediments of prospective value for petroleum and a more detailed magnetometer survey was carried out in September–December 1961, to gain a better indication of the extent of the basins. The trends of the Gippsland and Otway Basins were outlined and the wholly offshore Bass Basin was delineated.

Having thus delineated the basins, seismic surveys were then carried out to indicate structures within the basins which might contain oil reservoirs. Seismic work was done in the Gippsland and Bass Basins in the period 1962 to 1964. On the basis of this seismic work Hematite entered into negotiations with a number of exploration companies with a view to entering into a farm-out agreement. Esso Exploration Australia Inc. offered what was considered to be the best proposal and in May 1964, an agreement was entered into between Esso and Hematite under the terms of which Esso agreed to carry out a programme of drilling and seismic survey in the Gippsland Basin. Further negotiations for farm-out partners led to Hematite entering into further agreements with Esso in respect of the Bass Basin in February 1965, and the Otway Basin in April 1967. The negotiations for the latter agreement followed the completion of Hematite's seismic programme in this Basin in July 1965.

The Agreements contain extensive terms relating to the respective rights of the partners on a discovery and with respect to further exploration. Briefly summarised they provided that, in the event of economic discoveries being made, Hematite might elect to take a 12½ per cent royalty interest in the discoveries, in which case production titles were to be assigned to Esso. Alternatively, Hematite might elect to take a 50 per cent working interest, in which case production titles were to be assigned to Hematite and Esso jointly. If Hematite elected to take the 12½ per cent royalty Esso was to pay all development expenses, but if Hematite elected to take a 50 per cent interest, expenses were to be paid by Esso and Hematite jointly.

The work carried out and the discoveries made under the terms of these agreements are set out on pages 364 to 366 of the *Victorian Year Book* 1968. Further extensive seismic survey has been and is being carried out in the areas concerned. Fourteen wells have already been drilled and three are now being drilled in Victorian waters. Four have been drilled in Tasmanian waters, one has been drilled and one is being drilled in South Australian waters—a total of twenty-three wells.

The results are briefly summarised below. The official estimates shown below were as at 30 June 1968 and are likely to be revised at a future date :

Gippsland Basin

Barracouta Field. This field was discovered by Esso's first offshore well in February 1965. Subsequently, a second verifying well was drilled and a production platform has now been erected. One production well has been drilled from the platform and a combined production well—deeper pool wild cat is now being drilled. This has encountered shows of oil and gas at lower levels than the original discovery. These shows have yet to be evaluated. Barracouta field is a gas field which has been estimated to contain 1·5 to 2 mill. mill. cu ft of gas and 30 to 50 mill. barrels of condensate liquids.

Marlin Field. This field was discovered in March 1966, and two further wells were drilled after the discovery well. A production platform on this field was under construction in 1968. Marlin reservoir has about double the gas reserve indicated for Barracouta and is somewhat richer in condensates. It also contains oil. Early press statements about oil reserves in Marlin field have not been confirmed by later drilling and assessment of reserves will be made after some production history better indicates the nature of the reservoir.

Kingfish Field. This is an oil reservoir discovered in May 1967, and verified by two further wells. Three production platforms are planned. Reserves have been announced as 850 mill. barrels.

Halibut Field. This is also an oil reservoir, discovered in July 1967. Reserves have been announced as 350 mill. barrels and a platform for this field was under construction at Barry Beach in 1968.

Tuna and Snapper Fields. Tuna A1 and Snapper A1 holes were drilled on structures either side of the Marlin structure in 1968 and have encountered promising shows of oil and gas, the significance of which has not yet been evaluated.

Other Drilling. The Cod A1 well, drilled between the Barracouta and Marlin structures was a dry well. Dolphin A1 and Perch A1 wells both encountered oil but in quantities which are not regarded as economic in the present circumstances.

Otway Basin

Extensive seismic survey has been done in the Otway Basin but so far only one well—Nautilus A1—has been drilled in Victorian waters. This well was dry.

Bass Basin

Only the northern end of this basin extends into Victorian waters and no drilling has been carried out in this portion.

Activities by Other Companies

The Woodside (Lakes Entrance) Oil Company made its first overseas alliance in the form of a farm-out agreement with Arco Ltd. —entered into in September 1961. This agreement covered both onshore and offshore areas and work carried out under it included a seismic survey of the offshore permit area P.E.P. 42. After the completion of a further programme of work onshore, Arco withdrew from the association with Woodside in December 1964.

