Part 7

PRIMARY PRODUCTION

Land Settlement and Irrigation

Land Utilization

Introduction

The climatic conditions of Victoria (for details see pages 52 to 70) 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 484).

The pattern of land use is more or less clearly defined in each of the statistical districts (see map on page 506). 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 utilization. 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 7·5 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 fat lamb production. The principal crop grown is wheat and about 1·3 mill. acres are sown to this crop each year. In addition, some 300,000 acres of oats, including 15,000 acres for hay and 50,000 acres for grazing, and 80,000 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 17 bushels.

The lack of suitable pasture species has been a problem in pasture development and, in the past, grazing has been provided largely by native pastures, green cereal crops, and crop stubbles. More recently, wider use has been made of dry land lucerne and medics in rotation with crops, with benefit to both crop production and grazing. The district carries about 1·6 mill. sheep and produces about 16 mill. lb. of wool as well as a substantial number of early fat lambs for the Melbourne market.

Irrigation areas located close to the River Murray, which marks the northern boundary of the State, produce most of the State's (and Australia's) dried vine and 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 14 in. per year, increasing to 25 in. in the south. 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 fat 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. About 900,000 acres are sown to wheat each year, the average yield being close to 24 bushels per acre. Other major crops are oats (275,000 acres, including 30,000 acres for hay and 15,000 acres for grazing), and barley (35,000 acres). In recent years the development of suitable strains of medics and clovers has encouraged 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 40 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 5·5 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 550,000 acres, and, because of climatic and soil differences, yields vary widely across the area, the district average being 24 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 over 230,000 acres of oats are sown each year, including 40,000 acres for hay and 15,000 acres for grazing.

The district carries about 4 mill. sheep, largely on wheat farms, and emphasis is on fat 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 370,000 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.

North-Central District

This district includes much of the Central Highlands area and the rainfall is generally over 30 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 area north-east of Ballarat and fruit 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 over 2 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, much of which is very steep and heavily timbered. The area occupied is 3·7 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 inch 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 8,500 acres of tobacco and small quantities of hops are grown in these areas. The district carries about 150,000 dairy cattle, mainly along the river valleys.

Fat 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 240,000 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 inch rainfall belt, but an area north and east of the Otways is influenced by a rain shadow effect and the average annual rainfall is 20 to 25 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. The great bulk of the plains area consists of basaltic soils. 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 6·6 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 in the district. 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 9·75 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 fat 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 380,000 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 are produced in the district, which carries about 430,000 dairy cattle.

Central District

Rainfall varies from 20 in. in the rain shadow area, north of Geelong, to more than 50 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 2·7 mill. acres are occupied—the remainder being reserved as forest and watershed 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 and market gardening is important close to Melbourne, Geelong, and Bacchus Marsh.

The district carries about 2·3 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 3·6 mill. acres and the bulk of settlement is south of a line between Dandenong and Bairnsdale. Rainfall varies from just under 25 in. in 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 30 to 40 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 inch 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 nearly 500,000 dairy cattle. Pig raising is associated with dairy farming, and there are 60,000 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 inch rainfall area near Sale, fat 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 31st December, 1962, this comprised :—

	Acres
Lands alienated in fee-simple	31,634,458
Lands in process of alienation	2,380,130
Crown lands	22,231,172
Total	56,245,760

The Crown lands comprise :—

	Acres
Permanent forests (under Forests Act)	4,870,420
Timber reserves (under Forests Act)	709,484
State Forest and timber reserves (under Land Act)	150,974
Water reserves	315,595
Reserves in the Mallee	410,000
Other reserves	627,624
Roads	1,700,729
Water frontages, beds of rivers, lakes, &c., unsold land in cities, towns, and boroughs	3,845,479
Land in occupation under—	
Perpetual leases	180,218
Leases of former agricultural college lands	28,586
Other leases and licences	1,711
Temporary grazing licences and leases	*5,258,687
Unoccupied	4,131,665
Total	22,231,172

* In addition, 73,090 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 1958 to 1962. 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 31st December—	Area of Crown Lands Sold			Crown Lands Alienated in Fee-simple	
	Absolutely, at Auction, &c.	Conditionally to Selectors	Total	Area	Purchase Money
	acres				£
1958..	5,480	23,763	29,243	51,396	151,672
1959..	30,972	51,075	82,047	123,202	310,895
1960..	3,740	38,532	42,272	129,939	281,173
1961..	16,315	42,070	58,385	99,805	276,028
1962..	4,584	11,299	15,883	103,337	308,337

TRANSFER OF LAND ACT AND ASSURANCE FUND

Year Book 1961 (*451–452*).

GOVERNMENT ASSISTANCE TO THE FARMING INDUSTRY

Year Book 1964 (*525–527*).

Soil Conservation Authority

Functions

The Authority is responsible for the mitigation and prevention of soil erosion; promotion of soil conservation; and the determination of land use to achieve these objectives.

To perform these functions, the Authority 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.

It co-ordinates the policies and activities of Government departments and public authorities for the alienation and use of Crown lands and has powers in regard to the removal of stone, gravel, and soil by Government departments and public authorities.

The Chairman of the Authority is also Chairman of the Land Utilization Advisory Council, which operates under the same Act.

Hydrologic Research in Catchments

One of the Soil Conservation Authority's responsibilities is to determine the most suitable forms of land use in water supply catchments. To this end the Authority studies the effects of different kinds of land use not simply for the purpose of erosion control as such, but also for their influences on the hydrology of those areas. Research is being carried out in three different experimental areas where controlled land use over a period of years will provide useful information.

One of these long-term research projects, which is being carried out at the Parwan Experimental Area near Bacchus Marsh, has been established to discover the run-off to rainfall relationship of pastoral country receiving twenty inches annual rainfall. This area is typical of much of the Parwan Creek catchment where the native pasture affords little protection and all types of water erosion are extensive. This has led to low production and a threat to the Melton Weir.

Another project is the Stewart's Creek Experimental Area which was started in co-operation with the State Rivers and Water Supply Commission and Forests Commission in 1959. The area consists of about 300 acres of State forest (40 inch annual rainfall) just north of the Great Dividing Range, near Daylesford. The forest consists of two types of eucalypts, messmate and peppermint, and is typical of much of the forest cover on catchments ranging in size from 10 acres to 65 acres.

A third project, the Reefton Experimental Area, was started in 1962. It contains 2,700 acres of mountain ash forest (60 inch annual rainfall) in the Armstrong Creek Catchment. This is an upper tributary of the River Yarra and is representative of the forested catchments which provide most of Melbourne's water. At Reefton there are six experimental catchments ranging in size from 200 acres to 1,300 acres.

By measuring the rainfall and other associated factors on each of the catchments, it will be possible to gain a better understanding of the effect of different forms of management on water yield and which forms of land use are both productive and safe in water supply catchments.

Soil Conservation Authority : Further References

Year Books 1961 (*452–454*) ; 1962 (*62–65*) ; 1963 (*490–491*) ; 1964 (*528*).

Land Utilization Advisory Council

Year Book 1962 (*473–474*).

Destruction of Vermin and Noxious Weeds

Year Book 1963 (*491–492*).

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 men 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. It also 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, viz., 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.

Revenue, expenditure, &c., for each of the five years 1958–59 to 1962–63 is given in the following table :—

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

(£'000)

Particulars	1958–59	1959–60	1960–61	1961–62	1962–63
REVENUE					
Interest	381	405	437	475	520
Other	7	10	12	20	25
Total Revenue	388	415	449	495	545
EXPENDITURE					
Administration	49	54	58	60	55
Interest	250	261	278	299	365
Sinking Fund	19	20	20	22	23
Other	21	9	16	12	12
Total Expenditure	339	344	372	393	455
Net Surplus	49	71	77	102	90
Loans and Advances Outstanding at 30th June	8,611	8,731	9,365	9,859	10,170
Loan Indebtedness to State Government at 30th June	7,734	7,836	8,323	8,906	9,516

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 visualized.

Under the Victorian legislation, soldier settlement was carried out under two separate schemes. Firstly, 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 the applicants. The number of ex-servicemen settled under this scheme totalled 3,283. Secondly, there was the Single Unit Farm Scheme, where ex-servicemen were granted loans up to a maximum of £9,000 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 £11,957,265.

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, and equipment. For this purpose £6,083,360 has been advanced to settlers and at the 30th June, 1963, £5,592,312 has been repaid, £9,737 has been written off leaving an outstanding balance of £481,311. 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 the 30th June, 1963 :—

VICTORIA—LAND ACQUIRED AND COST OF DEVELOPMENT, 1945 TO 1963

Particulars	Total Expenditure to 30th June, 1963		Balance Outstanding at 30th June, 1963
	acres	£	£
Freehold Land	1,193,171	19,715,490	2,651,362
Crown Land	51,536		
Development and Improvement of Holdings	..	27,169,690	
	Total Realizations to 30th June, 1963		
	acres	£	
Sales of Land Not Required for Soldier Settlement	64,204	1,543,817*	295,519*

* 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 1963

Act	Total Advances to 30th June, 1963		Advances Outstanding at 30th June, 1963	
	No.	£	No.	£
Soldier Settlement Act—				
Advances for Settlers' Lease Liability*	2,967	27,269,513	2,631	22,742,261
Advances to Assist in Acquiring and Developing Single-unit Farms	2,878	11,957,265	1,592	6,108,126
Advances for Improvements, Stock, Implements, &c. ..	†	6,083,360	482	481,311
Advances for Shares in Co-operatives	327	125,164	2	466
Commonwealth Re-establishment and Employment Act—				
Advances to Assist Rehabilitation in Farming Industry	2,970	1,769,851	311	75,353

* The total number of settlers allocated holdings is 3,283 which includes 235 holdings re-allocated and 13 holdings disposed of. Some 68 settlers have yet to receive their lease liabilities.

† 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 494–496 of the Victorian Year Book 1963.

Up to the 30th June, 1963, the land being developed for allocation under this scheme has been on three developmental projects. These are at Heytesbury near Cobden, Yanakie on Wilson's Promontory, and the East Goulburn Project near Shepparton.

The demand for all holdings allotted to date has been exceedingly keen and the 197 farms allocated (136 dairying and 61 soft fruit) attracted nearly 7,000 applications.

At the 30th June, 1963, the position of other land settlement in Victoria under the *Land Settlement Act* 1959 was as follows :—

VICTORIA—OTHER LAND SETTLEMENT, 1959 TO 1963

Particulars	Total Expenditure to 30th June, 1963		Balance Outstanding at 30th June, 1963	
	acres	£	£	
Land Acquired—				
Freehold Land Purchased ..	17,538	635,623	6,622,395	
Crown Land	80,851			
Development and Improvement of Holdings	..	6,065,734		
	Total Realizations to 30th June, 1963			
	acres	£		
Sales of Land not Required for Settlement	1,754	32,917*	8,104*	
	Total Advances to 30th June, 1963		Advances Outstanding at 30th June, 1963	
	No.	£	No.	£
Advances to Settlers under the Land Settlement Act ..	†	94,526	57	69,572

* 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 £3,500 carrying interest at 4¾ 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 of advances, repayments, &c., for the year ended 30th June, 1963 may be found on page 684.

(2) Savings Bank Department loans are advances of larger amounts—the maximum loan is £10,000—and are available on the security of first mortgage over freehold property. These are short-term loans extending over a period of 3 years, but are subject to renewal. Interest charged is either 5½ or 6 per cent. per annum depending on whether the property is occupied by the borrower or whether the loan exceeds £5,000. 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 packaging 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 during the year ended 30th June, 1963 were 4 per cent. per annum if against the security of a Commonwealth or State Government guarantee, and 4¼ per cent. per annum against other securities.

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.

Commonwealth Development Bank

A brief outline of the functions of the Commonwealth Development Bank, together with particulars of rural advances outstanding at 30th June, 1963 may be found on pages 680 to 682. 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 30th June, 1963 are given in the following table :—

VICTORIA—COMMONWEALTH DEVELOPMENT BANK OF AUSTRALIA : RURAL ADVANCES APPROVED, YEAR ENDED 30TH JUNE, 1963

(£'000)

Type of Primary Industry	Rural Advances Approved
Sheep	169
Dairying	350
Cattle	17
Wheat	14
Other Grain Crops	..
Other Primary Industry	155
Total	705

The average loan approved for rural purposes during the year was £3,542.

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 1959 to 1963 :—

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

(£'000)

Industry of Borrower	Amount Outstanding at the End of June—				
	1959	1960	1961	1962	1963
Sheep Grazing	21,373	19,870	19,184	19,732	19,878
Wheat Growing	2,705	3,305	2,343	3,135	3,904
Dairying and Pig Raising ..	12,440	12,959	12,313	13,703	14,845
Other Rural	7,286	8,208	7,949	8,596	9,712
Total	43,804	44,342	41,789	45,166	48,339

Advances to rural industry borrowers represented 18 per cent. of trading banks' business advances outstanding at the end of June, 1963 and 15 per cent. of all advances outstanding. The maximum rate of interest on bank overdrafts at 30th June, 1963 was 6½ 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 1959 to 1963 :—

VICTORIA—RURAL ADVANCES* OF PASTORAL FINANCE COMPANIES

(£ Mill.)

At End of June—	Advances Outstanding
1959	16·0
1960	17·7
1961	19·9
1962	16·4
1963	17·8

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

Improvement Purchase Leases

Under the provisions of the *Land Act* 1958 an eligible person may purchase an allotment of Crown land by the payment of 20 annual instalments of rent. 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, exceeds £7,500. The control of this scheme is vested in a local land board. Certain conditions must be met by the lessee to retain the lease. During the first six years he must :—

(1) Carry out specific land improvement as set out by the board, e.g., clearing, draining or grading the land, the sowing of annual or fodder crops, soil improvement, &c.;

(2) complete one quarter of the land improvements within three years and commence clearing or other essential work within twelve months ;

(3) establish his permanent residence on the allotment ;

(4) not sell or transfer the allotment except in the event of death or bankruptcy ;

(5) not enter into a mortgage without the written consent of the board ; and

(6) suppress and destroy vermin and weeds declared to be such under the Vermin and Noxious Weeds Acts.

Non-compliance with or violation of any of the above conditions will render the lease subject to forfeiture. On the satisfactory compliance with all covenants and conditions including payment of all charges and fees, a Crown grant (freehold title) will be issued to the lessee. Since the scheme's inception in 1957 and up to the 30th June, 1963, 520 allotments comprising 208,315 acres have been proclaimed available for application.

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 1880's when the miners who had left the goldfields to settle on the northern plains began to realize 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 attack on 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 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 ; and

(3) it vested in the Crown the right to the use and control of the water in the State's rivers, streams, &c., thus avoiding the litigation which has clouded the history of water supply in the U.S.A.

Irrigation

One of the Commission's most important functions is to promote the development of irrigation, and at 30th June, 1963, it had spent about £80 mill. on this work, or 60 per cent. of its total capital expenditure on water supply and conservation generally.

Most irrigation is carried out in districts directly controlled by the Commission, although there is an increasingly large proportion of " private diverters ", i.e., irrigators who are authorized to take water from streams, lakes, &c., but who do not come within the boundaries of an irrigation district.

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 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.

Another 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 sheep-raising. The advantage of intensive irrigation is that much higher returns are available from a given quantity of water and, consequently, a much bigger rural population can be supported.

River Murray water is shared by Victoria equally with New South Wales after certain quantities have been reserved for the use of South Australia. This principle was established after many years of controversy by the River Murray Waters Agreement, which was incorporated in the 1915 River Murray Acts under which a Commission comprising representatives of the three States and the Commonwealth was formed to administer the Agreement. The four parties share equally the cost of all works on the River Murray.

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 ..	Eildon Reservoir ..	2,750,000	Goulburn–Loddon
	Goulburn Weir ..	20,700	,, ,,
	Waranga Reservoir ..	333,400	,, ,,
Campaspe ..	Eppalock Reservoir ..	252,860	,, ,,
Loddon ..	Cairn-Curran ..	120,600	,, ,,
	Tullaroop	60,000	Maryborough town supply; diverters; and Goulburn–Loddon System
Murray ..	Hume Reservoir ..	1,250,000*	Murray
	River Murray Weirs..	111,420*	,,
Macalister ..	Glenmaggie Reservoir	154,300	Macalister
Werribee ..	Pykes Creek Reservoir	19,400	Bacchus Marsh District
	Melton Reservoir ..	15,500	Werribee District
		5,299,410†	

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

† In addition to the storages named, the total includes a system of natural lakes in the Kerang–Swan Hill Area. These lakes are part of the Torrumbarry System and have a total capacity of 141,910 acre ft. 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 1962–63 :—

VICTORIA—AREA OF SYSTEMS AND LANDS IRRIGATED, AND WATER DELIVERED, 1962–63

System or District	Total Area within Constituted District	Area Irrigated								Water Deliveries
		Pastures		Lucerne and Sorghum	Vineyards	Orchards	Market Gardens	Others	Total	
		Native	Sown							
	acres									acre ft.
Goulburn–Loddon System	1,350,093	25,279	402,533	32,813	293	23,397	1,613	29,876	515,804	634,668
River Murray System—										
Torrumbarry System* ..	357,471	22,021	201,061	9,181	5,489	2,088	1,058	9,724	250,622	222,282
Murray Valley Area ..	301,141	2,268	96,205	8,708	40	6,280	413	3,011	116,925	176,720
Pumped Supply Districts†	80,763	302	601	683	36,803	2,912	590	1,497	43,388	122,016
Total River Murray	739,375	24,591	297,867	18,572	42,332	11,280	2,061	14,232	410,935	521,018
Macalister District ..	130,936	2,685	55,915	1,420	..	..	27	339	60,386	87,565
Werribee–Bacchus Marsh ..	16,343	123	5,739	657	..	602	4,480	43	11,644	17,636
Other Northern Systems ..	‡	671	11,022	1,271	8	3,281	498	43	16,794	25,844
Other Southern Systems ..	‡	..	..	..	..	..	1,094	236	1,330	..
Private Diversions ¶ ..	‡	7,968	85,309	11,267	3,124	4,499	12,861	9,634	134,662	..
Grand Totals ..	§2,236,747	61,317	858,385	66,000	45,757	43,059	22,634	54,403	1,151,555	1,286,731

* Includes 40,898 acres irrigated by private diversion.
† Including First Mildura Irrigation Trust (15,540 acres irrigated), supervised by the Commission.
‡ Not available.
§ Incomplete.
¶ Does not include 327,095 acre ft. of private diversion.

Works Under Construction and Projected

Due to the enlargement of the Eildon Reservoir and the construction of the Cairn-Curran, Tullaroop and Eppalock Reservoirs, a large scale channel enlargement and remodelling programme in the Goulburn–Murray Irrigation District is in progress. Approximately half of the work has been completed.