Woodside subsequently entered into agreements with Planet Exploration Co. Pty. Ltd., Australian Oil and Gas Corporation Ltd., Continental Oil Company of Australia Ltd., and B.O.C. of Australia Limited. The last named company was the operating partner for the carrying out of further marine seismic surveys and the drilling of Golden Beach 1A well (Golden Beach No. 1, near the same site was abandoned at shallow depth due to engineering difficulties). This well, some 16 miles west of Esso's Barracouta A1 well in the Gippsland Basin, discovered gas on a structure somewhat smaller than the Barracouta structure. The economic potential of this discovery is still under study. P.E.P. 42 has now been transferred to the above-named companies as joint holders.

Frome–Broken Hill entered into a farm-out agreement with Shell in June 1965, involving both onshore and offshore permits. With Shell as the operating partner, extensive marine seismic surveys have been carried out and three wells have been drilled, namely Pecten No. 1A (adjacent to Pecten No. 1, abandoned at shallow depth due to engineering difficulties) to a depth of 9,352 ft, Nerita No. 1 to 6,700 ft, and Voluta No. 1 to 13,037 ft. All three wells were dry and the area is now under study in the light of the information obtained from the wells, with a view to re-interpreting the seismic work. The permits which were the subject of the agreement are now jointly held by the two companies.

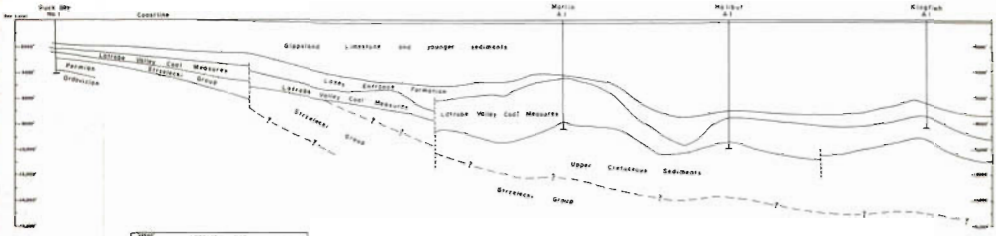
Shell hold P.E.P. 57, to the east of Hematite P.E.P. 38, in its own right. Seismic survey has been done in this area and joint studies of some aspects of this work are being made with Esso.

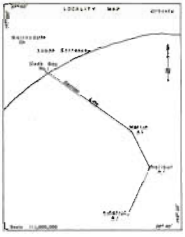
Alliance Oil Developments holds P.E.P. 36 in an area between the Gippsland and Otway Basins. Two geophysical surveys have been carried out offshore—namely an aero-magnetic survey in 1961 and a marine seismic survey in 1967. This work is now being re-evaluated in conjunction with some recent onshore seismic work.

Magellan holds the most recent permit area to be taken up and has completed aeromagnetic surveys.

Offshore Exploration

The following table summarises Victorian offshore petroleum exploration for the years 1964–68 :





Horizontal Scale of Miles

0 3 6 9

Vertical Scale of Feet

0 4,000 8,000 12,000 16,000

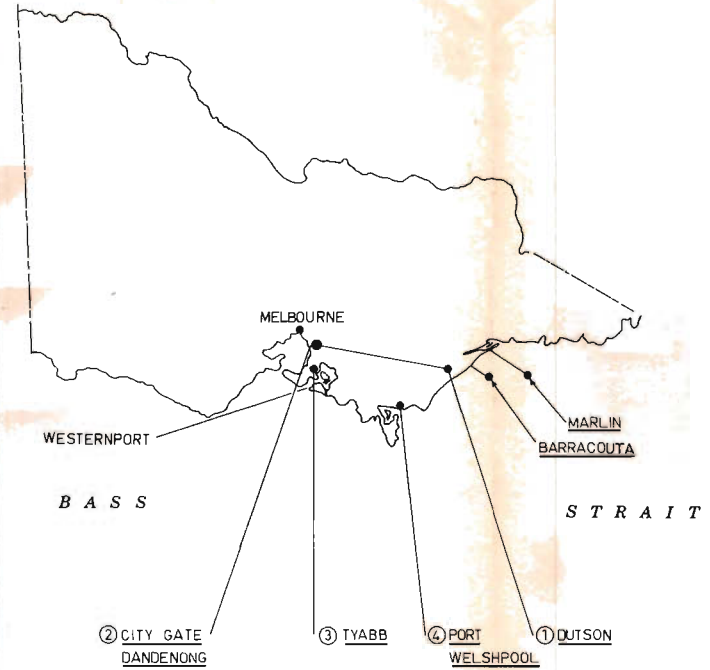
VICTORIA—DIAGRAMMATIC CROSS SECTION OF GIPPSLAND SHELF

VICTORIA—WELLS DRILLED OFFSHORE, 1964 to 1968

Well	Location	Company	Rig	Maximum Depth Reached		Status
				Ft	Date	
A. GIPPSLAND BASIN						
Barracouta A1 ..	Lat. 38°16′41″ S. Long. 147°42′45″ E.	Hematite/Esso	Glomar III ..	8,701	31.5.65	Commercial gas well
Barracouta B1 ..	Lat. 38°17′58″ S. Long. 147°40′26″ E.	Hematite/Esso	Glomar III	4,015	5.7.65	Commercial gas well
Cod A1	Lat. 38°21′43″ S. Long. 147°58′33″ E.	Hematite/Esso	Glomar III ..	9.540	20.11.65	Dry and abandoned
Marlin A1	Lat. 38°14′03″ S. Long. 148°13′33″ E.	Hematite/Esso ..	Glomar III ..	8,485	3.2.66	Commercial oil and gas well
Marlin B1	Lat. 38°15′59″ S. Long. 148°10′45″ E.	Hematite/Esso	Glomar III ..	10,007	24.8.66	Commercial gas well
Marlin C1	Lat. 38°14′44″ S. Long. 148°10′16″ E.	Hematite/Esso	Glomar III ..	5,845	9.1.67	Commercial gas well
Golden Beach No. 1	Lat. 38°15′30·2″ S. Long. 147°25′19·65″ E.	Woodside/B.O.C. ..	Investigator ..	1,266	25.4.67	Abandoned due to engineering difficulties
Kingfish A1	Lat. 38°35′50″ S. Long. 148°12′35″ E.	Hematite/Esso	Glomar III ..	8,451	28.5.67	Commercial oil well
Golden Beach No. 1A	Lat. 38°15′32·62″ S. Long. 147°25′21·13″ E.	Woodside/B.O.C. ..	Investigator ..	9,534	15.7.67	Possible commercial gas well
Halibut A1	Lat. 38°23′56″ S. Long. 148°18′59″ E.	Hematite/Esso	Glomar III ..	10,011	27.8.67	Commercial oil well

VICTORIA—WELLS DRILLED OFFSHORE—*continued*

Well	Location	Company	Rig	Maximum Depth Reached		Status
				Ft	Date	
		A. GIPPSLAND BASIN—*continued*				
Dolphin A1 ..	Lat. 38°29′32″ S. Long. 147°22′43″ E.	Hematite/Esso	Glomar III ..	9,461	20.11.67	Non-commercial oil well at present
Kingfish B1 ..	Lat. 38°35′57″ S. Long. 148°10′13″ E.	Hematite/Esso	Glomar III ..	8,021	22.1.68	Commercial oil well
Kingfish C1 ..	Lat. 38°35′03″ S. Long. 148°06′07″ E.	Hematite/Esso	Glomar III ..	8,299	28.2.68	Commercial oil well
Barracouta A2 ..	Lat. 38°17′54″ S. Long. 147°40′35″ E.	Hematite/Esso	Emsco rig on platform	4,202	6.4.68	Gas field development well
Perch A1	Lat. 38°34′37″ S. Long. 147°19′24″ E.	Hematite/Esso	Glomar III ..	9,406	30.4.68	Non-commercial oil well at present
Barracouta A3 ..	Lat. 38°17′54″ S. Long. 147°40′35″ E.	Hematite/Esso	Emsco rig on platform	..	..	Currently drilling
Tuna A1	Lat. 38°10′25″ S. Long. 148°25′03″ E.	Hematite/Esso	Glomar III ..	..	..	Currently drilling
Snapper A1 ..	Lat. 38°12′03″ S. Long. 148°00′49″ E.	Hematite/Esso	Discoverer II	..	..	Currently drilling
		B. OTWAY BASIN				
Pecten No. 1 ..	Lat. 38°40′41″ S. Long. 142°39′56″ E.	Frome/Shell	Sedco 135E	887	3.4.67	Abandoned due to engineering difficulties
Pecten No. 1A ..	Lat. 38°40′41″ S. Long. 142°39′56″ E.	Frome/Shell	Sedco 135E	9,350	15.6.67	Plugged and abandoned
Nerita No. 1 ..	Lat. 38°37′43″ S. Long.144°13′44·83″E.	Frome/Shell	Sedco 135E	6,700	2.8.67	Plugged and abandoned
Voluta No. 1 ..	Lat. 38°25′46·66″ S. Long.141°18′47·53″E.	Frome/Shell	Sedco 135E	13,047	12.12.67	Plugged and abandoned
Nautilus A1.. ..	Lat. 38°58′41″ S. Long. 142°32′47″ E.	Hematite/Esso	Ocean Digger	6,597	6.5.68	Dry and abandoned



VICTORIA — NATURAL GAS TRANSMISSION PIPELINE DUTSON TO DANDENONG

NATURAL GAS—VICTORIA

Natural gas from the offshore production fields of MARLIN and BARRACOUTA, after having been cleaned of basic impurities (such as sand) at the offshore platforms, will be piped first to the absorption plant near DUTSON, 12 miles south-east of SALE.