Victoria will benefit indirectly from the construction of the Chowilla Dam on the River Murray, six miles downstream of the South Australian border. The reservoir, of a design capacity of 4,600,000 acre ft., will be built under the terms of the River Murray Agreement. The contracting parties to the agreement have arranged with the Government of New South Wales that the Lake Menindee Storages, on the Darling River, shall operate under the control of the River Murray Commission during the construction of the Chowilla Dam. It is anticipated that construction will commence during 1964–1965.

A reservoir of a capacity of 60,000 acre ft. is under construction on Fyans Creek near Halls Gap. This storage, the Lake Bellfield Reservoir, will augment the water supply of the Borough of Ararat and supplement the Commission's Wimmera–Mallee System.

Adjoining Bittern Reservoir on the Mornington Peninsula, a 12,000 acre ft. storage is under construction on Devilbend Creek. This project is designed to function as a storage reservoir, filled from the Bunyip River headworks, to meet the local peak summer demands of the bayside towns. It will also have a valuable role as a drought reserve for the Mornington Peninsula System.

The latter two projects are part of a £37·5 mill. long-term programme for the erection of nine storages. The Tarago Reservoir on the Tarago River will be commenced in 1964 and will serve the Mornington Peninsula, whilst the first stage of the Buffalo Dam (capacity 16,000 acre ft.) on the Buffalo River has been started. This will augment the water supply of the City of Wangaratta and supplement water already supplied to tobacco farms in the area. The second stage is for a reservoir of 800,000 acre ft. capacity, costing approximately £20 mill., to be started in 1968.

IRRIGATION : FURTHER REFERENCE

Year Book 1962 (*479–483*).

WIMMERA–MALLEE REGION WATER SUPPLY AND FLOOD PROTECTION, RIVER IMPROVEMENT, AND DRAINAGE

Year Book 1963 (*499–502*).

WATER SUPPLY IN VICTORIA

Year Book 1964 (*535–543*).

Goulburn–Murray Irrigation District

Introduction

The Goulburn–Murray Irrigation District is the largest Irrigation District in Victoria and its irrigated area (a record 825,000 acres were irrigated in 1962–63) represents about 80 per cent. of Victoria's total irrigated acreage.

The first move for irrigation in northern Victoria—apart from the irrigation of isolated riverside farm lands—was the establishment of the United Echuca and Waranga Trust in 1882. After the Irrigation Act of 1886, many similar Trusts were begun. By 1905, the districts of these Trusts covered 1,760 square miles across the lower reaches of the Goulburn, Campaspe, and Loddon Rivers, but very little land was actually irrigated and the Trust system was not a success. In 1905, their districts and works were transferred by the Government to the State Rivers and Water Supply Commission. (See pages 480–481 of the Victorian Year Book 1962.) Since 1905, the Commission has built major storages on the Goulburn, Campaspe, and Loddon Rivers, whilst the River Murray itself has been harnessed by construction of the Hume Reservoir and a number of weirs down the river under the River Murray Agreement.

A network of new channels has been built by the Commission through the areas served by the old Trust works and to new areas. Water from the Murray, Goulburn, Campaspe, and Loddon Rivers is now distributed throughout 1,900,000 acres (2,969 square miles) in the Goulburn–Murray Irrigation District, enabling the area to be intensively developed under irrigation for dairying, sheep and fat lamb raising, orchards, and market gardens.

The Goulburn–Murray Irrigation District was formed in 1959 by the amalgamation of 20 smaller Irrigation Districts, comprising all the Districts then supplied with water by gravity on the northern plains. The identities of these former Districts have been preserved for certain administrative purposes as Irrigation Areas within the Goulburn–Murray District.

The northern boundary of the District is the River Murray. Its other boundaries are roughly defined by a line through the points at which water is diverted—Yarrawonga on the Murray, Murchison on the Goulburn, Rochester on the Campaspe, and the vicinity of Boort on the Loddon—returning to the Murray near Swan Hill, 200 miles west from Yarrawonga in a direct line. Within these boundaries, the district falls into two distinct parts, east and west, separated by a strip up to 25 miles wide east of Pyramid Hill.

Climate and Soils

Broadly speaking, the District has a dry Mediterranean or warm temperate type of climate, with hot and fairly dry summers and mild, rainy winters. The critical climatic factor is the rainfall which varies from about 13 ins. per year at Swan Hill to 22 ins. at Murchison.

Soils are generally fertile and suited to irrigation, but there is a fairly substantial area of heavy soils around Kerang and Boort which are shallow, hard to cultivate, and present difficult drainage problems under irrigation.

Water Supply for Irrigation

As the name of the District indicates, its main sources of supply are the Goulburn and Murray Rivers, although in the last decade large storages have also been built on the Loddon and Campaspe Rivers.

The main storages are as follows :—

VICTORIA—GOULBURN–MURRAY IRRIGATION DISTRICT : MAIN STORAGES

River System	Reservoir, &c.	Capacity (Acre Ft.)
Murray	Hume Reservoir	2,500,000
	Yarrawonga Weir	95,120
	Torrumbarry Weir	28,900
Goulburn	Eildon Reservoir	2,750,000
	Waranga Basin	333,400
	Goulburn Weir	20,700
Loddon	Cairn-Curran Reservoir ..	120,600
	Tullaroop Reservoir	60,000
	Kerang North-West Lakes ..	69,400
	Kow Swamp	40,860
	Laanecoorie Reservoir	6,300
Campaspe	Eppalock Reservoir	252,860
		6,278,140

However, not all of this storage capacity is available to the Goulburn–Murray Irrigation District. In particular, under the River Murray Agreement (pages 480–481 of the Victorian Year Book 1962), the River Murray storages are shared equally with New South Wales after meeting certain obligations to South Australia. Other Victorian demands are made on the storages for Districts further down the Murray (mainly around Mildura), for private irrigation outside Districts, and for town supplies. Furthermore, since most of the storage capacity is designed to regulate supplies from year to year and to cover prolonged dry periods, the quantity of water available annually is much less than the total capacity.

Investigations recently completed have led to the conclusion that, at the 1963 stage of water resources development, the water normally available for all purposes in northern Victoria—outside the Wimmera–Mallee system—is 3,200,000 acre ft. annually, of which the Goulburn–Murray Irrigation District has been allocated 2,750,000 acre ft. measured at the storages. About half of this is recorded as delivered on the land, the balance being lost in distribution by un-measured deliveries, evaporation, seepage, and unavoidable waste.

By 1970, further water will be available from diversion of Snowy water to the Murray and as a result of construction of the Chowilla storage (a River Murray Commission work), but most of this will be used to provide a more reliable supply in dry years, rather than to increase the normal regulated flow. In effect, therefore, the present commitment of 2,750,000 acre ft. (measured at storages) to the District represents virtually the maximum amount which the District can expect for a number of years.

Post-War Development

Since the end of the Second World War in 1945, there has been a capital expenditure of more than £50 mill. devoted to storages, channels, and drains for the development of the District. As a result of this, the area actually irrigated has increased by 50 per cent. to a record 825,279 acres in 1962–63, and there has also been a considerable increase in the volume of water delivered per acre irrigated to intensify production. Storage capacity has actually trebled, the comparative figure in 1945 for the table presented on page 500 being only 2,154,000 acre ft.

The pattern of production in the District is indicated in the table below, which shows the areas irrigated in 1962–63 :—

VICTORIA—GOULBURN–MURRAY IRRIGATION DISTRICT : LAND IRRIGATED, 1962–63

Particulars	Area Irrigated	Percentage of Total
	acres	per cent.
Permanent Pastures, Lucerne, and Fodders	324,247	39
Natural and Annual Pastures	425,626	52
Orchards	31,097	4
Market Gardens	2,987	1
Vineyards	4,518	
Other	36,804	4
	825,279	100

Thus, contrary to popular impression, irrigation in northern Victoria is predominantly for pasture production, the area under permanent pastures generally representing dairying, and the area under annual pastures representing sheep and fat lamb raising. These two categories each use about the same total quantity of water, as permanent pastures require more water per irrigated acre. Lucerne, fodders, and natural pastures are of comparatively minor importance.

Both dairying and sheep/fat lamb raising are practised to some degree throughout the whole of the District. However, the trend is for dairying to be concentrated in the areas which have the most intensive supplies of water. These are mainly in the eastern half of the District (Shepparton, Tatura, Tongala, Cobram, and Rochester) with Cohuna and Swan Hill the only important dairying centres in the western section of the District. In recent years, as increased quantities of water have been allocated to the District, there has been a strong tendency for many areas previously under annual pastures to change to dairying. This has permitted many more people to be supported in the area, since a given quantity of water is usually found to support two people at dairying but only one at sheep raising.

The more intensive forms of land use are orchards, market gardens, and vineyards. The only area of vines of any significance is to be found at Woorinen, and this is generally inferior to the larger settlements further up the Murray towards Mildura. Market gardens

are also concentrated, mainly around Shepparton, Tatura, Swan Hill, and Cobram. The most widely grown crop is tomatoes for canning, the Goulburn–Murray District providing almost the total Victorian production. The district around Shepparton and Tatura is particularly famous for its production of canning peaches, pears, and apricots. These districts, together with the Cobram area, produce almost all of Victoria's canning fruit, and about two thirds of the total Australian output of canning peaches, pears, and apricots. Non-canning pears are also an important crop around Shepparton and Tatura, and citrus is significant around Swan Hill and Cobram.

Spray Irrigation in Agriculture and Dairying

Spray irrigation in Victoria, for the growing of pastures and fodder crops, is mainly used in connection with private irrigation schemes, and consequently the area irrigated by this method is very small compared with that irrigated by flood systems.

Of the three types of spray irrigation equipment available (low pressure, medium pressure, and high pressure), the medium pressure (35 to 50 pounds per square inch) is the most popular. The normal delivery of water from the spray heads is equal to 20 to 30 points of rain per hour. Various automatic systems have been devised to eliminate the shifting of portable spray lines, which requires three-quarters of an hour's work per acre per irrigation. These automatic systems are more expensive to install and may cost up to £200 per acre compared with a figure around £40 per acre for manually shifted lines.

Some large individual areas of over 100 acres of spray irrigation per farm can be found in Victoria, but the vast majority of private schemes employing this method are of 10 to 20 acres only. This area is generally all that the available water supply can irrigate.

The main crop irrigated is perennial pasture, in which the main species sown (in varying proportions) are perennial ryegrass, cocksfoot, paspalum, white clover, and strawberry clover. However, some maize, Japanese millett, saccaline, and cruciferous fodder crops are also grown.

Tobacco is grown in Victoria on permeable undulating lands and, as a consequence, is exclusively spray-irrigated. In the potato growing areas spray-irrigation is being used increasingly to supplement rainfall which is often inadequate during the summer.

The expense attached to a small private irrigation scheme is high, and consequently efficient utilization of the fodder produced is necessary if the full benefit of the scheme is to be obtained. Rationing of the feed by subdivision, strip grazing, or restriction of time allowed for grazing, is usually considered necessary. Using such methods, one acre of irrigated perennial pasture can maintain the lactation of up to four cows throughout the whole of the summer and this is profitable. The employment of an expensive private irrigation scheme for fodder conservation alone is not by any means as profitable.

Underground Water

Year Book 1964 (*544–545*).

Agricultural Education, Research, and Extension

Agricultural Education

Department of Agriculture

The Victorian Department of Agriculture through its Division of Agricultural Education has the responsibility for agricultural education at the diploma level in the residential agricultural colleges at Dookie and Longerenong and the non-residential horticultural college at Burnley Gardens.

The main purpose of the colleges is to teach the principles and practice of agriculture and horticulture to those who intend to adopt practical farming or horticulture as a vocation and require a more intimate knowledge of agriculture or horticulture than can be acquired only through practical experience. In addition to achieving this main purpose, the diploma courses also provide a basic training for technical officers who are later employed by government instrumentalities and by firms which manufacture or distribute farmers' requisites or handle farm produce.

Melbourne University School of Agriculture

The School of Agriculture of the Melbourne University provides a four year degree course for undergraduates leading to the Degree of B.Agr.Sc. and postgraduate work for higher degrees in Agricultural Science. The undergraduate course is based on a first year devoted to pure science subjects; this is followed by three years in which the scientific principles upon which the practice of agriculture is based are presented and more intensive training is given in those scientific disciplines required by research workers in agriculture. During the second year of the course, the students are in residence at Dookie Agricultural College, where they have the opportunity of combining the advantages of communal college life with close observation and contact with the practice of agriculture.

Research and Extension

The high standard of Victoria's agriculture, which produces more than one-quarter of Australia's primary produce (measured in terms of value) from less than one-thirtieth of the nation's area, is due in no small measure to the programme of research and advisory services undertaken by the Victorian Department of Agriculture.

The Department of Agriculture, which has expanded greatly in recent years, has concentrated on strengthening its existing research stations with new and up-to-date facilities, establishing new research centres, promoting new research projects, and intensifying advisory services.

At research centres strategically located in Victoria's rural areas, highly trained scientists are seeking the answers to a wide range of problems which face the primary producer trying to improve the efficiency of his farm. These scientists have already made many notable discoveries which have benefited Victorian agriculture.

To speed these research results to the farming community, the Department of Agriculture has appointed trained advisory officers throughout rural Victoria.

These advisory officers use every method of communication to channel technical facts to farmers. Much of their time is taken up with on-the-farm advice, but they also speak at field days and hold discussion group meetings. Their work is also backed by the Department of Agriculture's intensified production of publications, films, and radio and television services.

Farming

Introduction

Collection of Statistics

Since the year 1904, police officers have been required to collect agricultural, pastoral, and dairying statistics from land holders in Victoria. 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.

The rural statistics contained in this chapter are in the main compiled from annual returns of agricultural, pastoral, and dairying production collected from some 70,000 rural holdings in Victoria at 31st March each year. Schedules are distributed to farmers by about 320 local police officers who act as collectors of statistics. 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 visited, and full particulars are obtained 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, and the quantity of wool clipped.

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

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

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

Summary of Australian Statistics

The following table, which summarizes the principal farming activities on rural holdings in Australia during the 1962–63 season, shows the position of farming in Victoria relative to other States :—

AUSTRALIA—PRINCIPAL ITEMS OF FARM ACTIVITY, 1962–63

Particulars	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	N.T. and A.C.T.	Australia
Rural Holdings—								
Number	76,294	69,700	43,284	28,922	22,554	10,974	498	252,226
Area ('000 acres)	172,038	37,709	376,788	156,697	262,660	6,422	165,331	1,177,645
Principal Crops—								
Wheat—								
Area ('000 acres) ..	5,008	3,125	919	2,595	4,804	15	3	16,469
Production ('000 bush.) ..	109,002	67,899	18,683	38,339	72,500	419	70	306,912
Oats—								
Area ('000 acres) ..	708	932	27	416	1,177	31	1	3,292
Production ('000 bush.) ..	16,035	27,042	545	5,770	18,572	828	17	68,809
Barley—								
Area ('000 acres) ..	220	194	150	1,053	390	20	..	2,027
Production ('000 bush.) ..	5,361	5,469	4,088	18,004	6,056	631	..	39,609
Hay—All Types—								
Area ('000 acres) ..	587	1,251	87	287	340	165	3	2,720
Production ('000 tons) ..	965	2,376	197	406	453	313	7	4,717
Tobacco—								
Area (acres)	3,163	9,844	16,906	..	28	..	..	29,941
Production (dried leaf '000 lb.)	2,577	9,447	15,277	..	29	..	..	27,330
Onions—								
Area (acres)	800	4,634	3,796	944	509	79	*	10,762†
Production (tons) ..	5,185	26,175	21,148	8,531	6,622	515	*	68,176†
Potatoes—								
Area (acres)	27,420	43,024	16,994	5,918	6,499	13,839	47	113,741
Production (tons) ..	132,969	254,473	86,239	53,253	56,900	82,545	217	666,596
Other Vegetables–Area (acres)	44,951	40,017	39,666	10,225	8,071	20,809	251	163,990
Fruit—Area (acres) ..	98,032	75,855	43,242	40,444	25,204	21,943	197	304,917
Vineyards—Area (acres) ..	17,704	45,662	3,237	58,266	16,416	..	*	141,285†
Grapes for Table (tons) ..	6,537	7,573	3,977	1,078	2,188	..	*	21,353†
Wine Made ('000 gals.) ..	5,858	2,433	28	20,785	789	..	*	29,893†
Currants (tons) ..	514	2,536	..	2,607	1,225	..	..	6,882
Sultanas and Raisins (tons)	8,446	44,060	..	11,007	51	..	..	63,564
Livestock Numbers, 31st March, 1963—								
Sheep ('000)	70,021	27,472	22,811	15,738	18,727	3,570	293	158,632
Dairy Cattle ('000) ..	1,262	1,858	1,193	281	240	238	3	5,075
Beef Cattle ('000) ..	3,307	1,367	6,040	398	1,058	206	1,066	13,442
Pigs ('000)	392	298	402	145	131	70	2	1,440
Livestock Slaughtered for Human Consumption—								
Sheep ('000)	5,772	7,423	1,787	1,748	1,604	466	65	18,865
Lambs ('000)	5,948	5,407	337	1,718	863	629	46	14,948
Cattle ('000)	1,242	1,025	1,401	170	281	112	34	4,265
Calves ('000)	567	537	403	84	27	46	2	1,666
Pigs ('000)	688	528	604	234	237	115	9	2,415
Wool Production ('000 lb.) ..	693,734	316,252	233,638	207,344	184,110	34,570	2,443	1,672,091
Whole Milk Production—								
All Purposes ('000 gals.) ..	324,113	670,788	245,067	95,378	56,029	78,518	1,090	1,470,983
Principal Items of Machinery on Rural Holdings—								
Tractors (No.)	72,489	68,415	57,963	31,655	29,218	10,388	438	270,566
Shearing Machines (Stands)	68,708	39,162	18,977	27,528	19,868	4,249	313	178,805
Milking Machines (Units)	43,089	97,372	46,674	18,836	10,514	12,701	*	229,186†
Gross Value of Production‡—								
Agriculture (£'000) ..	154,151	126,755	126,239	64,236	79,023	17,775	252	568,431
Pastoral (£'000)	239,225	157,739	120,608	63,693	53,640	13,768	4,489	653,162
Dairying (£'000) ..	69,590	78,568	34,616	15,984	10,018	10,702	211	219.689

* Not available for publication.

† Incomplete.

‡ Subject to revision.