DUTSON will be the operating headquarters for the Gippsland projects, with a gas absorption plant, and crude oil treating, storage and pumping facilities. The plant will remove moisture and impurities from the gas, and will recover the heavier components from the "wet" gas as liquids, leaving a "dry" premium fuel (mostly methane). The components are separated by chilling the raw product to minus 35° F. At this temperature some components liquefy; then, additional hydrocarbons are extracted. These components comprise condensates and liquefied petroleum gas (LPG) which are sent to market separately from the "dry" gas.

The "dry" gas will be transmitted by pipeline to DANDENONG where it will be incorporated into the Melbourne metropolitan reticulation system. A metering station will reduce the very high transmission pressure to a lower distribution pressure. Also at DANDENONG (THE CITY GATE), an odorisation plant will give the nearly odourless natural gas an artificial odour.

The "wet" fractions and crude oil will be transmitted by pipeline from DUTSON to the "fractionation" plant at OLD TYABB at WESTERNPORT BAY. At this plant the liquid will be fractionated into ethane, propane, butane, and a pentane plus fraction. These products will then be shipped to their respective markets.

A marine terminal is being built at BARRY BEACH near PORT WELSHPOOL which will be used as the base for off-shore construction as well as servicing operations. Facilities to be constructed include two warehouses, an office building, pipe storage, helicopter landing area, facilities to handle and load the heavy equipment used in construction of the offshore platforms, and wharf facilities.

CONVERSION TO NATURAL GAS

The metropolitan reticulation system is to be divided into sections, each of 2,000 to 3,000 consumers, which can be isolated from the manufactured gas supply and immediately connected to a natural gas source. During the conversion the natural gas system is becoming progressively larger, and the manufactured gas system is becoming smaller. The conversion in each section is expected to take two to three days, during which time the consumer will be unable to use his gas appliances in a normal fashion. Each section is isolated from its surrounding areas by closing valves in the gas mains, and once isolated and natural gas turned-in, it is not possible for the appliance to be used until it is converted for use on natural gas.

Mineral Production

The mineral production of the State, as recorded by the Mines Department, from lands occupied under the Mines Act (excluding stone produced in quarries and salt) for the years ended December 1965, 1966, and 1967, is as follows :

VICTORIA—MINERAL PRODUCTION

Minerals	1965		1966		1967	
	Quantity	Value	Quantity	Value	Quantity	Value
	fine oz	$'000	fine oz	$'000	fine oz	$'000
Precious Metals—						
Gold	19,246	687*	21,005	688*	10,996	468*
Silver	27	‡	29	‡	99	‡
Other Minerals—	ton		ton		ton	
Bauxite	2,555	11	..	..	2,020	11
Tin Concentrates ..	11	24	26	55	47	90
Coal, Black	42,247	515	35,519	497	32,066	251
Coal, Brown	20,658,856	18,436	21,782,977	20,064	23,383,607	20,686
Copper Concentrate ..	13	4†	36	4	66	4
Fireclay	32,816	62	30,978	69	34,581	57
Gypsum	168,589	287	111,293	244	224,065	355
Kaolin and Other White Clays	565,141	872	330,932	531	473,703	693
Limestone	1,458,545	1,411	1,807,298	2,191	1,992,158	2,671
Iron Ore	47	1	422	6	480	6

* Includes gold subsidy, $144,489 for 1965, $73,750 for 1966, and $125,332 for 1967.

† Includes copper bounty $21 for 1965. Nil for 1966 and 1967.

‡ Value of silver production in Victoria $28 in 1965, $13 in 1966, and $71 in 1967.

The following table shows the average annual production and value of black and brown coal for each of the five year periods from 1926 to 1960 and the production and value for each of the years 1961 to 1967 :

VICTORIA—COAL PRODUCTION AND VALUE*

Period	Black Coal		Brown Coal	
	Production	Value	Production	Value
	ton	$'000	ton	$'000
1926–1930	668,177	1,786	1,515,592	386
1931–1935	472,030	888	2,445,215	512
1936–1940	324,903	568	3,608,751	712
1941–1945	286,277	818	5,010,555	1,052
1946–1950	156,290	722	6,648,430	2,404
1951–1955	143,535	1,590	8,728,116	7,186
1956–1960	100,893	1,050	12,193,625	11,302
1961	66,363	718	16,279,168	15,444
1962	56,721	632	17,137,438	15,682
1963	50,481	588	18,456,445	16,158
1964	47,058	544	19,034,792	17,304
1965	42,247	515	20,658,856	18,436
1966	35,519	497	21,782,977	20,064
1967	32,066	251	23,383,607	20,686

* Value of output at the mine.

Groundwater in Victoria

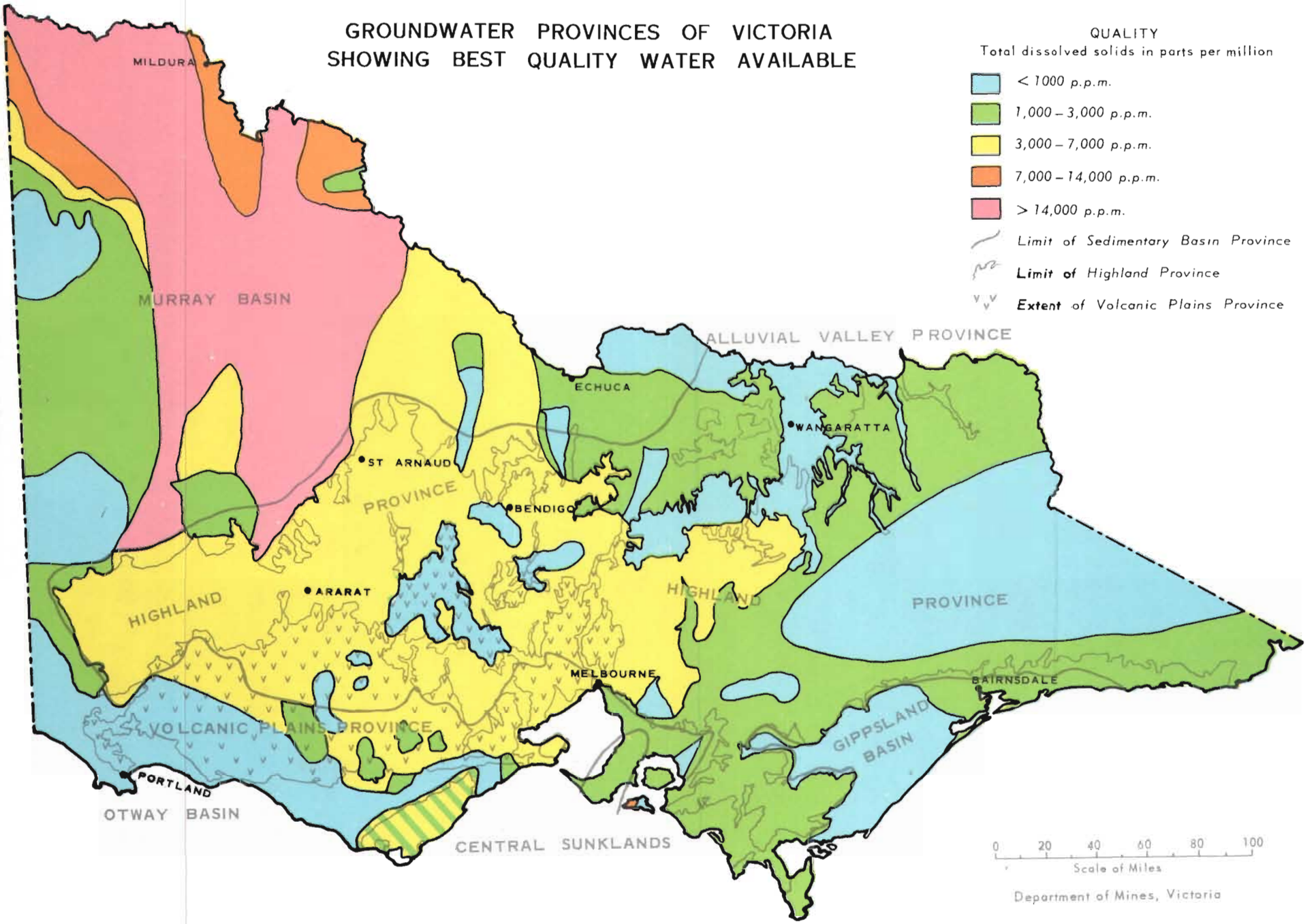
Even though Victoria is comparatively well endowed with surface water there is an ever increasing demand for information on groundwater potential in all parts of the State. The Department of Mines formed a groundwater investigation section within the Geological Survey in 1955 to investigate fully the groundwater resources of the State. The section carries out regional geological mapping in some areas, hydrological and hydrochemical surveys of surface water and groundwater in existing bores, and the supervision of extensive drilling and testing of bores for water. However, from late 1967 until February 1968 the greater part of the Department's geological groundwater staff and drilling facilities were engaged on groundwater development projects aimed at alleviating the heavy demand for water resulting from the severe drought of 1967-68.

Groundwater occurs in four main provinces, namely, the Highland Province, the Alluvial Valley Province, the Volcanic Plains Province, and the Sedimentary Basin Province. Each province has been investigated to some extent, areas with the highest useful groundwater potential being given priority over those with lesser potential.