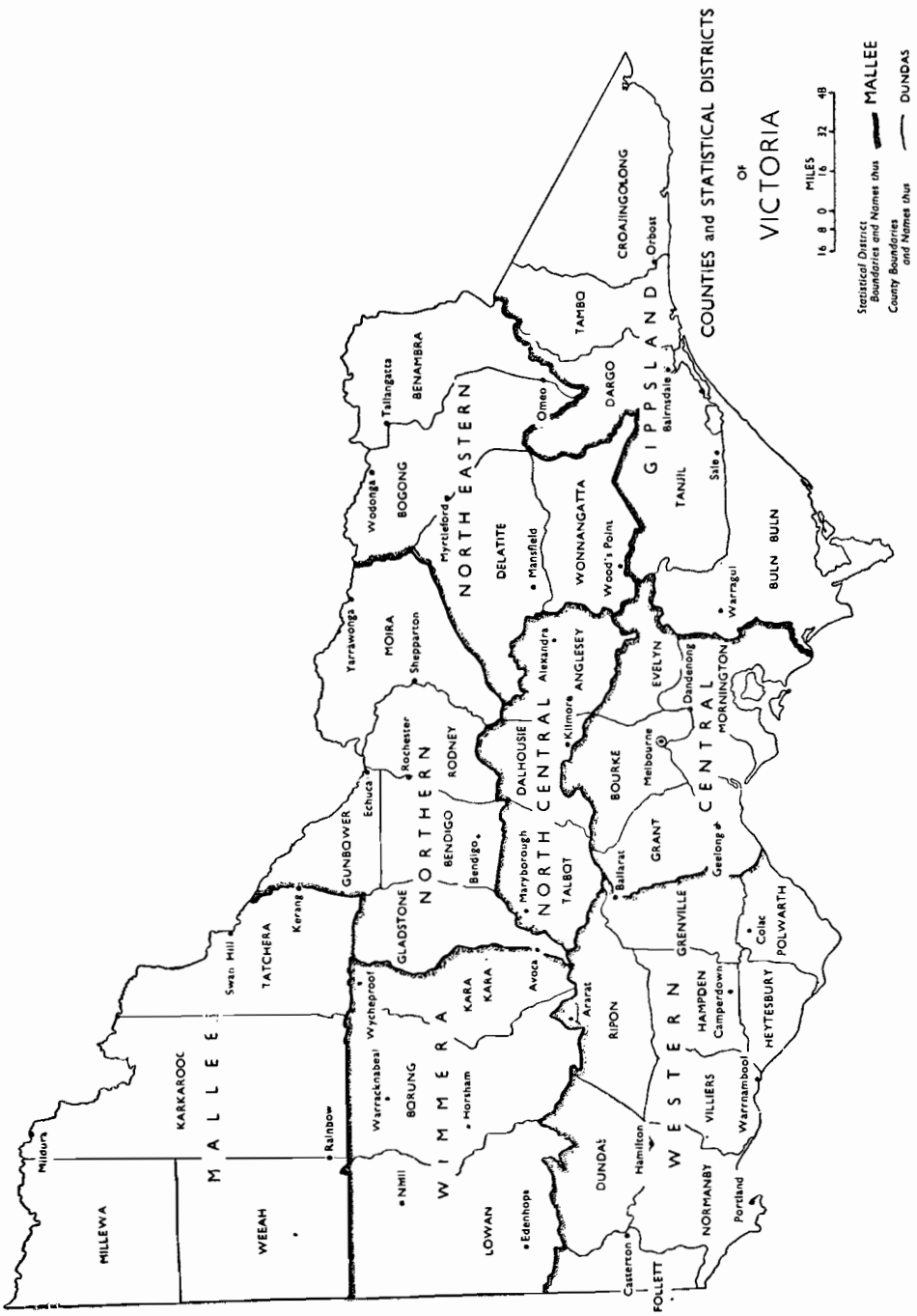

FIGURE 14. Counties and Statistical Districts of Victoria.

Land Occupied in Different Districts, 1962–63

For the season 1962–63, the number of occupiers of rural holdings was 69,700, the area devoted to agriculture 7,558,041 acres, and the total area occupied 37,708,842 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 1962–63

(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	No.	'000				
Central	4,065	14,440	333	1,302	789	236	2,660
North-Central ..	2,930	4,401	118	629	1,212	135	2,094
Western ..	8,775	12,828	443	4,026	1,729	432	6,630
Wimmera ..	7,395	6,094	2,071	1,698	1,802	425	5,996
Mallee	10,784	6,207	2,961	894	2,984	682	7,521
Northern ..	6,337	11,705	1,383	1,724	2,259	171	5,537
North-Eastern ..	7,221	5,028	143	974	1,926	657	3,700
Gippsland ..	8,739	8,997	106	1,382	1,254	829	3,571
Total ..	56,246	69,700	7,558	12,629	13,955	3,567	37,709
			PERCENTAGE OF ABOVE TO AREA OCCUPIED				
Central	..	..	12·52	48·95	29·66	8·87	100·00
North-Central ..	..	..	5·63	30·04	57·88	6·45	100·00
Western ..	..	..	6·67	60·73	26·08	6·52	100·00
Wimmera ..	..	..	34·53	28·32	30·06	7·09	100·00
Mallee	..	..	39·37	11·89	39·67	9·07	100·00
Northern ..	..	..	24·98	31·14	40·80	3·08	100·00
North-Eastern ..	..	..	3·86	26·32	52·06	17·76	100·00
Gippsland ..	..	..	2·97	38·70	35·12	23·21	100·00
Total ..	..	..	20·05	33·49	37·01	9·45	100·00
			PERCENTAGE IN EACH DISTRICT OF TOTAL IN STATE				
Central	7·23	20·72	4·40	10·31	5·66	6·62	7·05
North-Central ..	5·21	6·31	1·57	4·98	8·68	3·81	5·56
Western ..	15·60	18·41	5·86	31·88	12·39	12·12	17·58
Wimmera ..	13·14	8·74	27·40	13·44	12·91	11·93	15·90
Mallee	19·17	8·91	39·18	7·08	21·38	19·09	19·95
Northern ..	11·27	16·79	18·29	13·65	16·19	4·79	14·68
North-Eastern ..	12·84	7·21	1·89	7·71	13·80	18·42	9·81
Gippsland ..	15·54	12·91	1·41	10·95	8·99	23·22	9·47
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, and 1959-60. The first detailed classification of holdings by principal type of activity was carried out in conjunction with the size classification of rural holdings 1959-60. The following tables show some of the information, in summary form, from the 1959-60 classification of rural holdings by size and type of activity:—

VICTORIA—HOLDINGS CLASSIFIED ACCORDING TO SIZE OF HOLDING: NUMBER AND TOTAL AREA OF HOLDINGS AND AREA USED FOR VARIOUS PURPOSES, 1959–60

Size of Holding	Number of Holdings	Total Area of Holdings	Area Used For—				
			Fruit	Crops (Excluding Fruit)	Fallow	Sown Grasses and Clovers	Balance of Holding
acres			acres				
1– 99 ..	21,803	841,772	86,184	124,963	11,042	290,300	329,283
100– 199 ..	12,374	1,750,203	10,890	256,687	25,417	824,264	632,945
200– 299 ..	6,499	1,569,717	4,053	185,773	30,833	661,140	687,918
300– 399 ..	5,263	1,780,143	3,445	217,143	55,612	638,202	865,741
400– 499 ..	3,423	1,523,243	1,374	181,096	63,511	519,584	757,678
500– 999 ..	11,287	7,931,505	3,744	1,165,916	571,239	2,249,580	3,941,026
1,000–1,399 ..	3,737	4,409,447	869	727,701	405,757	1,038,161	2,236,959
1,400–1,999 ..	2,477	4,081,603	2,184	606,537	346,348	966,320	2,160,214
2,000–2,999 ..	1,515	3,635,339	1,771	517,383	314,369	811,277	1,990,539
3,000–4,999 ..	888	3,292,668	169	393,508	242,314	656,082	2,000,595
5,000 and over ..	512	6,920,890	1,438	199,910	113,824	752,141	5,853,577
Total ..	69,778	37,736,530	116,121	4,576,617	2,180,266	9,407,051	21,456,475

VICTORIA—NUMBER OF HOLDINGS GROWING WHEAT, AND NUMBER OF HOLDINGS ON WHICH LIVE STOCK WERE DEPASTURED, CLASSIFIED ACCORDING TO SIZE OF HOLDING, 1959–60

Size of Holding	Holdings With—				
	Wheat	Sheep	Dairy Cattle	Beef Cattle	Pigs
acres	No.				
1– 99	191	2,865	11,071	2,271	2,510
100– 199	302	4,027	9,842	2,362	2,670
200– 299	442	3,490	4,782	2,006	1,323
300– 399	819	3,709	3,537	2,051	987
400– 499	743	2,747	2,267	1,533	523
500– 999	4,380	10,144	7,436	5,382	1,412
1,000–1,399	1,914	3,521	2,464	1,830	439
1,400–1,999	1,302	2,383	1,574	1,243	254
2,000–2,999	845	1,477	1,662	780	291
3,000–4,999	501	858		457	
5,000 and over ..	196	470	321	343	60
Total	11,635	35,691	44,956	20,258	10,469

VICTORIA—HOLDINGS CLASSIFIED ACCORDING TO TYPE OF ACTIVITY: NUMBER AND TOTAL AREA OF HOLDINGS AND AREA USED FOR VARIOUS PURPOSES, 1959–60

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 ..	6,092	8,334,036	857	1,959,402	1,127,595	1,039,230	4,206,952
Sheep	16,622	16,546,417	996	735,512	223,135	5,383,597	10,203,177
Cereal Grain	2,370	2,496,198	74	966,888	598,859	82,153	848,224
Beef Cattle	1,887	2,462,716	174	46,235	9,862	359,760	2,046,685
Dairying	20,097	4,190,352	2,324	509,283	52,149	1,904,901	1,721,695
Vineyards	2,159	77,960	45,176	1,493	1,410	2,593	27,288
Fruit (Other than Vine) ..	2,109	154,894	53,719	4,688	1,990	18,887	75,610
Vegetables—							
Potatoes	1,030	156,331	130	49,977	4,866	44,673	56,685
Other and Mixed ..	1,688	145,125	3,632	43,662	5,249	33,121	59,461
Poultry	1,333	97,854	943	10,116	5,651	16,009	65,135
Pigs	246	28,040	109	1,925	1,434	5,703	18,869
Tobacco	212	29,626	81	7,281	71	6,421	15,772
Other	486	51,187	448	14,230	2,655	9,969	23,885
Multi-Purpose	2,139	1,271,362	2,267	191,875	71,117	304,046	702,057
Total Classified Holdings	58,470	36,042,098	110,930	4,542,567	2,106,043	9,211,063	20,071,495
Unclassified Holdings—							
Sub-Commercial ..	6,821	656,874	1,069	19,664	31,040	89,804	515,297
Unused, Special, &c. ..	4,487	1,037,558	4,122	14,386	43,183	106,184	869,683
Total All Holdings ..	69,778	37,736,530	116,121	4,576,617	2,180,266	9,407,051	21,456,475

Artificial Fertilizers

In 1962–63 artificial fertilizers were used on 3,099,735 acres of wheat; 1,066,775 acres of other cereal crops; 81,085 acres of vegetables; 87,124 acres of orchards; 194,842 acres of other crops; and 9,940,017 acres of pastures. Superphosphate is the main fertilizer used on both crops and pastures and in 1962–63 amounted to 184,609 tons or 81 per cent. of the total artificial fertilizer used on all crops and 561,832 tons or 94 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 1958–59 to 1962–63 :—

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
1958–59 ..	*	4,580	229	40,452	8,925	502
1959–60 ..	40,460	4,079	217	38,327	9,153	523
1960–61 ..	31,774	4,129	199	40,561	9,408	546
1961–62 ..	32,965	4,193	211	40,166	9,661	567
1962–63 ..	32,028	4,530	227	40,144	9,940	596

* Not available.

Aerial Agriculture

The aerial agriculture industry in Victoria has grown rapidly and aircraft are now extensively used for topdressing and 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 agriculture is the dropping of young fish into Victorian lakes and streams.

Since 1956–57, statistical information has been collected by the Department of Civil Aviation and details for each of the years 1958–59 to 1962–63 are shown in the following table :—

VICTORIA—AERIAL AGRICULTURE

Particulars	Unit	Year Ended 31st March—				
		1959	1960	1961	1962	1963
Total Area Treated * † ..	acres	505,805	616,531	806,592	972,269	923,776
Topdressed or Seeded ..	acres	253,489	372,597	580,169	676,219	659,975
Sprayed or Dusted	acres	155,256	134,561	196,297	231,098	206,711
Materials Used—						
Superphosphate ..	cwt.	317,900	459,520	749,020	877,200	888,060
Seed	lb.	8,320	24,000	1,624	5,135	2,128
Aircraft Utilization (Flying Time) ..	hours	6,523	6,622	9,598	8,545	8,238

* Areas treated with more than one type of material in one operation are counted once only.

† Includes 109,373 acres baited for rabbit destruction in 1960, 29,981 acres in 1961, 64,952 acres in 1962, and 57,090 acres in 1963 ; 345 acres treated for mosquito eradication in 1961 ; 290 acres for fly eradication in 1962, and 1012 acres for insect eradication in 1963.

Farm Machinery

The numbers of the principal items of farm machinery on rural holdings at the 31st of March during each of the past five years are given in the table below :—

VICTORIA—FARM MACHINERY ON RURAL HOLDINGS

Particulars	Number at 31st March—				
	1959	1960	1961	1962	1963
Milking Machines—Units ..	85,608	89,657	92,315	95,661	97,372
Shearing Machines—Stands ..	35,951	37,015	37,926	38,758	39,162
Tractors—Wheeled Type ..	57,818	59,438	62,730	65,487	66,479
—Crawler Type	1,684	1,730	1,807	1,931	1,936
Rotary Hoes	9,429	9,180	9,284	9,777	9,899
Fertilizer Distributors and Broadcasters	27,290	27,948	29,035	29,349	29,188
Grain Drills—Combine	19,428	18,517	18,749	19,016	19,155
—Other	8,525	9,531	9,501	9,709	†
Maize Planters	1,020	998	*	*	*
Headers, Strippers and Harvesters	13,507	14,216	13,888	14,065	14,646
Pick-up Balers	7,073	8,040	8,968	9,282	10,107
Stationary Hay Presses	2,518	2,465	2,584	2,213	*

* Not collected. † Not available for publication.

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

MECHANIZATION OF FARMING

Year Book 1962 (*493–495*).

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 1955 and the actual area for each of the following eight seasons 1956 to 1963 :—

VICTORIA—ACREAGE CULTIVATED ANNUALLY

Period or Year (Ended March)	Annual Average Area in Each Decennium, 1856–1955, and Actual Area Each Year 1956–1963, 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	4,542,096	1,982,742	6,524,838
1957	3,637,352	1,879,812	5,517,164
1958	4,051,249	1,644,764	5,696,013
1959	4,790,989	2,187,212	6,978,201
1960	4,482,757	2,180,266	6,663,023
1961	4,504,732	2,217,789	6,722,521
1962	4,532,686	2,286,771	6,819,457
1963	5,036,686	2,521,355	7,558,041

* Until 1960 the area of crop included pasture cut for hay and seed. From 1961 onwards. area of pasture cut for hay and seed is included under pasture.

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 1962–63 :—

VICTORIA—AREA, YIELD, AND GROSS VALUE OF CROPS, 1962–63

Crop	Area	Yield	Gross Value*
	acres		£
Cereals for Grain—			
Barley—			
2 row	180,275	5,128,758 bushels	2,494,927
6 row	14,021	339,526 bushels	159,860
Maize	3,634	216,164 bushels	143,184
Oats	932,168	27,042,057 bushels	9,205,566
Rye	17,551	114,639 bushels	85,278
Wheat	3,124,790	67,899,180 bushels	49,454,878
Hay—			
Barley and Rye	9,119	13,785 tons	106,770
Lucerne	75,897	157,353 tons	1,150,600
Meadow	910,999	1,733,511 tons	16,673,729
Oaten	217,328	406,974 tons	3,949,899
Wheaten	37,139	64,755 tons	552,768
Green Fodder	130,429	..	1,206,734
Dun and Other Field Peas	15,143	328,736 bushels	206,080
Grass and Clover Seed	23,183	34,622 cwt.	427,114
Industrial Crops—			
Broom Millet	583	2,985 cwt. fibre 1,601 cwt. seed	31,343 2,642
Linseed	25,232	327,216 bushels	572,628
Hops	547	8,079 cwt.	355,325
Mustard	903	5,999 cwt.	37,813
Tobacco	9,844	84,351 cwt.	5,104,543
Vegetables—			
Onions	4,634	26,175 tons	694,866
Potatoes	43,024	254,473 tons	3,306,326
Other	40,017	204,569 tons	8,134,329
Stock Fodder—			
Pumpkins	408	..	17,340
Turnips, Beet, &c.	25,252	..	593,422
Vineyards—			
Grapes—			
Table	2,168	7,573 tons	366,533
Wine	4,798	13,294 tons	262,661
Drying	35,768	192,669 tons producing—	
		39,321 tons of sultanas	5,758,055
		4,738 tons of raisins	665,038
		2,537 tons of currants	401,053
Vines, Unproductive	2,928	..	..
Orchards—			
Productive	55,243	..	11,772,650
Unproductive	20,612	..	..
All Other Crops	7,231	..	2,840,430
Total Crops	5,970,868	..	126,734,384

* The gross value is based on the wholesale price realized 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 the principal markets.

The following table shows the numbers of growers of certain primary products, in each statistical district of the State, for the season 1962–63.

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 1962–63

Crops Grown	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Grain Crops—									
Wheat ..	668	409	900	4,003	2,799	3,731	532	61	13,103
Oats ..	731	588	2,138	3,061	1,552	2,873	814	42	11,799
Barley ..	579	91	395	577	714	768	114	83	3,321
Maize ..	9	..	1	..	..	2	55	186	253
Green Fodder—									
Maize ..	860	71	316	7	4	34	69	1,302	2,663
All Other ..	1,168	461	1,711	57	68	424	537	1,375	5,801
Other—									
Potatoes ..	1,795	534	603	15	18	20	179	578	3,742
Onions ..	326	2	266	8	17	4	1	8	632
Other Vegetables	1,414	27	294	46	329	529	32	106	2,777
Orchards ..	1,824	162	77	123	1,338	1,045	156	82	4,807
Vineyards ..	2	2	..	7	2,386	126	24	..	2,547
Grass and Clover Seed	30	59	134	23	9	50	123	7	435
Tobacco ..	..	..	..	..	..	61	314	..	375*

* Excluding share-farmers.