Into the latter category falls the *Highland Province.* This Province includes the Palaeozoic igneous and metamorphic rocks and the Palaeozoic and Mesozoic lithified sediments of the Central and Eastern Highlands, and the Southern Uplands (Strzelecki, Otway Ranges, etc.). With the exception of some Upper Devonian and Carboniferous sandstones in the Grampians and Mansfield Basin, the porosity and permeability of these rocks is limited to sheet fractures and joints. Consequently they generally yield only small supplies of water, which in the drier western areas of the province around Stawell are saline, because salts released by chemical weathering of the rock are dissolved in the water. Many bores have been drilled in these rocks for stock water with an overall success rate of 70 per cent to 80 per cent. The Devonian and Carboniferous sandstones have as yet not been fully tested, but from the few bores which have been drilled into them they may have a very much higher potential both in yield and quality than other rocks in the Highland Province.

The *Alluvial Valley Province* includes the alluvium-filled valleys within the Highland Province. In some valleys the streams have deposited thick layers of alluvial sands and silt. The major aquifers (water bearing strata) are well-sorted sands laid down as channel deposits. In some valleys they vary in thickness and width continuously down the stream tract and may be difficult to locate ; in other valleys they take the form of broad sand sheets. In the north-eastern areas of the State, large yields of low salinity water (200 parts per million, total dissolved solids) are obtained from sands deposited in the Ovens and King river valleys. Further west the valley of the Goulburn is proving to have some groundwater potential, though the salinity of the water increases rapidly from around 400 p.p.m. at Nagambie to 14,000 p.p.m. at Tongala. In places south of the Great Divide and in the western section of the Central Highlands, the alluvium has been covered by Newer Volcanics, forming so-called

GROUNDWATER PROVINCES OF VICTORIA
SHOWING BEST QUALITY WATER AVAILABLE



" deep leads ". To date no large supplies of water have been developed from bores in these sediments, though salinities are frequently low ranging from 100 to 1500 p.p.m.

The *Volcanic Plains Province* includes the basalts, tuffs, and scoria deposits of the Newer Volcanics. These Volcanic rocks form a sheet extending throughout a large part of the Western District and the Werribee Plains, and lava flows partly filling valleys north and north-west of Melbourne, and the " deep lead " valleys mentioned before. The porosity and permeability of these essentially crystalline rocks is due to fractures, joints, and the high degree of vesicularity exhibited in some areas.

Salinity of the groundwater varies with the topography and age of particular lava flows. In steep well-drained country or around old volcanic cones salinities may be low ranging from 100 to 500 p.p.m. Similarly in comparatively young flows, such as form the " Stony Rises " (west of Colac) the salinity may be less than 1,000 p.p.m. due to the unweathered nature of the rocks. On the adjacent flat country more deeply weathered basalt flows occur and the salinity generally ranges between 2,000 and 5,000 p.p.m. Occasionally in areas with less than 20 in rainfall per annum values may approach 12,000 p.p.m. Yields are mostly in the range 500 to 1,000 gals per hour, but occasionally yields in excess of 15,000 gals per hour have been achieved, particularly in Stony Rise type basalts.

The *Sedimentary Basin Province* is the province with the greatest groundwater potential in the State and includes four separate geohydrological systems, namely, the Murray Basin, the Otway Basin, the Central Sunklands, and the Gippsland Basin.

By far the largest proportion of groundwater investigation has been carried out in this province, leading to the recognition of a number of separate aquifers in each basin. The aquifers range from marine limestones and sands to non-marine fluviatile and lacustrine (lake) deposits. Large variations in salinity have been mapped for each basin and pumping tests have indicated that yields in excess of 100,000 gals per hour may be possible from some aquifers with properly constructed bores. Many of the Gippsland and Otway Basin aquifers are too deep to be economic for general use in agriculture (1,000 ft +) but are suitable as sources of water for town supply. Salinities range from 100 to 4,000 p.p.m. in the southern basins ; but, aquifers in some areas in the Murray Basin have yielded water with a salinity of up to 16,000 p.p.m. Each of the basins within this province is of great importance as a source of groundwater but locally, deterioration of water quality or excessive depth of the aquifers may detract from the economic significance of the ground water resources. Areas of good quality water at comparatively shallow depth occur around the margins of the basins in areas of higher rainfall and, if properly managed, these will prove to be of great importance in the future.

Concurrent with the groundwater investigation in Victoria has been the development of areas of groundwater usage. The rates of water withdrawal in these areas have brought with them problems of overdraft which can only be handled by the application of groundwater conservation techniques. To this end a further facet of study

has arisen which involves the construction of observation bores and the analysis of records obtained from them. In some areas the results of this work have shown dangers of salt water intrusion, as well as overdraft; while in other areas suspected overdraft has been found to be merely bore interference.

VICTORIA—GROUNDWATER DRILLING, 1955 TO 1965

Area	Ft
Highland Province	4,390
Alluvial Valley Province	12,506
Volcanic Plains Province	11,974
Sedimentary Basin Province—	213,108
Total	241,978
Murray Basin	50,363
Otway Basin	118,010
Central Sunkland	32,656
Gippsland Basin	12,079
Total	213,108

Further References, 1965, 1966, 1967, 1968; Mining in Victoria, 1964; Underground Water, 1964

Quarrying

Information in the following table has been obtained from "regular" quarries which are known to have a fixed plant and which are in permanent production, and from mines producing construction materials as by-products of their main activity :

VICTORIA—CONSTRUCTION MATERIALS

Year Ended 31 December—	Number of Returns	Production					Local Value of Production
		Sand	River Gravel and Gravel Boulders	Dimension Stone	Crushed and Broken Stone	Other Quarry Products	
		'000 cu yd		ton	'000 cu yd		$'000
1963	275	2,134	401	10,147	7,866	936	17,270
1964	223	2,442	526	10,268	8,685	932	19,886
1965	221	2,956	664	14,347	9,827	728	22,736
1966	209	3,148	492	9,546	11,198	754	24,206
1967	213	3,009	596	10,530	12,839	602	27,244

In addition to the production set out in the preceding table, a considerable quantity of material is won by contractors operating shallow pits for or on behalf of local government authorities. Some of these work mine tailings. This itinerant activity was first covered by statistical returns for 1961. However, the statistics are available only from 1962. Reported production data for the years 1963 to 1967 are :

VICTORIA—CONSTRUCTION MATERIALS : ITINERANT ACTIVITIES

Type of Material	Year Ended 31 December—				
	1963	1964	1965	1966	1967
	'000 cu yd				
Sand	311	240	194	266	422
Gravel and Gravel Boulders ..	2,533	2,582	1,759	1,994	2,156
Crushed and Broken Stone ..	1,453	1,469	2,123	1,537	703
Other Quarry Products	914	1,241	1,040	818	880
	$'000				
Local Value	1,659	1,648	1,710	1,698	1,820

Further Reference, 1966

Value of Production

General

The value of production as estimated in the following tables is based to a large extent on returns received annually from individual producers throughout the State. As a measure of total production it is incomplete, as it does not include the building and construction industry. It also omits factories employing less than four hands (unless power-driven machinery is used) and excludes agriculturists with holdings of less than 1 acre.

A detailed account of the period covered for individual rural industries is given on page 317. Except in the case of mining and quarrying, statistics for the non-rural industries refer to the year ended 30 June. Statistics for mining and quarrying relate to the year ended 31 December of the first year shown.

Gross Value

Gross value is defined as the value placed on recorded production at the wholesale price realised in the principal market. In cases where primary products are absorbed locally, or where they become raw material for secondary industry, these points are presumed to be the principal markets. Care is taken to prevent, as far as possible, all overlapping or double counting. The primary value of dairy production, in accordance with the above definition, is the price paid at the factory for milk or cream sold by the farmer ; the value added by the process of manufacturing into butter, etc., is included in manufacturing production.

VICTORIA—GROSS VALUE OF PRIMARY PRODUCTION
($'000)

Industry	1962–63	1963–64	1964–65	1965–66	1966–67
Agriculture	253,468	272,807	295,013	262,852	325,461
Pastoral	318,914	382,211	373,501	413,558	376,196
Dairying*	157,136	172,560	194,988	190,141	210,345
Poultry and Bees ..	46,688	52,945	47,777	51,975	57,657
Trapping	5,868	6,373	5,830	5,785	4,244
Forestry	27,437	30,592	33,629	34,146	33,319
Fisheries	3,764	4,835	3,731	4,403	4,980
Mining	40,016	40,838	44,892	48,924	53,105
Total Primary Industries	853,291	963,161	999,360	1,011,784	1,065,308

*Includes Subsidy—1962–63, $13,572,000 ; 1963–64, $13,690,000 ; 1964–65, $14,642,000 ; 1965–66, $14,569,000 ; 1966–67, $14,575,000.