A summary of the area under cultivation in each statistical district of the State for the season 1962–63 is given in the following table :—

VICTORIA—AREA UNDER CULTIVATION, SEASON 1962–63

(Acres)

Crop	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Grain Crops—									
Wheat ..	46,363	28,688	76,002	915,790	1,389,527	608,909	55,953	3,558	3,124,790
Oats ..	32,787	24,271	145,372	256,614	227,972	215,538	28,153	1,461	932,168
Barley ..	37,510	2,243	13,287	31,869	66,505	36,112	3,594	3,176	194,296
Maize ..	51	..	1	..	..	4	503	3,075	3,634
Field Peas ..	8,746	269	5,321	304	105	22	119	257	15,143
All Hay ..	186,814	68,339	338,543	131,906	32,732	247,815	89,810	154,523	1,250,482
Green Fodder ..	26,152	9,462	44,582	1,448	2,917	8,920	9,126	27,449	130,056
Grass and Clover for Seed ..	1,573	3,046	8,357	1,415	945	2,314	5,382	151	23,183
Tobacco ..	..	..	..	..	..	1,199	8,645	..	9,844
Potatoes ..	22,647	7,298	6,129	50	114	85	1,054	5,647	43,024
Onions ..	1,768	..	2,654	9	78	10	..	115	4,634
All Other Vegetables ..	20,620	92	10,532	158	2,777	4,059	160	1,619	40,017
Vines ..	4	60	..	719	42,744	773	1,362	..	45,662
Orchards ..	24,880	2,676	649	3,912	8,089	33,388	1,724	537	75,855
All Other Crops	12,217	862	32,165	509	17,523	2,763	2,543	9,498	78,080
Total Area under Crop ..	422,132	147,306	683,594	1,344,703	1,792,028	1,161,911	208,128	211,066	5,970,868
Land in Fallow	52,551	19,505	45,531	804,079	1,177,357	385,470	10,328	26,534	2,521,355
Total Area under Cultivation ..	474,683	166,811	729,125	2,148,782	2,969,385	1,547,381	218,456	237,600	8,492,223

The following table shows the yields, in statistical districts, of the principal crops for the season 1962–63 :—

VICTORIA—YIELDS OF PRINCIPAL CROPS, SEASON 1962–63

Crop	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Grain Crops—									
Wheat bush.	1,410,440	739,832	2,448,681	21,277,153	24,687,837	15,400,479	1,829,612	105,146	67,899,180
Oats ,,	1,342,984	830,691	6,941,657	6,975,412	3,330,596	6,603,351	986,603	30,763	27,042,057
Barley ,,	1,585,335	63,051	508,795	830,289	1,169,921	1,115,791	105,861	89,241	5,468,284
Maize ,,	1,410	..	..	..	..	90	18,376	196,288	216,164
Field Peas ,,	192,157	3,636	119,223	5,915	1,748	552	998	4,507	328,736
All Hay tons	384,070	135,110	682,266	209,552	40,528	427,390	185,782	311,680	2,376,378
Grass and Clover for Seed cwt.	1,914	5,118	13,785	1,193	1,351	2,511	8,631	119	34,622
Tobacco ,,	..	..	..	..	..	9,388	74,963	..	84,351
Potatoes tons	131,384	45,610	35,685	176	707	360	4,181	36,370	254,473
Onions ,,	9,865	..	15,282	38	389	25	..	576	26,175
Wine Made gall.	*	*	*	*	*	*	*	*	2,433,269
Dried Vine Fruits—									
Raisins tons	..	..	..	..	4,733	6	..	..	4,739
Sultanas ,,	..	..	..	..	39,316	5	..	..	39,321
Currants ,,	..	..	..	..	2,530	6	..	..	2,536

* 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 for all main crops grown in the State including those mentioned above.

Wheat

The acreage sown to wheat in recent years has increased to approximately 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 one per cent. being cut for hay. The average annual production for the five years ended 1962–63 was about 55 mill. bush., of which about 70 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 93 per cent. of the crop is grown. The average rainfall in these Districts varies from 10 inches in the extreme north-west of the State to about 20–22 inches at the eastern and southern margins of the main wheat belt. 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 stem rust and foot rots. Ball smut is effectively controlled by pickling, which is done at the same time as the wheat 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 crops, and pastures. The use of subterranean clover and medic leys has greatly improved soil fertility, with resultant benefit to wheat yields and quality. These changes have been described in the Victorian Year Book 1963, pages 517 to 519. Sheep grazed on these, and on native pastures, contribute materially to the State's wool and fat lamb production, especially to the production of early fat lambs.

Wheat is grown on three major soil types :—(1) Mallee soils referred to as solonized 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.

The 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 attention is being given to this in the eastern Mallee. Substantial improvement in wheat quality has been achieved by plant breeding during the past 30 years, and several of the soft wheats available reach the medium-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 whole of the crop is marketed through the Australian Wheat Board. Victorian wheat is marketed in one grade known as f.a.q. (fair average quality).

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, 212 country receiving elevators and a shipping terminal have been constructed, the necessary finance being obtained from loans totalling £7,472,597. Repayment of the principal and interest are guaranteed by the Victorian Government.

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

The Board's Geelong Terminal is the most modern and the largest single wheat shipping terminal in the world. Its operation is by push-button remote control with operational indicator lights appearing on a diagram panel of the whole terminal. Wheat can be received from rail trucks at the rate of 1,200 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 86 million bushels of wheat. The largest quantity of wheat delivered to railway stations by Victorian growers in any one season prior to the 1963–64 season was 65,300,852 bushels in 1962–63. A new record was established during the 1963–64 season when 76,051,000 bushels were delivered.

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 31st October—				
	1959	1960	1961	1962	1963
REVENUE					
Australian Wheat Board—Operating and Maintenance Expenses ..	478	513	704	694	742
Australian Wheat Board—Capital Facilities Allowance	342	350	370	376	465
Interest on Investments	63	90	103	154	170
Other	1	1	..	1	..
Total Revenue	884	954	1,177	1,225	1,377
EXPENDITURE					
Operating and Maintenance Expenses	281	291	462	431	445
Administration Expenses ..	101	107	128	135	135
Depreciation and Renewals ..	96	114	114	128	162
Interest on Loans	178	188	207	267	341
Sinking Fund Charges	32	34	42	50	64
Appropriations to Reserves ..	131	252*	164	206	270
Other	7	7	6	6	..
Total Expenditure ..	826	993	1,123	1,223	1,417
Net Surplus	58	−39	54	2	−40
Fixed Assets (At 31st October) ..	4,229	4,429	4,663	5,628	7,262
Loan Indebtedness (At 31st October)—					
State Government	946	935	924	913	902
Public	2,838	3,195	3,895	4,667	6,096

* Including £100,000 appropriated from profits accumulated in previous years.

Australian Wheat Board

The Australian Wheat Board, which is the sole marketing authority for Australian wheat, consists of a Chairman and four other Commonwealth Government appointees, and ten members who are representatives of wheat growers in the five main wheat-growing States, each such State being represented by two members.

The Stabilization Plan ending with the 1962–63 season provided for a guaranteed price to growers on up to 100 mill. bushels of exports from each season's wheat. The guaranteed price for 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 Stabilization Act and, for the season 1962–63, it was fixed at 15s. 10d. per bushel. Under the Stabilization Plan for the following five seasons, the quantity covered by the guarantee has been increased to up to 150 mill. bush., while the cost of production, and thus the guaranteed price for the first season (1963–64), has been reduced to 14s. 5d. per bushel.

Total deliveries by wheat growers to the Victorian Branch of the Australian Wheat Board during season 1962–63 were 67,214,000 bushels, including 3,256,576 bushels delivered to Victorian controlled receival points in southern New South Wales. During the growing period, the State received normal rainfalls. Rain, accompanied by humid conditions extended for about a week in late December/early January, and harvesting had just resumed when a second rain fell on 14th January, 1963, followed a fortnight later with very heavy falls, particularly in the areas where harvesting had not been completed. These late rains adversely affected the quality of the grain still to be stripped, with the result that a substantial quantity had to be received as under-grade and marketed separately from the f.a.q. or standard grade wheat. The average yield per acre for this season was 21 bushels.

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 farmers engaged in 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 1958–59 to 1962–63 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 bushels	bushels	£'000	lb.
1958–59 ..	9,074	1,810	42,697	23·59	28,274	64
1959–60 ..	10,561	2,261	38,793	17·16	26,743	62½
1960–61 ..	10,625	2,672	67,587	25·30†	45,855	64¾
1961–62 ..	11,648	2,849	56,878	19·97	42,697	64
1962–63 ..	12,166	3,125	67,899*	21·73	49,455	65½

* Record production. † Record yield per acre.

Wheat Breeding

The objective of wheat breeding in Victoria is to produce new varieties which will give higher yields of better quality grain than existing varieties.

Included in the yield objective is the reduction of losses due to disease and drought. The breeding work is a function of the Victorian Department of Agriculture, which has special sections to undertake plant breeding, field testing, and quality evaluation. The plant breeding activities of the Department are centred on the State Research Farm at Werribee, with 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. The number of centres for varietal testing in Victoria is nearly 40. Disease testing is carried out at research stations and at the Plant Research laboratories at Burnley. Quality evaluation, including test baking using samples grown in all districts of the State, is undertaken at the Department's Cereal Laboratories in Melbourne.

The wheat breeding work of the Department has been very successful. In about 50 years, 40 new wheats 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). Ninety-five per cent. of the wheat acreage in Victoria is sown to varieties bred by the Department. The variety Insignia was the most popular wheat in Australia in the 1962–63 season. Since 1930, the baking quality of Victorian wheat has improved markedly.

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

The following table shows the areas under the principal varieties of wheat, including wheat for hay, for the seasons 1960–61, 1961–62, and 1962–63. Varieties are tabulated in order of popularity for the last mentioned season.

VICTORIA—PRINCIPAL VARIETIES OF WHEAT SOWN

Variety (in Order of Popularity), Season 1962–63	1960–61		1961–62		1962–63	
	Acres Sown	Percentage of Total Area Sown	Acres Sown	Percentage of Total Area Sown	Acres Sown	Percentage of Total Area Sown
Insignia ..	1,325,742	48·95	1,357,440	47·13	1,516,564	47·96
Pinnacle ..	582,312	21·50	683,027	23·72	764,009	24·16
Olympic ..	384,599	14·21	482,194	16·74	503,082	15·91
Sherpa ..	135,351	4·99	107,724	3·74	101,022	3·20
Insignia 49 ..	91,036	3·37	71,235	2·47	80,529	2·54
Quadrat ..	94,646	3·49	78,494	2·73	58,727	1·86
Heron ..	398	0·02	7,743	0·27	32,677	1·03
Beacon ..	14,638	0·54	19,261	0·67	25,879	0·82
Stockade ..	..	..	2,226	0·07	18,106	0·58
Baldmin ..	16,342	0·60	15,099	0·53	13,271	0·41
Sabre ..	11,831	0·44	9,098	0·32	10,488	0·34
All Other Varieties ..	51,136	1·89	46,361	1·61	37,575	1·19
Total ..	2,708,031	100·00	2,879,902	100·00	3,161,929	100·00

Wheat Growing in Conjunction with Livestock Grazed

A table showing the number of holdings in Victoria growing wheat for grain together with sheep, dairy cattle, beef cattle, and pigs as at 31st March, 1960, appears on page 508.

Oats

Oats are the second most widely grown crop in Victoria, and in recent years the area of this cereal has averaged about 1·2 mill. acres. Nearly 70 per cent. of this is harvested for grain, some of it after winter grazing. Although oaten hay was important in the past, only about 17 per cent. of the acreage is now harvested for this purpose, the remainder of the area being used solely for grazing.

As the land on which oats are grown is normally not fallowed or does not receive as good seedbed preparation as that intended for wheat, oat production shows greater fluctuations than does wheat production. This seasonal variability is particularly marked in the northern parts of the State. The average annual grain production is about 20 mill. bush. (40 lb. per bushel), ranging in the last ten years from 9·5 mill. bush. in 1957–58 to 27 mill. bush. in 1962–63.

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. The proportion of oats purchased in the milling grades is approximately 10 per cent. of the oats marketed. Milling grades usually command a premium of 3d. to 1s. 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 Feed" 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.

With the decline in the number of horses throughout the State, there has been a corresponding decline in the area of oats used for hay production, particularly in the main cereal growing districts. However, during the past ten years, the area cut for hay has fluctuated around 200,000 acres. 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 34 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, Ballidu, and Algeribee—is nearly 90 per cent. of the total oat acreage in the State.

The area harvested (season 1962–63) for hay was 217,328 acres, and for grain 932,168 acres, which produced 406,974 tons of hay, and 27,042,057 bushels of grain respectively. The area of oats sown for grazing purposes amounted to 142,685 acres. The following table shows the area, yield, and gross value of oats for grain for each of the five seasons 1958–59 to 1962–63 :—

VICTORIA—OATS FOR GRAIN

Season	Area	Production	Yield per Acre	Gross Value
	'000 acres	'000 bushels	bushels	£'000
1958–59	971	23,339	24·04	6,820
1959–60	673	12,701	18·87	4,797
1960–61	835	20,666	24·75	6,479
1961–62	774	16,312	21·06	5,732
1962–63	932	27,042*	29·01	9,206

* Record production

Barley

The area sown to barley showed a substantial increase during the 1950's—due largely to a keen export demand at that time. Changed markets and the lack of bulk handling facilities have resulted in smaller areas being sown during the past few years. 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. bush. (50 lb. per bushel). Well over 90 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 15 bushels per acre.

The other important area is in southern Victoria between Geelong, Werribee, 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 1961 and 1962, 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 superior to those of the older variety. Yields are considerably higher than those obtained in the north, the average yield being about 30 bushels per acre. This region is close to the main barley shipping terminals, and growers' freight costs are thus considerably lower than in the northern areas.

Until the early 1960's barley was marketed in three-bushel bags. Farmer interest in bulk handling has been keen, and a larger proportion of the crop will be handled in bulk as facilities become available. 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. All the barley is classified on sample before delivery. Classification is, firstly, on varietal type—Chevalier (Prior and similar varieties) and Research (Research, Resibee, Anabee)—and, secondly, on quality—Malting (Nos. 1 and 2), Milling (No. 3), and Feed (Nos. 4 and 5). There are price differentials for each grade.

Practically all the barley of malting quality is malted in Australia for local use or export as malt—principally to Eastern destinations. Most of the milling and feed grades are exported, chiefly to Europe and Eastern Asia.

The following table shows the area, yield, and gross value of barley for each of the five seasons 1958–59 to 1962–63 :—

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 bushels		bushels			£'000
1958–59 ..	343	19	8,174	407	23·80	20·97	23·65	4,165
1959–60 ..	264	14	5,318	274	20·17	19·79	20·15	2,643
1960–61 ..	293	16	7,392	327	25·19	20·66	24·95	3,316
1961–62 ..	212	13	4,415	239	20·79	18·26	20·64	2,528
1962–63 ..	180	14	5,129	340	28·45	24·22	28·14	2,655

Maize

Maize for grain is cultivated mainly in Gippsland. It is grown in Victoria both for grain and for green fodder. The area, yield, and gross value of maize for each of the five seasons 1958–59 to 1962–63 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				bushels				£
1958–59 ..	7,619	3,135	746	3,881	180,796	22,570	203,366	52·40	136,876
1959–60 ..	9,084	2,981	402	3,383	167,489	12,965	180,454	53·34	131,367
1960–61 ..	11,681	2,742	243	2,985	162,682	8,422	171,104	57·32	136,916
1961–62 ..	15,440	2,999	310	3,309	181,745	10,029	191,774	57·96	123,797
1962–63 ..	15,970	3,138	496	3,634	197,376	18,788	216,164	59·48	143,184

Rye

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

The chief purpose for which rye is grown is the stabilization 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 1958–59 to 1962–63 :—

VICTORIA—RYE PRODUCTION

Season	Area	Production	Yield per Acre	Gross Value
	acres	bushels		£
1958–59	27,458	226,320	8·24	114,104
1959–60	22,344	138,438	6·20	88,831
1960–61	22,895	187,659	8·20	117,287
1961–62	17,849	136,725	7·66	92,498
1962–63	17,551	114,639	6·53	85,278

Hay

The pattern of hay production in Victoria has changed considerably in the post-war period. More complete mechanization and the virtual disappearance of the working horse have taken the 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 there has been a marked decline in the amount of cereal hay produced.

On the other hand, there have been spectacular increases in the production of other forms of fodder. The annual production of meadow hay has increased from about 400,000 tons to over 1 mill. tons during this period. There has also been a substantial increase in the amount of lucerne hay conserved. Silage has become an important supplement to hay for stock feeding, and silage produced mainly from pasture growth has increased from about 25,000 tons annually to over 300,000 tons in the post-war period.

This increase in fodder conservation has resulted in more efficient utilization 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.

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

VICTORIA—HAY PRODUCTION, 1962–63

Kind	Area	Production	Yield per Acre
	acres	tons	tons
Wheaten	37,139	64,755	1·74
Oaten	217,328	406,974	1·87
Lucerne	75,897	157,353	2·07
Barley, Rye, &c.	9,119	13,785	1·51
Meadow	910,999	1,733,511	1·90
Total	1,250,482	2,376,378	1·90

The following table shows, in respect of each statistical district of the State, the quantity of ensilage made during the 1962–63 season, and the stocks of ensilage and hay held on rural holdings at the 31st March, 1963 :—

VICTORIA—ENSILAGE MADE AND FARM STOCKS OF ENSILAGE AND HAY

(Tons)

Statistical District	Ensilage Made, 1962–63	Stocks at 31st March, 1963	
		Ensilage	Hay
Central	76,619	67,545	296,558
North-Central	12,220	10,401	105,442
Western	50,692	38,967	561,997
Wimmera	8,264	10,904	216,256
Mallee	812	11,273	58,599
Northern	22,424	23,464	435,666
North-Eastern	36,008	35,374	224,605
Gippsland	88,875	65,512	298,602
Total	295,914	263,440	2,197,725

Potatoes

Victoria is the largest producer of potatoes in Australia, contributing a little more than 40 per cent. of the total annual requirement. The bulk of the Victorian crop is used within the State for human consumption and seed purposes, the surplus being exported to other States to augment local supplies. Potatoes are generally used as a fresh vegetable, but there is increasing interest in processed forms. 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, Otways, and the Gippsland hill country. Harvest commences in April and runs on until October.

Spray irrigation is now common in most districts and has proved 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 mechanized 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 1958–59 to 1962–63 :—

VICTORIA—POTATO PRODUCTION

Season	Area	Production *	Yield per Acre	Gross Value
	acres	tons		£'000
1958–59	46,122	259,346	5·62	5,040
1959–60	48,506	242,548	5·00	5,808
1960–61	38,672	180,819	4·68	9,343
1961–62	36,469	196,032	5·38	6,524
1962–63	43,024	254,473	5·91	3,306

* Includes amounts held on farms for seed, stock feed, &c., as follows :— 42,345 tons in 1958–59 ; 31,951 tons in 1959–60; 23,910 tons in 1960–61 ; 25,506 tons in 1961–62 ; and 32,688 tons in 1962–63.

Onions

The principal onion growing areas are in the Central and Western Districts. In the season 1962–63 these areas were responsible for 96 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 1958–59 to 1962–63 :—

VICTORIA—ONION PRODUCTION

Season	Area	Production	Yield per Acre	Gross Value
	acres	tons		£'000
1958–59	3,971	28,456	7·17	1,062
1959–60	3,994	27,808	6·96	1,012
1960–61	3,532	16,286	4·61	750
1961–62	4,456	23,784	5·34	794
1962–63	4,634	26,175	5·65	695

Linseed

Linseed is the major oil producing crop grown in Victoria. Its commercial production, which began in 1947, has now increased to over 25,000 acres in suitable years, with an output in excess of 300,000 bushels. In wet seasons, however, such as 1960, weather and soil conditions seriously cut the intended acreage.

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 inch. 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. Other factors influencing the expansion of the industry have been the improved technical knowledge available to growers, price stability, and the decline of flax growing.

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 1958–59 to 1962–63 :—

VICTORIA—LINSEED PRODUCTION

Season	Area	Production	Yield per Acre	Gross Value
	acres	bushels		£
1958–59	8,817	110,779	12·56	193,863
1959–60	24,850	295,644	11·90	535,089
1960–61	6,179	39,356	6·37	70,877
1961–62	17,711	243,700	13·76	426,475
1962–63	25,232	327,216	12·97	572,628

Tobacco

Tobacco has been grown in Victoria for over a century. In the earlier part of this period the industry was confined to fertile alluvial flats where growers concentrated on the production of dark air-cured leaf suitable mainly for pipe smoking. A gradual change in consumer preference towards a milder type of leaf saw the introduction of the flue-curing process before 1920, and this was accompanied by a greater concentration of tobacco growing on the lighter and less fertile soils in the north-eastern river valleys. These areas have remained the hard core of the industry to the present day.

The use of domestic leaf is encouraged by a statutory mixing percentage in conjunction with concessional rates of import duty, and at the present high level of usage it is important that only leaf with desirable qualities is produced. Victorian tobacco is used mainly for the manufacture of cigarettes, and it appears that leaf suitable for this purpose can be grown with more certainty in areas with an appreciable summer rainfall and moderate temperature.

As a result, Victorian tobacco growing is concentrated at the present time along the Ovens and King rivers and their tributaries, with small outlying areas in the northern part of the State. Recent trends have shown movement towards expansion of production in the higher parts of these valleys, with a consequential contraction in climatically less favoured areas. The construction of the Buffalo River dam will cause the inundation of several hundred acres of good tobacco land and has eliminated some of the most likely sites for future expansion. In the last few years the Mt. Beauty area in the Upper Kiewa Valley has become established as a reliable producing centre for good quality tobacco, and to a large extent will compensate for the inevitable restriction in the Buffalo River area and other places.

During its history the tobacco growing industry has seen many periods of prosperity interspersed with long intervals of recession. Production has fluctuated accordingly, and it is only in quite recent years that any appearance of stability has been exhibited. Encouraged by these occasional boom periods, sandy soils in various other parts

of the State have been devoted to tobacco production from time to time. These have seldom prospered and generally have not survived for very long. An exception is found at selected centres in the Murray Valley, where a nucleus of experienced growers at Gunbower and Nathalia carry on a small but efficient industry.

Victorian growers are assisted in their efforts to produce more and better tobacco by the Department of Agriculture, which operates a Tobacco Research Station at Ovens and a substation at Gunbower.

The following table shows the area, yield, and gross value of tobacco in each of the five seasons 1958–59 to 1962–63 :—

VICTORIA—TOBACCO PRODUCTION

Season	Area	Production	Yield per Acre	Gross Value
	acres	cwt. (dry)		£'000
1958–59	4,248	43,617	10·27	2,764
1959–60	6,424	66,080	10·29	4,146
1960–61	9,932	86,854	8·74	4,225
1961–62	9,286	58,168	6·26	3,639
1962–63	9,844	84,351	8·57	5,105

FURTHER REFERENCE

Year Book 1963 (*531–533*).

Fruit Industries

Victoria is a major producer of a wide variety of fruit and nearly 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 inches. 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 inches, but the average rainfall in the Goulburn Valley is 19 inches and in the Mallee only 10 inches. 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. (See also pages 498 to 502.)

Because of the high capital expenditure invested in orchard land and equipment and with the keen competition for local and oversea markets, most Victorian growers realize 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 made less frequent cultivation possible. 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 1958–59 to 1962–63 are given in the following table :—

VICTORIA—FRUIT GROWING

Particulars		1958–59	1959–60	1960–61	1961–62	1962–63
Number of Growers		5,065	5,076	4,783	4,700	4,807
Area	acres	66,746	68,657	71,415	72,712	75,855
Gross Value of Fruit Produced	(£'000)	10,328	10,530	12,679	12,678	11,773
Kind of Fruit—						
Apples	bushels	2,969,521	3,005,669	3,134,917	3,045,808	4,059,045
Pears	„	3,279,535	3,582,549	3,704,278	4,605,808	3,848,614
Quinces	„	31,431	19,595	20,563	32,564	22,017
Apricots	„	291,547	468,055	206,521	631,810	535,235
Cherries	„	97,872	101,189	90,297	137,494	116,920
Nectarines	„	18,770	18,896	14,981	16,940	20,713
Peaches	„	1,033,712	1,210,021	955,224	1,686,496	1,811,799
Plums	„	139,579	156,940	106,833	184,723	141,953
Prunes	„	20,540	26,594	23,853	24,383	24,346
Lemons	„	162,616	156,217	199,535	150,738	212,693
Oranges—						
Navels	„	410,086	447,817	343,659	399,168	531,249
Valencias	„	385,228	538,710	314,730	543,832	586,991
Other Oranges	„	34,801	42,184	31,024	42,167	45,495
Mandarins	„	24,180	20,081	27,095	27,824	41,297
Grapefruit	„	66,894	67,214	69,844	80,902	97,217
Figs	„	4,660	3,218	2,273	2,349	2,264
Passion-fruit	„	4,800	2,197	2,680	2,288	3,601
Olives	„	12,281	11,741	23,425	13,178	14,845
Gooseberries	cwt.	953	1,172	703	775	865
Loganberries	„	2,458	2,462	2,144	1,787	1,684
Raspberries	„	2,486	2,862	2,616	2,936	2,848
Strawberries	„	7,739	6,692	6,531	10,712	15,172
Youngberries	„	3,383	3,833	4,172	4,649	4,891
Other Berries	„	*	1,505	625	679	964
Almonds	lb.	92,838	115,444	74,900	141,819	64,599
Filberts	„	6,615	6,590	7,244	15,510	6,608
Walnuts	„	139,660	149,136	148,357	135,254	146,020

* Not collected.

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 531–532.

VICTORIA—DRIED TREE-FRUITS

(lb.)

Year Ended 31st March—	Apricots	Peaches	Pears	Prunes	Others	Total
1959	72,807	5,122	6,824	355,072	1,183	441,008
1960	38,067	5,417	3,505	460,806	2,429	510,224
1961	33,820	4,510	2,290	368,731	626	409,977
1962	17,844	..	3,925	397,841	620	420,230
1963	31,421	2,278	4,652	590,323	1,988	630,662

Information on the number of trees of each variety is collected triennially, the latest figures available are for the season 1961–62. The extent of cultivation of each important class of fruit and nuts on holdings of 1 acre and upwards during the seasons 1958–59 and 1961–62 is shown in the following table :—

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

Fruit and Nuts	Number of Trees, Plants, &c.					
	1958–59			1961–62		
	Bearing	Not Bearing	Total	Bearing	Not Bearing	Total
Apples	1,498,638	511,163	2,009,801	1,531,839	664,194	2,196,033
Pears	1,124,220	376,722	1,500,942	1,189,246	548,139	1,737,385
Quinces	21,402	922	22,324	13,099	481	13,580
Plums	146,136	38,127	184,263	137,450	48,047	185,497
Prunes	25,332	6,385	31,717	26,990	8,575	35,565
Cherries	117,292	48,813	166,105	117,078	65,327	182,405
Peaches	540,124	607,039	1,147,163	842,117	634,192	1,476,309
Apricots	312,979	89,970	402,949	317,157	68,495	385,652
Nectarines	18,103	5,296	23,399	13,252	12,219	25,471
Oranges—						
Navels	166,147	24,729	190,876	175,563	60,572	236,135
Valencias	190,266	60,475	250,741	208,758	89,498	298,256
Other Oranges ..	16,137	1,620	17,757	18,904	2,874	21,778
Mandarins	9,252	9,676	18,928	13,049	23,144	36,193
Grapefruit	22,917	1,541	24,458	21,898	4,663	26,561
Lemons and Limes ..	89,869	14,704	104,573	80,162	27,326	107,488
Figs	5,840	983	6,823	3,402	1,294	4,696
Raspberries	247,970	60,001	307,971	223,000	32,250	255,250
Loganberries	138,129	19,001	157,130	49,890	1,395	51,285
Strawberries	6,972,270	405,759	7,378,029	6,877,500	686,250	7,563,750
Gooseberries	51,762	8,480	60,242	40,500	9,000	49,500
Youngberries	127,304	21,600	148,904	79,489	9,532	89,021
Other Berries	45,906	12,610	58,516	19,737	2,127	21,864
Olives	60,351	56,568	116,919	73,931	53,660	127,591
Passion-fruit	15,950	8,085	24,035	9,011	3,657	12,668
Almonds	26,496	4,576	31,072	23,568	3,247	26,815
Walnuts	6,549	2,094	8,643	6,134	1,054	7,188
Filberts	3,725	458	4,183	5,592	120	5,712

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 1961–62 :—

VICTORIA—NUMBER OF FRUIT TREES, PLANTS, ETC., SEASON 1961–62

Particulars		Statistical District								
		Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	Total
Growers ..	No.	1,821	157	91	129	1,273	1,030	136	63	4,700
Area	acres	23,564	2,617	685	3,922	7,455	32,402	1,613	454	72,712
Apples ..	trees	1,567,287	189,503	59,602	18,913	17,484	219,060	90,102	34,082	2,196,033
Pears	,,	244,416	73,072	1,103	8,431	3,893	1,403,147	1,009	2,314	1,737,385
Peaches ..	,,	234,479	2,421	386	19,142	35,609	1,180,828	2,000	1,444	1,476,309
Apricots ..	,,	45,124	634	1,023	13,915	61,937	261,611	672	736	385,652
Plums	,,	88,295	5,482	825	3,275	23,519	61,492	1,956	653	185,497
Prunes ..	,,	1,629	2	863	14,908	10,238	7,889	22	14	35,565
Cherries ..	,,	153,147	5,066	50	1,312	477	13,934	6,960	1,459	182,405
Quinces ..	,,	7,272	260	65	612	525	4,778	23	45	13,580
Nectarines ..	,,	12,291	90	84	208	8,197	4,059	310	232	25,471
Figs	,,	1,231	8	31	310	370	2,224	513	9	4,696
Olives	,,	335	..	2	103,280	21,002	1,656	1,316	..	127,591
Oranges ..	,,	807	2	3	148	415,759	137,616	1,817	17	556,169
Mandarins ..	,,	11	..	..	6	33,801	2,329	46	..	36,193
Grapefruit ..	,,	404	..	3	25	19,376	6,563	187	3	26,561
Lemons and Limes	,,	70,478	68	19	217	15,154	21,301	166	85	107,488
Passion-fruit ..	vines	3,275	..	41	27	1,036	1,449	6,138	702	12,668
Strawberries ..	plants	7,485,000	3,750	3,750	3,750	33,750	3,750	22,500	7,500	7,563,750
Raspberries ..	bushes	252,750	500	..	..	2,000	..	..	..	255,250
Loganberries ..	,,	51,085	..	..	200	..	..	..	..	51,285
Gooseberries ..	,,	45,900	1,200	..	2,400	..	..	..	..	49,500
Youngberries ..	,,	88,867	..	..	..	..	154	..	..	89,021
Other Berries ..	,,	21,864	..	..	..	..	..	..	..	21,864
Almonds ..	trees	626	30	13	2,032	11,094	7,054	5,937	29	26,815
Walnuts ..	,,	308	41	15	63	625	207	5,135	794	7,188
Filberts ..	,,	135	..	..	..	112	..	5,461	4	5,712

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 1962–63 amounted to 39,321 tons of sultanas, 2,536 tons of currants, and 4,739 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 specialized 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 area around Rutherglen is gradually declining, increasing quantities of grapes for winemaking are produced in the River Murray Irrigation districts. In 1962–63, 2·4 mill. gall. of wine were produced.

GRAPES FOR WINE

Year Book 1964 (*573–574*).

Particulars of vine production for the five seasons 1958–59 to 1962–63 are given in the following table :—

VICTORIA—VINE-FRUIT PRODUCTION

Season	Number of Growers	Area		Production				
						Dried Fruits		
		Bearing	Not Bearing	Grapes Gathered	Wine Made	Raisins	Sultanas	Currants
		acres		'000 cwt.	'000 gall.	cwt.		
1958–59 ..	2,494	42,482	2,319	5,041	2,354	116,252	937,878	95,517
1959–60 ..	2,505	42,244	1,885	4,229	2,147	122,258	773,035	66,615
1960–61 ..	2,524	42,688	1,961	5,017	3,021	105,552	914,492	111,660
1961–62 ..	2,526	42,540	2,565	5,902	3,605	122,730	1,174,494	54,290
1962–63 ..	2,547	42,734	2,928	4,271	2,433	94,777	786,410	50,728

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 £10 mill. each year to Victoria are harvested from about 40,000 acres.

Over half the area under vegetables is situated close to 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 inches. Vegetables are grown on a wide variety of soils (sand, sandy loam, clay loam, peat, and volcanic). Many market gardeners use irrigation from town water supplies, storage catchments, streams, and dams to supplement summer rains.

North of the Dividing Range the summer is longer and hotter, but winter frosts are more frequent. Many areas along the Murray are ideal for growing early spring crops. In many instances intercropping in orchards and vineyards is practised. Efficient transport enables the shipping of the products to both the Melbourne and the Sydney markets. In the Goulburn Valley and around Bendigo tomato production for processing is concentrated. The greatest part of the Victorian crop, which is almost half of the total Australian production, comes from this area.

Returns from market gardening can fluctuate greatly depending on weather and market conditions and production methods have to be highly efficient. Besides using the dwindling supplies of animal manure, a large amount of artificial fertilizer is used (6–12 cwt. per acre). There is an increasing tendency towards mechanization (spraying units for pest and weed control, vining units for harvesting of peas and beans). While most crops reach the consumers as fresh vegetables, a considerable amount is processed. The value of canned, bottled, and pickled vegetables (including tomato soup) was just over £5 mill. in 1962–63.

Details of the area, production, and gross value of vegetables are given in the table below for all the more important types, except potatoes and onions which are shown under separate headings on pages 525–526 :—

VICTORIA—VEGETABLES FOR HUMAN CONSUMPTION, 1962–63

Type	Area Sown	Production	Gross Value
	acres	tons	£'000
Carrots	1,805	22,422	1,237
Parsnips	634	6,543	368
Beetroot	436	3,982	243
Tomatoes	4,124	53,453	1,597
French Beans	2,892	5,069	436
Green Peas—			
Sold in Pod	7,700	9,432	581
Canning	8,465	13,418*	209
Cabbages	1,898	24,678	465
Cauliflowers	2,948	33,812	820
Brussels Sprouts	787	2,577	271
Lettuce	2,539	8,332	886
Pumpkins	2,046	11,413	249
Other Vegetables	3,743	16,818	772
Total	40,017	211,949	8,134

* Pod equivalent

Minor Crops

There are other crops cultivated in Victoria in addition to those enumerated on pages 512 to 514. The most important of these are nursery products, cut flowers, Japanese millet, sunflowers, agricultural seeds, vegetable seeds, and flax.

Pastoral and Dairying

Progress of Stock Breeding in Victoria

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 discovery.

According to early statistical records, there were 26,000 sheep, 100 cattle, and 57 horses in the Colony on the 25th May, 1836. On the 1st 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 1st 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 1951 and the number of livestock on rural holdings for each of the five years 1959 to 1963. 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 31st 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 1st 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 31st March ..	186	1,489	727	20,012	237
1959 „ „ ..	73	1,637	989	26,871	249
1960 „ „ ..	68	1,652	937	26,542	280
1961 „ „ ..	64	1,717	1,147	26,620	319
1962 „ „ ..	62	1,824	1,332	27,533	325
1963 „ „ ..	58	1,858	1,367	27,472	298

* Separate figures for beef and dairy cattle are not available for years prior to 1942–43.

A table showing the sizes of holdings and the numbers of holdings depasturing stock at March, 1960, appears on page 508. Dot maps showing the distribution of livestock on rural holdings in Victoria at 31st March, 1962, appear on pages 577 to 580 of the Victorian Year Book 1964.

Changing Patterns in Animal Husbandry

Year Book 1963 (*539–541*).

The following table contains particulars of livestock in each statistical district of the State at 31st March, 1963 :—

VICTORIA—DISTRIBUTION OF LIVESTOCK, MARCH, 1963

('000)

Particulars	Statistical District								
	Central	North-Central	West-ern	Wim-mera	Mallee	North-ern	North-East-ern	Gipps-land	Tota
Horses	13	4	13	3	2	8	7	8	58
Dairy Cattle—									
Cows in Milk or Dry	186	24	266	18	17	226	92	320	1,149
Springing Heifers ..	18	3	36	3	2	28	19	36	145
Other Heifers for Dairying ..	40	5	56	4	4	47	14	55	225
Calves, under 1 Year—									
Heifer	37	6	58	5	5	62	22	69	264
Other	5	2	6	3	2	6	4	4	32
Bulls, 1 Year and over	7	1	10	2	1	8	3	11	43
Total Dairy Cattle..	293	41	432	35	31	377	154	495	1,858
Beef Cattle—									
Cows	98	38	202	19	11	64	116	117	665
Calves, under 1 Year	56	24	114	13	9	52	76	80	424
Bulls, 1 Year and over	4	2	9	1	1	3	5	5	30
Other	34	16	56	6	4	32	47	53	248
Total Beef Cattle ..	192	80	381	39	25	151	244	255	1,367
Total All Cattle ..	485	121	813	74	56	528	398	750	3,225
Pigs	53	9	29	11	16	89	32	59	298
Sheep	2,345	2,199	9,748	4,233	1,581	3,907	1,928	1,531	27,472

Fodder Conservation

The practice of fodder conservation is an essential part of livestock production because pastures do not provide a full ration for grazing animals throughout the year. Dry summers and cold or wet winters cause regular periods of pasture shortage, which may become much more serious if, for instance, rains fail to arrive at the expected time. These feed shortages must be provided for by fodder conservation and feeding.

Fodder conservation is probably the most important single farm practice in making effective use of pastures and achieving stable livestock production. It provides the only effective way of meeting the risk of drought.

Fodder conservation refers mainly to the conservation of hay, particularly pasture or meadow hay. Much cereal hay is also made, especially when large areas of oats are sown in a poor season. On the whole, however, the prominence of cereal hay has declined with the decline in horse numbers, and pasture hay has largely taken its place. Oaten grain is another important conserved fodder. Silage, in spite of recent spectacular increases, is still a relatively minor fodder, but of great value in many circumstances. Lucerne hay is the other main fodder.