Local Value

The gross value of production, less costs of marketing (freight, cartage, brokerage, commission, insurance, and containers), represents the gross production valued at the place of production, that is, local value, details of which are shown in the following table :

VICTORIA—LOCAL VALUE OF PRIMARY PRODUCTION
($'000)

Produce	1962–63	1963–64	1964–65	1965–66	1966–67
Agriculture—					
Barley	4,720	3,438	3,808	2,938	6,174
Maize	226	216	203	99	111
Oats	14,314	11,034	12,345	12,555	14,498
Wheat	85,118	93,039	91,950	75,456	87,279
Onions	1,078	919	1,140	1,507	1,188
Potatoes	3.986	13,432	22,705	7,763	12,649
Other Vegetables for Human Consumption	15,106	15,876	17,350	19,425	21,862
Hay and Straw ..	39,850	34,703	41,580	39,350	73,108
Fruit—					
Orchards ..	17,560	22,016	22,047	27,654	24,302
Vineyards ..	12,678	21,875	19,806	17,670	18,688
Other Crops ..	21,112	23,389	21,515	21,295	22,095
Total ..	215,748	239,938	254,449	225,713	281,954
Pastoral—					
Wool	137,980	187,157	150,987	168,613	167,123
Sheep, Slaughtered ..	44,764	46,523	51,297	57,113	57,081
Cattle, Slaughtered ..	102,434	112,071	130,201	145,403	119,187
Total ..	285,178	345,751	332,484	371,130	343,391

VICTORIA—LOCAL VALUE OF PRIMARY PRODUCTION—*continued*
($'000)

Produce	1962-63	1963-64	1964-65	1965-66	1966-67
Dairying—					
Whole Milk Used for—					
Butter	71,368	77,246	87,345	87,544	100,755
Cheese	11,210	12,851	14,537	11,201	14,792
Condensing, Concentrating, etc. ..	12,284	14,065	16,379	16,365	16,552
Human Consumption and Other Purposes ..	28,894	32,786	34,348	35,410	37,731
Subsidy Paid on Whole Milk for Butter and Cheese	13,572	13,690	14,642	14,569	14,575
Pigs, Slaughtered ..	13,410	15,217	20,165	17,513	17,540
Total ..	150,738	165,857	187,416	182,601	201,945
Poultry and Bees—					
Eggs	28,946	34,659	30,183	33,914	35.173
Poultry	11,794	12,009	11,196	11,546	15,423
Honey and Beeswax	480	1,151	867	989	758
Total ..	41,220	47,819	42,245	46,449	51,354
Trapping, etc.—					
Rabbits and Hares ..	4,332	4,444	4,599	4,826	3,470
Rabbit and Hare Skins, etc. ..	1,168	1,470	870	595	506
Total ..	5,500	5,914	5,469	5,421	3,976
Forestry—					
Sawmills	18,884	19,543	22,391	22,494	23,798
Hewn Timber ..	2,202	2,490	2,587	2,928	2,516
Firewood	4,943	6,682	6,949	6,842	5,500
Bark for Tanning ..	108	134	90	108	89
Other	64	72	58	62	77
Total ..	26,200	28,920	32,076	32,434	31,982
Fisheries—					
Fish	2,528	3,049	1,702	1,871	1,643
Crayfish	670	606	797	1,040	909
Oysters	2	2	2	*	1
Scallops	..	481	656	789	1,344
Other	50	64	57	96	409
Total ..	3,250	4,202	3,212	3,797	4,307

* More than nil, but less than half the final digit shown.

VICTORIA—LOCAL VALUE OF PRIMARY PRODUCTION—*continued*
($'000)

Produce	1962–63	1963–64	1964–65	1965–66	1966–67
Mining—					
Gold	946	854	737	687	688
Coal—					
Black	632	589	544	515	497
Brown	15,682	16,158	17,304	18,436	20,064
Other Metals and Minerals ..	3,990	4,308	4,772	4,839	5,951
Quarrying	18,766	18,929	21,534	24,446	25,905
Total ..	40,016	40,838	44,892	48,924	53,105
Total Primary Industries	767,851	879,238	902,243	916,470	972,013

Net Value of Production

Net value of production is computed by subtracting from local value the cost of materials used in the process of production. These materials include stock feed, seed, manures, power, petrol, kerosene, other oils, dips, sprays, and other costs. No deductions have been made for depreciation or certain maintenance costs. The net value of production is the only satisfactory measure to use when comparing or combining the value of primary industries with those of other industries. Details for primary industries and manufacturing are shown in the table below :

VICTORIA—NET VALUE OF PRODUCTION
($'000)

Division of Industry	1962–63	1963–64	1964–65	1965–66	1966–67
Rural—					
Agriculture ..	193,972	218,136	232,775	202,674	255,016
Pastoral	265,126	323,696	309,668	346,230	315,142
Dairying	110,134	121,385	136,097	135,601	145,567
Poultry	24,812	30,104	24,407	28,192	32,464
Bee-farming ..	480	1,151	867	989	758
Total Rural ..	594,524	694,473	703,814	713,686	748,947
Non-rural	67,372	72,686	77,809	81,609	83,653
Total Primary ..	661,897	767,159	781,623	795,296	832,599
Manufacturing ..	1,601,742	1,750,478	1,949,665	2,027,685	2,237,159
Total All Industries ..	2,263,639	2,517,637	2,731,288	2,822,981	3,069,758