Until season 1950–51, cereal hay was of major importance although production of pasture or meadow hay was increasing rapidly. In that season, 433,000 tons of pasture hay were produced, representing 48 per cent. of the total production of hay. By season 1962–63, the production of pasture hay had risen to 1,734,000 tons or 73 per cent. of the total. This expansion has been associated with the general improvement of pastures, and with developments in mechanization, which have also stimulated the upsurge of interest in silage.

Most hay in Victoria is made with the mower, side-delivery rake, and pick-up baler. About one in eight farms now has a baler. After mowing, the hay crop dries for a time in the swath, and is then raked before drying is completed in the windrow before baling. Some farmers have developed systems of loose hay handling based on simple, low-cost equipment, especially where short-term storage of hay is involved for early feeding needs.

Most silage is made in open stacks using the mower and buckrake. This is simple and cheap, but wastage is high. The flail-type forage harvester has also become popular because of its simple cutting action and relative cheapness. It consists of swinging knives (rotating at high speed on a horizontal shaft) which cut the crop by impact and throw or blow it into an accompanying trailer or truck for transport to storage.

Although the contribution of mechanization to increased fodder conservation has been noteworthy, there is still great potential, since less than 10 per cent. of improved pastures are cut for hay. Far more is often cut on individual intensively run and highly productive farms.

Fodder conservation has stimulated the productivity of Victorian farms, and promoted their stability in dry years, but there is still a great challenge in the years ahead. As the success of fodder conservation on the farm is largely dependent on effective mechanization, the challenge is one for machine and farmer alike.

Further References

Year Book 1964 (*565–566, 581*) ; Year Book 1963 (*543–545*).

Dairying Industry

Though faced with the long-term prospect of expanding local markets, both for liquid milk and for dairy products, as the population of this country increases, the Australian dairying industry at present experiences varying fortunes according to the demand in oversea markets and the supply from other countries. In Victoria, however, the demand for good dairying land remains keen.

There is some tendency to sustain competitive land prices by increasing the output of milk or butterfat up to the point at which the farm business gives a satisfactory return. Until the middle of the 1930's, 30-cow hand-milked herds were common, and three milkers were usually needed to milk a herd of this size. In the next decade the introduction of milking machines made it possible for two

people to milk 30 to 40 cows. In the late 1940's, dairy farmers in large numbers gave up hand-stripping after machines and one man could then comfortably milk 40 to 45 cows. Doubling up of machine units also made the task easier. In the past four years the introduction of the herringbone-type milking shed has made it possible for one man to milk up to 60 cows and for two men to milk 80 or more.

Pasture improvement has been the basis of the increased carrying capacity of many farms. In some places potash fertilizers and trace elements have played their part; in others, the use of more superphosphate and better management and grazing of the pastures have sufficed.

With this increase of production has come a greater need to produce and conserve feed to be used at times when pasture production is slack. This is especially true on farms which supply market milk, as they must fulfil a contract every day of the year. Silage making on dairy farms has increased eightfold in recent years, and is still being taken up by more farmers. More crops are grown to fill the summer and winter feed gaps, and some have resorted to water harvesting and spray irrigation to provide green pasture in summer. Light tractors with hydraulic three-point linkage have brought with them the tendency to rely on machinery in preference to employing labour.

Advisory services given by the Department of Agriculture through dairy supervisors, the bi-monthly "Dairyfarming Digest", and other media, have made dairy farmers more conscious of their need to give thought to every side of farm management. More cows are under test than ever before in Victoria. Many artificial breeding groups have been formed, and a co-operative society now conducts the bull farm on which the semen is produced. There has been increased interest in milking methods, milking machine efficiency, and in the use of new and improved dairy detergents.

Refrigeration of milk on the farm and its collection from bulk vats by road tanker have been proved practicable in some districts, and these practices are now being adopted in other areas.

Local markets are changing. More and more country towns are being provided with supplies of pasteurized bottled milk, and the Milk Board has brought several country areas under its jurisdiction. In manufacturing, the trend is towards large versatile factories equipped to change from one type of product to another, according to market prospects. There is a growing local market for various types of cheeses hitherto little known in this country, and cheddar cheese is now exported in blocks wrapped in plastic film. These have several advantages over the traditional cylindrical bandaged cheeses.

The research projects now being financed by the industry levy for research and promotion should benefit the dairying industry greatly in the coming years.

Victoria is the principal milk producing State and in 1962–63 the Victorian output (671 mill. gall.) represented 46 per cent. of the Australian production.

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 31st March—	Number of Cow-keepers	Number of Dairy Cows*	Estimated Total Production of Milk for All Purposes (Year Ended 30th June)	Gross Value of Dairy Produce†
		'000	'000 gall.	£'000
1959	‡	1,204	582,948	65,264
1960	44,124	1,196	598,323	70,471
1961	43,690	1,197	596,706	72,004
1962	43,113	1,264	642,055	71,588
1963	41,866	1,294	670,788	78,568

* Includes cows (in milk and dry) and springing heifers.

† Includes subsidy.

‡ Not available.

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 30th June—	Butter*	Cheese*	Condensed Milk	Powdered Full-Cream Milk	Casein
1959	198,652	39,140	87,288	24,585	22,765
1960	201,394	43,152	99,063	23,822	19,181
1961 ..	201,447	44,799	87,321	22,396	22,576
1962 ..	215,328	53,633	88,178	23,745	27,362
1963	228,167	57,468	104,518	20,635	32,907

* Including that 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 1958, and 1960 to 1963. Details for 1959 are not available.

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

At 31st 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
1958.. ..	5,889	2,801	1,860	3,215	6,402	8,406	1,464	30,037
1960.. ..	4,304	2,262	1,682	2,971	6,155	8,488	1,397	27,259
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

* Includes cows in milk and dry and springing heifers.

The numbers of farmers with less than five cows were :—18,414 in 1958, 16,865 in 1960, 16,858 in 1961, 16,015 in 1962, and 15,290 in 1963. These numbers were excluded from the above table as the groups were considered too small to be classed as dairy herds.

ERADICATION OF TUBERCULOSIS

Year Book 1962 (*525–526*).

Pig Industry

Between 20,000 and 25,000 tons of pig carcasses are produced in Victoria in a year. Most of them are consumed here. Only a few are exported to other countries. About half the pig meat is used as fresh pork or for sausages and other meat products. The other half is made into bacon and ham, some of which is canned. Victoria is usually a net importer of pig meat from other States of Australia.

Farmers sell pigs to meat works either directly or through public auction sales. There are adequate facilities for selling pigs in most districts. Pigs are sold for meat as porkers about 4 to 5 months old and yielding dressed carcasses of 60 lb. to 100 lb. ; as baconers, 5 to 7 months old and with dressed carcasses of 120 lb. to 160 lb. ; or as backfatters, yielding carcasses of 200 lb. to 500 lb. after having been discarded from the breeding herd.

Most of the pigs in Victoria are in small herds on dairy farms and mixed farms. The sizes of the herds are related to the quantities of separated milk and other food by-products of the farms. A food supply which is adequate in quality, quantity, and cost is the basis of economic pig production. There are few specialized pig farms in Victoria. Their main food supplies are buttermilk and whey from dairy produce factories, and food refuse from eating places and food factories.

Pig prices vary and farmers have practically no control over them. Prices are usually higher in spring, when there are fewer pigs in the market, than in autumn when there are more pigs. Seasonal fluctuation in the quantities of milk available for pig feeding is the usual cause of fluctuating supplies of pigs to markets.

Another cause of fluctuation in production and prices of pigs, not so regular but sometimes big enough to cancel the seasonal one, is due to big increases or decreases in pig breeding. As three-quarters of the pig breeders in Victoria have an average of less than three breeding sows each, an addition of one more sow when prices are favourable results in a substantial overall increase.

The number of pigs in Victoria at 31st March, 1963, was 297,791. About 77 per cent. of these are held in the Central, Western, Northern, and Gippsland districts which are so largely devoted to dairying. The following table shows classifications (in statistical districts) of pigs, together with the numbers of pig-keepers :—

VICTORIA—PIGS AND PIG-KEEPERS, 31ST MARCH, 1963

Statistical District	Boars	Breeding Sows	All Other	Total Pigs	Pig Keepers
Central	998	8,085	44,076	53,159	1,248
North-Central ..	246	1,352	7,201	8,799	436
Western	822	4,684	23,908	29,414	1,198
Wimmera	345	1,884	9,071	11,300	861
Mallee	449	2,359	12,657	15,465	832
Northern	1,765	13,400	73,622	88,787	1,888
North-Eastern ..	900	5,373	25,343	31,616	1,137
Gippsland	1,412	9,240	48,599	59,251	1,747
Total	6,937	46,377	244,477	297,791	9,347*

* Of this number 2,098 had herds of under 5 pigs, 1,198 herds of 5 and under 10, 1,762 herds of 10 and under 20, and 4,289 herds of 20 pigs and over.

The following table shows 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, 1960

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 ..	526	119	71	44	49	55	42	31	937	12,351	13,288
5–9 ..	481	136	64	45	50	58	33	11	878	4,786	5,664
10–14 ..	279	122	70	24	35	32	14	7	583	2,113	2,696
15–19 ..	169	83	57	23	40	24	10	2	408	1.301	1,709
20–29 ..	255	164	121	61	93	60	23	14	791	1,946	2,737
30–49 ..	330	339	255	169	240	172	53	14	1,572	3,176	4,748
50–69 ..	179	261	261	192	328	298	100	15	1,634	2,976	4,610
70–99 ..	118	142	165	151	320	490	266	30	1,682	3,747	5,429
100–149 ..	42	75	55	64	171	300	288	73	1,068	2,050	3,118
150 and over ..	9	7	14	14	26	78	114	66	328	629	957
Total ..	2,388	1,448	1,133	787	1,352	1,567	943	263	9,881	35,075	44,956

Pastoral Industry

Sheep

The world renowned Merino is the most common sheep breed in Victoria. In 1962, the sheep population of this State comprised Merinos 42·0 per cent., Corriedales 14·6 per cent., Polwarths 4·5 per cent., Comebacks 9·3 per cent., Crossbreds 21·3 per cent., and British breeds 8·3 per cent., consisting mainly of Border Leicesters, Dorset Horns, Romneys, and Southdowns.

The Merino is the main wool producing breed and it also plays an important role in the breeding of Comeback and Crossbred sheep. These are produced mainly by crossing the Merinos with Corriedales, Polwarths, and Border Leicesters.

The pure British breeds are mostly run in small stud flocks which produce rams for cross breeding in fat lamb production.

The two main sheep enterprises are wool production and fat lamb production.

Wool is produced mainly in the Western, Wimmera, and Northern districts where both rainfall and topography are ideal for the development of improved pastures. The majority of these flocks breed their own replacements and consist of about one-third breeding ewes and two-thirds wethers which are the best wool producing sheep. Most of the ewes in wool producing flocks lamb in April, May, and June, but in the high rainfall districts there is an increasing trend to lamb down in August, September, and October.

Nearly half of Victoria's total wool production comes from the Western and Southern Wimmera districts and the wools are much sought after by oversea buyers because of their high yield, good colour, soft handling, and freedom from dust and seed.

On the other hand, most of the fat lambs are produced in the Wimmera, Mallee, and Northern districts where fat lamb production has become complementary to cereal production. These lambs are produced mainly from strong crossbred ewes which graze on clover and medic pastures—an important part of the clover ley system of crop rotation. The lambs are usually dropped in the autumn and fattened on the late winter and early spring crop feed. The majority are cashed from August to November. Wool from these areas is poor in quality and contains more seed and vegetable fault than that produced in the higher rainfall districts.

Fat lamb production is also carried on in the South Western, Central and Gippsland districts, where rainfall and country favour the development of highly improved pastures which carry well into the summer.

These lambs are usually dropped later than in the cereal growing districts and, after fattening on spring and summer pastures, the majority are cashed in local markets from November to April.

The wools produced in these areas are mainly fine and strong crossbred types, which have good style and no dust or vegetable fault.

WOOL GROWING DISTRICTS

Year Book 1962 (*534–536*).

The numbers of sheep in Victoria in selected years since 1861 are shown in the table on page 534. The distribution of all livestock is shown in the table on page 535.

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 mortality due to 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 dropped to ewes mated, and thus the natural increase from season to season may vary considerably. The following table shows the numbers of ewes mated or intended to be mated, the number actually mated, and lambs marked, in each of the five seasons 1959 to 1963 :—

VICTORIA—LAMBING

Season	Ewes Intended for Mating	Ewes Actually Mated	Lambs Marked	Proportion of Lambs Marked to Ewes Mated
		'000		%
1959	11,403	11,232	9,357	83
1960	10,837	10,614	8,630	81
1961	11,516	11,440	9,773	85
1962	11,409	11,008	9,217	84
1963	11,436	11,369	9,795	86

Sheep and Lambs in Statistical Districts

The following tables set out the numbers of rams, ewes, wethers, and lambs depastured in each statistical district of the State at 31st March, 1963, 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 31ST MARCH, 1963

('000)

Particulars	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Rams ..	29	24	119	46	24	59	25	17	343
Breeding Ewes*	1,053	877	3,952	1,685	950	2,196	989	695	12,397
Other Ewes ..	99	60	548	198	20	76	52	51	1,104
Wethers ..	752	855	3,015	1,503	222	790	510	451	8,098
Lambs ..	412	383	2,114	801	365	786	352	317	5,530
Total Sheep and Lambs ..	2,345	2,199	9,748	4,233	1,581	3,907	1,928	1,531	27,472

* Includes breeding ewes not mated (961,070 at 31st March, 1963).

VICTORIA—LAMBING, 1962 SEASON

Particulars	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Ewes Mated '000 ..	902	753	3,362	1,447	967	2,072	903	602	11,008
Lambs Marked '000 ..	790	643	2,753	1,094	810	1,801	778	548	9,217
Percentage ..	88	85	82	76	84	87	86	91	84

VICTORIA—LAMBING FORECAST, 1963 SEASON
(As Advised by Farmers at 31st March, 1963)
('000)

Breed of Rams Used	Ewes Mated or Intended to be Mated (For Lambing during 1963 Season)								Total
	Statistical District								
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Merino ..	147	269	1,424	896	143	317	176	174	3,546
Corriedale or Polwarth ..	191	107	1,093	206	67	167	118	62	2,011
Shortwool Breeds ..	547	304	527	221	391	1,133	465	268	3,856
Longwool Breeds ..	92	135	457	192	319	503	187	138	2,023
Total ..	977	815	3,501	1,515	920	2,120	946	642	11,436

Breeds of Sheep

The method of collecting particulars of breeds was changed considerably in 1950 and, apart from Merinos, all comparison with breeds of previous years is nullified. Merino Comebacks were previously collected as a whole, irrespective of whether they were fine or coarse. The 1950 collection made provision for segregating those "finer than half-bred", while those not up to that standard were included with other Crossbreds.

Similarly, it cannot be determined if any increase in the numbers of other Pure Breeds (British and Australasian) has occurred as another very important change in method was the substitution of the category "Other Recognized Breeds" in place of the former category "Other Pure Breeds". "Other Pure Breeds" in 1947 numbered 1,407,349, whereas in 1953, "Other Recognized Breeds" numbered 5,220,326. Crossbreds, which numbered 6,923,603 in 1947, dropped to 5,625,483 in 1953, notwithstanding the inclusion of half-bred and coarser Merino Comebacks.

Australasian breeds are the Polwarth and the Corriedale. The Polwarth is a Merino–Lincoln cross (approximately three-quarters Merino and one-quarter Lincoln). It was evolved to meet the conditions of light wool-growing localities found to be too wet and cold for the pure Merino. The Corriedale was evolved by heavily culling the progeny of Lincoln rams and Merino ewes and by judicious mating over several years. The Corriedale is a dual purpose sheep, being favoured by many breeders both for lamb raising and for wool production.

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 31st March, 1962 :—

VICTORIA—BREEDS OF SHEEP (INCLUDING RAMS), 31ST MARCH, 1962

('000)

Statistical District	Merino	Other Recognized Breeds	Merino Comeback (Finer than Half-bred)	Crossbred (Including Half-bred and Coarser Comebacks)	Total
Central	515	781	217	724	2,237
North-Central ..	967	458	243	425	2,093
Western	4,428	3,330	1,029	901	9,688
Wimmera	3,134	604	163	387	4,288
Mallee	724	286	220	638	1,868
Northern	1,172	817	316	1,627	3,932
North-Eastern ..	565	421	185	689	1,860
Gippsland	610	293	198	466	1,567
Total ..	12,115	6,990	2,571	5,857	27,533

Information on the number of rams of each breed is collected annually. The following table shows the breeds of rams in Victoria (by statistical districts) at the 31st March, 1963 :—

VICTORIA—BREEDS OF RAMS, 31ST MARCH, 1963

Statistical District	Merino	Corriedale	Polwarth	Border Leicester	Dorset Horn	Southdown	Other	Total
Central	3,968	4,405	1,737	1,372	8,879	4,946	3,972	29,279
North-Central	7,750	2,952	455	2,743	5,110	2,837	2,041	23,888
Western	55,014	23,383	11,998	2,117	8,114	4,248	13,395	118,269
Wimmera	26,810	6,424	311	3,927	5,643	225	2,601	45,941
Mallee	3,913	1,847	86	7,939	8,059	93	1,444	23,381
Northern	9,853	4,648	506	12,734	24,033	3,586	4,005	59,365
North-Eastern	4,305	2,323	836	4,197	7,944	2,297	3,574	25,476
Gippsland	4,206	1,342	279	1,747	3,307	2,526	3,430	16,837
Total ..	115,819	47,324	16,208	36,776	71,089	20,758	34,462	342,436

Production of Wool

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

VICTORIA—SHEEP AND LAMBS SHORN, SEASON 1962–63

Statistical District	Shorn		Wool Clipped (Including Crutchings)		Average	
	Sheep	Lambs	Sheep's	Lambs'	Per Sheep	Per Lamb
	'000		'000 lb.		lb.	
Central ..	2,009	442	18,631	1,325	9·27	3·00
North-Central ..	2,062	432	20,095	1,260	9·75	2·92
Western ..	9,102	2,326	85,078	6,507	9·35	2·80
Wimmera ..	4,034	877	38,999	2,461	9·67	2·81
Mallee ..	1,404	404	14,941	1,148	10·64	2·84
Northern ..	3,589	928	35,355	2,708	9·85	2·92
North-Eastern ..	1,796	430	16,993	1,113	9·46	2·59
Gippsland ..	1,380	396	13,146	1,039	9·53	2·63
Total ..	25,376	6,235	243,238	17,561	9·59	2·82

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.	
1958–59 ..	25,553	5,821	241,872	15,703	9·47	2·70
1959–60 ..	25,393	6,823	255,341	18,621	10·06	2·73
1960–61 ..	24,999	5,822	255,915	17,222	10·24	2·96
1961–62 ..	25,664	6,847	261,012	19,994	10·17	2·92
1962–63 ..	25,376	6,235	243,238	17,561	9·59	2·82

VICTORIA—WOOL PRODUCTION AND VALUE

Season	Clip	Stripped from and Exported on Skins, &c. (Greasy)	Total Quantity (Greasy)	Gross Value	Average Price per lb.
	'000 lb.			£'000	d.
1958–59 ..	257,575	41,269	298,844	59,471	47·76
1959–60 ..	273,961	49,265	323,226	75,814	56·29
1960–61 ..	273,137	48,874	322,011	69,265	51·62
1961–62 ..	281,006	49,633	330,639	74,219	53·87
1962–63 ..	260,799	55,906	316,705	79,007	59·87

Wool Marketing System

The present system of wool marketing has been built up over more than a century by the efforts of many able and energetic leaders, notably Thomas Sutcliffe Mort who prompted the first Australian auctions held at Sydney in 1843, and Richard Goldsbrough who started the sale of Victorian wool and produce in Melbourne in 1848. Geelong, the third Australian centre, was established in 1857.

On these foundations has been built a marketing system probably unique in world commerce, where a product is sold, in the presence of its grower, to the highest bidder amongst manufacturers and their agents from all over the world.

A sales programme, which ensures that there is a representative selection of wool to meet the varied demand at each centre covered by Victorian buyers, is prepared for the complete season. Thus, by controlling the amount of wool offered, an orderly marketing system is maintained.

Auction System

Under the auction system wools are displayed on the show floors of woolbrokers' stores, equipped with sawtooth roofs, giving clear, even lighting. This presentation of the wool under conditions which promote the interest of the grower, and at the same time retain the confidence of the buyer is the responsibility of the selling broker, and involves strict and thorough attention to detail.

The whole of the offering in each catalogue is valued by the brokers' experts, who keep in the closest touch with the market and its movements. When the auction begins, the auctioneer is accompanied by the wool expert who is able to protect the growers' interests. In this way, the grower exercises control up to the last moment, and may withdraw any lot if the bids do not conform to his ideas of value.

At the fall of the auctioneer's hammer, the ownership of the lot passes from the woolgrower to the woolbuyer, but the woolbroker still performs some service by storing it in his warehouse until it is required by the buyer. If the wool is to go overseas it is dumped, or compressed tightly and held by metal bands. The broker then has it delivered to the ship, or the local mill, and at that point marketing ends, and wool enters the process of manufacture.

FURTHER REFERENCE

Year Book 1963 (*560–561*).

WOOL GROWING DISTRICTS

Year Book 1962 (*534–536*).

HISTORY OF PASTORAL INDUSTRY

Year Book 1963 (*549–556*).

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.

In the early days of settlement, some meat was produced specifically for local consumption but, in the main, it was a by-product to wool and dairy production and surplus livestock was used to produce hides, tallow, and fertilizer. Wool was far more important than mutton and lamb. The sale of bullocks for draught purposes was also an important outlet for cattle producers until about 1915.

Local consumption increased during the gold rush of the 1850's and 1860's and satisfactory prices were obtained for prime livestock supplied to the diggings. Cattle and sheep numbers increased and boiling down increased until the advent of refrigeration, when the shipment of frozen meat to the United Kingdom became the important outlet for all surplus meat for nearly 70 years, being superseded during the past seven years by the new markets in North America.

Prior to refrigeration, there was some preservation of meat by salting and drying, but this was never as important or popular for preserving beef, mutton and lamb, as it had always been for preserving pigmeats in the form of bacon and ham.

The canning of meat increased more since refrigeration. It has been a means of preserving by-products and meat from carcasses not sufficiently fat for good freezing. Canning has declined with the development of the North American markets because the United States of America is taking boneless beef and mutton with very little fat, and the carcasses formerly canned are now boned and frozen.

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.

At one time, most of the beef sold on the local market came from four to six year old bullocks. With the greatly improved pastures since the 1920's, the breeding of small, chunky, early maturing beef cattle, and the increased demand for small joints and stocks with not too much fat, increasingly younger cattle have been marketed. Today, half the prime beef would be obtained from cattle, referred to as calves, slaughtered at six to fifteen months old. When grown quickly on good pasture, this baby beef is tender, palatable, and reasonably tasty. Most mature beef comes from bullocks between two and two and half years old. There is often a shortage of older and heavier bullocks needed for the supply of large roasts to the stevedoring industry and large hotels and restaurants.

The local market for lamb has always been good but the demand for our export lambs has been irregular, largely because of overfatness. Canada is now taking as many lambs as the United Kingdom. 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 opened up a big outlet for old sheep which at one time brought low prices for canning and small goods. There is still a proportion of old sheep 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 our 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.

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 1958–59 to 1962–63 :—

VICTORIA—STOCK SLAUGHTERED

Particulars	Stock Slaughtered in Establishments and on Farms and Stations				
	Year Ended 30th June—				
	1959	1960	1961	1962	1963*
	'000				
Sheep	5,940	7,623	6,374	7,389	7,444
Lambs	4,573	4,888	5,002	5,099	5,408
Bulls and Bullocks ..	256	215	165	263	310
Cows	441	367	267	356	463
Young Cattle ..	173	199	172	216	255
Calves	527	497	436	508	574
Pigs	462	458	514	588	530
	No.				
Number of Slaughter-houses	316	306	296	282	284

* Average dressed weights per carcass during 1962–63 were : Sheep 46·27 lb. ; Lambs 34·93 lb. ; Bulls and Bullocks 608·46 lb. ; Cows 416·85 lb. ; Young Cattle 283·75 lb. ; Calves 48·81 lb. ; Pigs 106·41 lb.

Frozen Mutton and Lamb Exported

The importance to sheep owners of the mutton and lamb export trade is indicated by the export figures for the years 1958–59 to 1962–63 as shown in the table below :—

FROZEN MUTTON AND LAMB EXPORTED FROM VICTORIAN PORTS

Year Ended 30th June—	Mutton		Lamb	
	'000 lb.	£'000	'000 lb.	£'000
1959	41,854	3,692	44,638	3,737
1960	47,512	3,203	29,440	2,036
1961	50,043	4,680	34,209	3,122
1962	76,284	5,638	18,022	1,192
1963	95,057	8,251	27,674	2,557

Honey Industry

Victoria's hardwood forests each year provide an important contribution to the wealth of the State by virtue of timber production for various purposes. However, one little known facet of forest productivity is the annual harvest of honey and beeswax taken from many species of eucalypts in all parts of the State. Today, Victoria ranks second among the States in apicultural activities. Eucalyptus species provide the bulk of the honey crop—up to 95 per cent. of the total—with the balance made up of ground flora species such as clover and Patterson's Curse.

There are some 1,300 apiarists in Victoria with five or more hives. These apiarists produce an average of 8·0 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 the 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.

Pollination of agricultural crops is a further aspect of the industry which has received considerable attention. Each year in the past, thousands of colonies have been hired out to fruit and seed growers to ensure profitable sets of seed and fruit. However, in recent years the advent of the newer types of insecticides and their increasing popularity especially with fruit growers has caused concern amongst apiarists, many of whom are no longer prepared to lease hives of bees for

pollination because of serious losses of bees following spray application of certain types of insecticides. It is anticipated that, with the increasing use of this type of chemical, pollination of agricultural crops may become a serious problem in Victoria and elsewhere.

Marketing has always been a great problem to the industry. Violent fluctuations in the annual honey crop are always, in the absence of any organized marketing scheme, attended by similar fluctuations in prices. Considerable carry-overs occasionally aggravate this. However, late in 1962 Federal Parliament passed enabling legislation for the establishment of the Commonwealth Honey Marketing Board. The functions of the Board are to regulate export of, and export prices for, honey. The activities of the Board are financed by means of a levy on domestic consumption of honey and a publicity and research programme is being undertaken.

State interest in the industry is authorized by the *Bees Act* 1958 and extends to disease control, advisory services and research into the problems of the industry. An Apicultural Research Unit is in operation at the Research Station at Fern Tree Gully.

Particulars relating to apiculture for the five years 1959–1963 are given in the following table :—

VICTORIA—BEE-HIVES, HONEY, AND BEESWAX

Season Ended 31st May—	Beekeepers*	Hives	Production		Gross Value	
			Honey	Beeswax	Honey	Beeswax
	No.		lb.		£	
1959 ..	1,145	100,953	7,624,037	85,743	532,094	24,383
1960 ..	1,217	104,767	9,660,937	113,526	599,480	29,091
1961 ..	1,184	105,685	8,389,817	104,690	524,364	26,173
1962 ..	1,276	103,216	10,314,129	135,218	590,896	33,805
1963 ..	1,280	100,787	4,818,300	63,906	291,074	16,309

* Apiarists with 20 hives and over numbered 771 in 1959, 818 in 1960, 822 in 1961, 830 in 1962, and 821 in 1963. Since 1958 the collection has excluded apiarists with less than five hives.

Primary Industries Other than Farming

Forestry

Forest Estate

Of the 56,245,760 acres in Victoria, the forest estate consists of 5,577,575 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 protected forests and are of value in safeguarding the State's water catchments. In addition, the Forests Commission 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 summarizes the total output of all species for the years 1959 to 1963 :—

VICTORIA—FOREST TIMBER
('000 Cubic Feet)

Item	Year Ended 30th June—				
	1959	1960	1961	1962	1963
Logs for Sawing, Peeling, Slicing or Pulping—					
Forest Hardwoods	67,175	67,546	63,779	60,789	66,910
Softwoods—					
Indigenous Forest Pines ..	406	152	217	205	*
Plantation Grown Pines ..	7,102	7,554	7,822	8,139	9,615
Total Logs	74,683	75,252	71,818	69,133	76,525
Hewn and Other Timber (Not Included Above) Estimated Volume—					
Firewood†	63,956	70,224	68,360	68,420	68,328
Other §	4,427	5,274	4,956	4,676	4,152

* Output was only 524 cub. 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 land. Similar information for private lands is not available.

During the year 1962–63 the sawmilling industry showed a considerable degree of recovery from the depressed conditions of 1960 to 1962.

Usage of hardwood logs, although still below that of recent years of peak production, was substantially above the low point reached in the previous year. At the same time the rate of use of plantation grown softwood logs continued to increase.

The increased use of pulpwood was largely to meet the demands of hardboard manufacture. This is important in providing an outlet for small and low-grade timber removed from the forests during silvicultural works designed to increase their future productivity.

The decline in miscellaneous timbers was mostly due to reduced purchases of railway sleepers following the completion of the Melbourne–Sydney standard gauge line, but the volume of fencing timber used also decreased in comparison with the previous year.

Victoria is not normally an exporting State as far as wood products are concerned, and is not likely to become one. It is more likely that the problem in the future will be meeting the ever increasing home demand for all types of forest products except wood fuel.

Softwood Plantations

Experimental plantings of softwoods began in Victoria in 1880, and the first commercial plantations were established in 1910. In 1925, there were 4,555 acres of State plantations and the planting programme then began to accelerate rapidly until by 1935 the area had increased to 38,360 acres. The main areas were at Bright, Ovens, and Stanley in the north-east, the Otways, and at Ballarat and Creswick. More recent extensions of State plantations have been in the south-west, north-east, and in the south Gippsland hills on abandoned settlement areas. The total area of State plantations at 30th June, 1963, was 54,486 acres. In 1961 an expanded planting programme commenced and it is anticipated that the annual planting objective of 5,000 acres of softwood per year will be reached in the 1964 planting season.

Pinus radiata has proved itself adaptable to all sites available, makes rapid growth, is hardy and relatively immune from insect and fungous attack, and produces a good quality utility timber. The area planted to *Pinus radiata* comprises 44,443 acres. Many of the areas originally planted with other conifers are now being converted to this species.

The older stands are principally 12 to 35 years old. Relatively small areas have been clear felled and either replanted or naturally regenerated, the bulk of the timber utilized to date being from thinnings in the form of logs for peeling and sawing, and pulpwood for paper manufacture.

The output from State plantations is summarized below :—

VICTORIA—OUTPUT OF SOFTWOOD LOGS AND PULPWOOD

('000 cubic feet)

Year Ended 30th June—	Sawlogs and Peeling Logs	Pulpwood
1959	1,861	925
1960	2,129	1,143
1961	2,196	1,392
1962	2,659	1,527
1963	2,949	1,540

Privately owned softwood plantations were estimated to comprise 64,400 acres at 30th June, 1963, 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.

Fire Protection

Victoria is one of the most fire hazardous areas in the world. Long dry summers and inflammable vegetation, when combined with very dry hot winds blowing from Central Australia, provide conditions under which fires can become completely uncontrollable in a matter of minutes. Disastrous fire seasons have occurred periodically since the first was recorded in 1851. Seventy-one lives were lost in 1939, and 51 in 1944.

The Forests Commission is responsible for the prevention and suppression of fires in all State forests and National Parks. In addition it is responsible for fire prevention and suppression in certain alienated lands within one mile of a State forest or National Park. The exceptions are where such land :—

(1) Is within the Mallee country ;

(2) is under the control of the Melbourne and Metropolitan Board of Works ; and

(3) has been specifically exempted by notice published in the *Government Gazette*.

This area of responsibility is legally designated the Fire Protected Area.

The State is divided into seven Divisions, comprising 55 forest districts, with men and equipment in each district. Fires are detected from 136 towers supplemented on occasions by aircraft. Adequate reserves of equipment are strategically located, and men are transferred between districts as required.

The Commission maintains its own laboratory for the development of specialized radio equipment, and for the repair of all radio in service. A fire equipment workshop caters for the construction of specialized equipment not available from other sources.

Legislation provides strict control over the lighting of fires, power to prohibit entirely the use of fire and to close down operations authorized under the Forests Act in the fire protected area during any period of extreme fire danger. It also imposes on any citizen finding a fire the duty of attempting to extinguish it and reporting it, and provides that any person causing a fire may, on conviction, be ordered to pay the costs of suppression incurred by the Commission.

The use of wetting agent in tankers to increase the effectiveness of water in fire fighting is now standard practice, and the supply of food, bedding, and equipment to crews working on remote fires is now made by free fall air-drops from planes.

Telecommunications

The radio system consists of 40 base stations, 170 mobile sets in vehicles, 280 portable radios, and a central station in Melbourne. Nine automatic repeating stations have been installed to improve radio performance in difficult areas, and three mobile emergency stations are held for use at the base of operations of major fires. Nine hundred and thirty miles of telephone lines erected by the Commission are maintained each year prior to the fire season.

Forest Fires

The causes of fires attended by Forests Commission personnel in the period 1958–59 to 1962–63 were as follows :—

VICTORIA—CAUSES OF FOREST FIRES

Cause	Number of Fires				
	1958–59	1959–60	1960–61	1961–62	1962–63
Grazing Interests	6	8	2	2	7
Landowners, Householders, &c. ..	103	141	101	200	149
Deliberate Lighting	62	91	44	59	44
Sportsmen, Campers, Tourists ..	33	58	59	82	61
Licensees and Forest Workers ..	18	19	18	34	22
Smokers	43	65	59	44	33
Lightning	59	100	187	133	53
Tractors, Cars, Trucks, Locomotives, and Stationary Engines ..	39	33	47	30	26
Children	19	27	30	39	18
Sawmills	13	20	10	7	3
Miscellaneous Known Causes ..	39	107	80	94	22
Unknown Origin	31	59	25	60	43
Total	465	728	662	784	481

VICTORIA—AREAS OF STATE FOREST BURNT

(Acres)

Year Ended 30th June—	Commercial Area	Non-Commercial Area	Total
1959	143,891	106,624	250,515
1960	135,583	1,065,850	1,201,433
1961	25,943	118,996	144,939
1962	59,348	108,024	167,372
1963	36,289	43,592	79,881

Laboratory Research

Tests for viability and purity of seeds of various tree species are being carried out. Study of dormancy in seeds of *Pinus radiata, P. pinaster, P. lambertiana, P. contorta* and *Pseudotsuga menziesii* are continuing and seeds of these species have been stratified for both commercial and research sowings.

Investigations into *P. radiata* seed properties are being made including the effect on seed of cone age, cone size, and seed extraction temperature and also the effect of seed size on germination capacity and seedling size.

Field Research

The various factors affecting regeneration of *Eucalyptus camaldulensis* and the effect of grazing animals on such regeneration are being studied. Progress has been made in defining a number of the controlling influences.

Thinning trials in *Eucalyptus regnans* regrowth of various ages and espacement trials with newly planted stock have been extended. Associated with this work research is proceeding on the significance of damage to crop trees during thinning operations. Certain fungi have been isolated and their effect on wood properties is being investigated.

Animal repellent trials have been laid out in an endeavour to reduce severe losses due to browsing of rabbits and wallabies in newly planted *E. regnans* areas. Various chemicals as foliar sprays are being tested.

The examination and testing of field techniques for naturally regenerating *E. regnans* is proceeding to define more closely the conditions necessary for success under a range of climatic and soil conditions. Direct sowing trials have been commenced to evaluate this technique as a method of plantation establishment and to regenerate burnt areas and other sites which have not been satisfactorily regenerated by natural means. Species being used in direct sowing trials are *E. regnans, P. Radiata,* and *Pseudotsuga menziesii.*

Periodicity of flowering and seedfall has been further studied in a number of eucalypt species.

A tree improvement programme with *P. radiata* is now well advanced. Over 1,700 field and glass-house grafts were made during the year from selected " plus " trees. Exchange of scions of " plus " trees has been arranged with other States. The *P. radiata* seed orchard in the Daylesford district has been extended to 40 acres and further extensions will be required to meet future needs of high quality seed.

Various pathological and entomological investigations have been carried out. One of the major fields of activitiy has been that directed against *Sirex noctilio,* the European horntail woodwasp. Surveys have been made throughout the State to determine the extent of infestation and to delineate the two major known areas, i.e., the " Metropolitan " and the " Gippsland " zones.

Marking of suspect pine trees and their destruction by felling and burning has been proceeding on an extensive scale. This work has been financed by the National Sirex Fund, a joint Commonwealth–States fund established for control and research purposes. Priority in search and control measures has been given to a peripheral zone 10 miles outside the known boundaries of infestation and 3 miles inside such boundaries. About 2,000 *Ibalia leucospoides,* a cynipid parasitic wasp obtained from New Zealand and Tasmania have been released in an endeavour to obtain a degree of biological control of the sirex wasp. Almost all known infestations of sirex have been in *P. radiata* but some activity has been found in *P. laricio, P. pinaster,* and *P. ponderosa.*

The predicted severe to complete defoliation of extensive areas of native forest in eastern Victoria by one of the plague phasmatids *Didymuria violescens,* a stick insect, occurred but the insect is still primarily in the mixed species eucalypt forests and has not penetrated far into the alpine ash stands. Spraying from the air of some infected forest areas has been carried out with excellent results.

Various pathological studies have been carried out in fungal diseases on both exotic softwood species and in native eucalypt forests.

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 is located at Snobs Creek, near Eildon. A wildlife research centre is in the process of being established 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.

Marine Fisheries

The Department's marine research activities are best considered as four separate programmes of which three are exclusively Victorian, while the fourth shares in a co-operative enterprise called the Southern Pelagic Project, involving all of the south-eastern Australian States, including Tasmania, the Fisheries Division of the Department of Primary Industry, and the C.S.I.R.O. Division of Fisheries and Oceanography. This project was conceived in 1960 at the annual Commonwealth/State Fisheries Conference and it is concerned with fish such as the Australian Salmon, Southern Bluefin Tuna, Striped Tuna, Southern Crayfish, and Barracouta. Other marine research undertaken by the Department includes the following major aspects.

General Marine Research aims to develop and manage in-shore and demersal fisheries such as Snapper, Flathead, Scallops, Mussels, and Abalone. This programme includes many diversified activities ranging from the provision of artificial fishing reefs to the expansion of port facilities. The newly developed scallop fishery deserves special mention for it is the first fishery to be developed in Victoria on a known stock. Fishermen were advised where and how to fish and a very complete record of the fishery is being maintained.

In the Gippsland Lakes area, a very important Bream fishery suffered a serious decline which appeared to be caused by over-fishing associated with environmental changes. Extensive hydrological research has been undertaken and further work is now proceeding on the Bream population itself.

In Westernport Bay, a programme was originally conceived as a general biological and ecological survey of the Bay, but much of the emphasis has now turned to an investigation of the Australian Whiting (King George Whiting), one of Victoria's most popular sporting and commercial species. Special measures have been adopted to collect catch data from amateur anglers.

Freshwater Research

A great deal of the Department's freshwater research effort is being directed to development of the fertile waters of the Murray Valley. Because the Valley is a natural geographic area many of the problems encountered in the research programmes mentioned below are closely interrelated.

At Snob's Creek Freshwater Fisheries Research Station and Hatchery, Rainbow and Brown Trout are produced for stocking all suitable waters of the State, and the major research project is directed towards improving the quality of fish raised and reducing production costs through refinement of artificial diets and the study and control of fish diseases. In the future, fish behaviour will be studied in a special laboratory which was completed recently.

Initial research into native fish has been focussed on two species—the Murray Cod, which is one of the most important freshwater species in Australia, and the Blackfish. A detailed ecological study of a Cod population in a Murray Valley lake has just concluded. In the case of the Blackfish, most of the work to date has been taxonomic.

The current study into Introduced Fish is an assessment of the survival of more than 80,000 hatchery reared yearling Trout which were marked and released in seven important streams. Creel census cards (Angler's Diaries), electric shocking, and other techniques are

being employed in this work. Some attention is also being given to the role of algal toxins in fish kills that have been observed in some lakes.

There are many permanent and semi-permanent lakes in the Murray Valley that have large populations of fish species which are not popular either with amateur or professional fishermen and are therefore largely unexploited. With the development of sound stocking and management policies, the annual harvest of desirable species from these waters could be very substantial.

In Victoria there is a very large and increasing number of relatively small bodies of water such as farm dams which have a tremendous potential for fish farming or production, both for sport and for commercial purposes. Research is aimed at determining the appropriate species for use in these waters and at working out techniques for their management.

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 1958–59 to 1962–63 :—

VICTORIA—FISHERIES : MEN AND BOATS EMPLOYED: QUANTITY AND GROSS VALUE OF TAKE

Year Ended 30th June—	Number of Men	Boats Employed		Value of Nets and Other Plant	Recorded Production*			
		Number	Value		Fish		Crayfish	
					Quantity	Value	Quantity	Value
			£'000	£'000	'000 lb.	£'000	'000 lb.	£'000
1959	929	690	1,002	215	9,863	1,185	1,294	231
1960	897	657	1,165	198	12,700	1,724	1,500	300
1961	1,002	714	1,207	220	12,140	1,559	2,069	483
1962	1,045	794	1,346	277	13,065	1,575	1,676	405
1963	1,004	784	1,374	317	12,611	1,469	1,531	383

* Includes catch by Victorian fishermen in Tasmanian waters.

The following table shows the production of the principal types of fish in Victoria for the years 1958–59 to 1962–63 :—

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

Type of Fish	Year Ended 30th June—				
	1959	1960	1961	1962	1963
Marine Fish—					
Australian Salmon ..	1,241	1,951	1,050	636	1,023
Barracouta ..	1,996	3,004	3,608	3,308	2,588
Bream	50	128	225	329	195
Flathead	1,427	1,815	1,880	2,318	1,832
Garfish	172	211	310	479	503
Morwong	111	71	138	318	277
Mullet	1,224	769	710	964	978
Pilchard	137	280	192	349	308
Shark*	1,673	1,488	1,873	2,181	2,731
Snapper	143	153	132	279	303
Whiting	367	464	537	402	300
Other†	1,121	2,176	1,265	1,258	1,369
Total Marine Fish..	9,662	12,510	11,920	12,821	12,407
Freshwater Fish ..	201	190	220	244	204
Total Fish ..	9,863	12,700	12,140	13,065	12,611

* Includes catch by Victorian fishermen in Tasmanian waters.
† Includes quantities of shark livers for oil extraction.

WILDLIFE ; INTRODUCED FISH ; COMMERCIAL FISHERIES, EUROPEAN CARP

Year Books 1962 (*544–546*) ; 1963 (*569–570*) ; 1964 (*601–602*).

Mining

Since the discovery of gold in Victoria in 1851, mining has played a significant part in the State's development. The change from alluvial to reef mining developed gradually following the first discoveries of gold. By the end of the century gold mining had decreased in importance relative to other primary and secondary industries.

Although Victoria mines lime, black coal, clays, and other products, it was the discovery of brown coal which made the most important mining impact in this century. The State Electricity Commission's exploitation of brown coal in the Latrobe Valley has become the basis of Victoria's power generation, which in turn has been an important factor in the large development of secondary industry during the last three decades.

MINING IN VICTORIA

Year Book 1964 (*604–607*).

UNDERGROUND WATER

Year Book 1964 (*544–545*).

Mineral Production

The mineral production of the State, as recorded by the Mines Department, from lands occupied under the Mines Act (excluding stone raised in quarries and salt) for the years ended December, 1962 and 1963, is shown in the following table :—

VICTORIA—MINERAL PRODUCTION

Minerals	1962		1963	
	Quantity	Value	Quantity	Value
Precious Metals—	fine oz.	£	fine oz.	£
Gold	28,262	473,297*	24,668	426,975*
Silver	472	195	546	275
Other Minerals—	ton	£	ton	£
Antimony Ore	0·5	200	..	..
Bauxite	4,413	15,862	2,157	8,569
Coal, Black	56,721	316,341	50,481	294,428
Coal, Brown	17,137,438	7,841,004	18,456,445	8,078,766
Copper Concentrate	26·5	2,622†	10·5	1,235†
Copper Ore	46		72·3	
Fire Clay	28,207	26,617	31,913	29,584
Gypsum	78,728	81,531	114,503	101,138
Kaolin and Other White Clays	450,218	493,682	713,379	613,683
Limestone	1,214,391	609,609	1,227,350	606,086
Other	862	22,328	612	19,161

* Includes gold subsidy, £50,579 for 1962 and £43,267 for 1963.
† Includes copper bounty £284 for 1962 and £53 for 1963.

The following table shows the average annual production and value of black and brown coal for each of the five year periods from 1921 to 1955 and the production and value for each of the years 1956 to 1963 :—

VICTORIA—COAL PRODUCTION AND VALUE*

Period	Black Coal		Brown Coal	
	Production	Value	Production	Value
	tons	£'000	tons	£'000
1921–1925	520,705	592	258,094	62
1926–1930	668,177	893	1,515,592	193
1931–1935	472,030	444	2,445,215	256
1936–1940	324,903	284	3,608,751	356
1941–1945	286,277	409	5,010,555	526
1946–1950	156,290	361	6,648,430	1,202
1951–1955	143,535	795	8,728,116	3,593
1956	118,827	668	10,559,801	4,644
1957	111,569	556	10,740,989	5,227
1958	108,359	528	11,643,629	5,418
1959	87,715	455	13,040,717	6,123
1960	77,995	418	14,982,990	6,845
1961	66,363	359	16,279,168	7,722
1962	56,721	316	17,137,438	7,841
1963	50,481	294	18,456,445	8,079

* Value of output at the mine.

Oil Exploration in Victoria, 1924 to 1963

Since the first crude oil was discovered at Lakes Entrance in 1924, petroleum exploration in Victoria has gone through fluctuating stages of activity which have been largely influenced by developments in other parts of Australia.

The early well sites at Lakes Entrance were selected under the geological guidance of the Director of the Victorian Geological Survey and were aimed primarily at establishing the stratigraphy, structure, and extent of the Lakes Entrance field. Numerous small shows of oil and dry gas were found in the basal Tertiary greensands and sands, but no significant production could be established.

Oil exploration companies mushroomed under the influence of the initial indications of petroleum, but at this early stage most of the companies lacked the technical knowledge necessary for scientific selection of well sites or for carrying out deep drilling operations. A large number of wells were drilled throughout the State during the ensuing years, most of them wildcat wells, but only trace amounts of hydrocarbons were encountered until the drilling of the Port Campbell No. 1 well in 1959.

The difficulty of raising capital for drilling led to an arbitrary concentration of effort in the Lakes Entrance area where some indications of petroleum could generally be expected and this resulted in the comparative neglect of other prospective areas. Activity at Lakes Entrance waned in the late 1930's, but was temporarily revived during the war in an attempt to obtain worthwhile production by drilling horizontal holes radially into the supposed oil reservoir from a shaft sunk for this purpose. This project was economically unsuccessful.

Production of heavy asphaltic base crude oil from a number of wells at Lakes Entrance totalled a little over 100,000 gall. for the period 1930 to 1941. A small additional production was obtained from the Lakes Entrance Shaft from 1945 to 1950. Throughout this period small flows of gas were discharged continuously to the atmosphere.

From 1924 to 1946 a number of important deep wells were drilled by the Mines Department on its own account and in conjunction with the Commonwealth Government. These yielded much essential new stratigraphic data—mostly in Gippsland, which has provided a basis for subsequent exploration and geophysical interpretation.

Immediately before and shortly after the war several major oil companies carried out geological reconnaissance with a view to selecting areas for further search. These investigations failed to attract the

companies concerned, but led to a revival of local interest and by 1950 much of the Gippsland Basin had been taken up under petroleum permits and licences.

Following the discovery of oil at Rough Range, Western Australia, in December 1953, activity stepped up considerably. For the first time integrated geological and geophysical investigations were undertaken and a number of deep wells were drilled. Investigations were extended to the pre-Tertiary sedimentary section and minor oil shows were encountered in the lower Tertiary and Mesozoic strata in wells at Woodside drilled in 1955.

Since 1950 the Bureau of Mineral Resources has carried out a number of regional gravity and aeromagnetic surveys which have provided basic data for exploration in Gippsland, Port Phillip Bay, and far south-western Victoria. Considerable impetus has also been provided by new stratigraphic data from deep water wells drilled by the Mines Department in Western Victoria since November, 1957.

Apart from a minor lull in activity in 1958–1959, the tempo of company exploration has increased since 1953, and with the stimulus of a strong, but non-commercial, flow of wet gas in the Port Campbell No. 1 well late in 1959 and a show of petroliferous gas in North Seaspray No. 1 in November, 1962, surface and sub-surface geological and geophysical data have been steadily built up to the stage where parts of the basins are now known in reasonable detail.

In keeping with oversea practice, the trend throughout the post-war period has been to increase the proportion of preliminary geological and geophysical work carried out before selecting new sites for drilling.

An important recent development has been the extension of oil search to the off-shore area during 1961–62, and most Victorian waters to the edge of the continental shelf have now been covered by aeromagnetic and seismic surveys.

Some difficulty has been experienced in obtaining satisfactory seismic records in parts of Western Victoria and Gippsland and it may reasonably be expected that the quality of exploration work will improve substantially when these difficulties have been overcome. In addition to presenting a seismic problem, the extensive basalts of Western Victoria also cause difficulty in the interpretation of aeromagnetic records.

Some indication of developments in oil exploration in Victoria since 1924 is given in the table below. At the present time a large number of sites suitable for drilling have been demonstrated and many

other areas have not yet been investigated in detail. As elsewhere in Australia, the stimulus of an oil strike is needed if the intensity of search is to be maintained at its present level or to increase.

VICTORIA—OIL EXPLORATION

Period	Number of Wells	Footage Drilled	Mean Well Depth	Expenditure			
				Drilling	Geological	Geophysical	Total
			ft.	£'000			
1921–1953 ..	85	104,068	1,224	145	10 (Est.)	..	155
1953–1963 ..	37	159,300	4,303	2,164	350	1,386	3,900

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 31st 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 cub. yds.		tons	'000 cub. yds.		£'000
1958	132	938	92	4,753	4,214	550	5,203
1959	121	948	107	4,387	4,970	489	5,842
1960	126	911	125	4,058	5,869	425	6,581
1961* ..	252	1,701	661	6,877	7,903	819	9,217
1962	254	2,054	425	9,181	7,622	744	8,892

* From 1961, figures are not comparable with previous years. In 1961, increased coverage involving an additional 126 informants (59 being mainly sand and gravel quarries) accounted for sand, 678,000 cub. yds. ; river gravel and gravel boulders, 471,000 cub. yds. ; dimension stone, 3,881 tons ; crushed and broken stone, 1,013,000 cub. yds. ; other quarry products, 437,000 cub. yds. ; with a total additional value of £1,605,000.

In addition to the production set out in the preceding table, there is a considerable quantity of material " won " by contractors operating shallow pits for or on behalf of Local Government Authorities, and

by exploiting stone outcrops, mine tailings, &c. This itinerant activity was first covered by a statistical collection for 1961. However, the first year for which statistics are available is 1962 and the reported production for that year is :—

Sand	225,000	cub. yds.
Gravel and Gravel Boulders	1,976,000	,, ,,
Crushed and Broken Stone	718,000	,, ,,
Other Quarry Products	524,000	,, ,,

The local value of such production is estimated at £491,000.

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 504. Except in the case of mining and quarrying, statistics for the non-rural industries refer to the year ended 30th June. Statistics for mining and quarrying relate to the year ended 31st December of the first year shown.

Gross Value

Gross value is defined as the value placed on recorded production at the wholesale price realized 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, &c., is included in manufacturing production.

VICTORIA—GROSS VALUE OF PRIMARY PRODUCTION

(£'000)

Industry	1958–59	1959–60	1960–61	1961–62	1962–63
Agriculture	101,058	92,411	132,918	115,112	126,734
Pastoral	134,015	160,138	139,414	143,880	159,457
Dairying*	65,264	70,471	72,004	71,588	78,568
Poultry and Bees ..	23,087	24,327	25,428	23,727	23,344
Trapping	3,862	3,749	3,156	3,024	2,934
Forestry	17,525	19,111	18,232	17,964	18,332
Fisheries	1,434	2,045	2,064	2,016	1,882
Mining	13,694	14,935	16,267	19,583	20,008
Total Primary Industries	359,939	387,187	409,483	396,894	431,259

* Includes Subsidy—1958–59, £6,223,000 ; 1959–60, £6,204,000 ; 1960–61, £6,710,000 ; 1961–62, £6,544,000 ; 1962–63, £6,786,000.

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	1958–59	1959–60	1960–61	1961–62	1962–63
Agriculture—					
Barley	3,375	2,042	2,364	1,989	2,360
Maize	114	113	106	89	113
Oats	4,716	3,573	4,910	4,459	7,157
Wheat	23,567	22,421	40,721	36,671	42,559
Onions	894	842	628	650	539
Potatoes	3,874	4,966	8,313	5,378	1,993
Other Vegetables ..	8,217	8,703	9,410	8,104	7,553
Hay and Straw ..	17,789	13,836	20,854	13,734	19,925
Fruit—					
Orchards ..	7,884	7,914	10,084	10,423	8,780
Vineyards ..	8,342	6,188	7,236	7,960	6,339
Other Crops ..	6,679	8,532	9,850	9,281	10,556
Total ..	85,451	79,130	114,476	98,738	107,874

VICTORIA—LOCAL VALUE OF PRIMARY PRODUCTION—*continued*

(£'000)

Produce	1958–59	1959–60	1960–61	1961–62	1962–63
Pastoral—					
Wool	51,786	67,758	61,095	63,475	68,990
Sheep, Slaughtered ..	22,375	27,766	23,655	20,482	22,382
Cattle, Slaughtered ..	45,623	49,891	40,963	43,017	51,217
Total ..	119,784	145,415	125,713	126,974	142,589
Dairying—					
Whole Milk Used for—					
Butter	28,522	30,829	30,796	30,711	35,684
Cheese	3,650	4,329	4,742	4,901	5,605
Condensing, Concentrating, &c. ..	5,979	6,667	6,070	6,100	6,142
Human Consumption and Other Purposes ..	12,744	13,122	13,552	14,238	14,447
Subsidy Paid on Whole Milk for Butter and Cheese	6,223	6,204	6,710	6,544	6,786
Pigs, Slaughtered ..	5,540	6,460	7,177	5,773	6,705
Total ..	62,658	67,611	69,047	68,267	75,369
Poultry and Bees—					
Eggs	13,984	14,506	15,174	14,138	14,473
Poultry	6,533	6,765	6,895	6,185	5,897
Honey and Beeswax	408	428	319	415	240
Total ..	20,925	21,699	22,388	20,738	20,610

VICTORIA—LOCAL VALUE OF PRIMARY PRODUCTION—*continued*

(£'000)

Produce	1958–59	1959–60	1960–61	1961–62	1962–63
Trapping, &c.					
Rabbits and Hares ..	2,717	2,560	2,310	2,285	2,166
Rabbit and Hare Skins, &c. ..	845	932	635	525	584
Total ..	3,562	3,492	2,945	2,810	2,750
Forestry—					
Sawmills	9,552	10,157	9,225	9,068	9,442
Hewn Timber ..	998	1,426	1,358	1,261	1,101
Firewood	5,455	5,913	6,036	6,041	6,182
Bark for Tanning ..	128	86	58	46	54
Other	15	36	36	33	32
Total ..	16,148	17,618	16,713	16,449	16,811
Fisheries—					
Fish	1,052	1,495	1,347	1,357	1,264
Crayfish	199	260	420	353	335
Oysters	1	1	2	1	1
Other	13	15	18	30	25
Total ..	1,265	1,771	1,787	1,741	1,625
Mining—					
Gold	694	585	471	470	473
Coal—					
Black	528	455	418	359	316
Brown	5,418	6,123	6,845	7,722	7,841
Other Metals and Minerals	1,851	1,930	2,007	1,815	1,995
Quarrying* ..	5,203	5,842	6,526	9,217	9,383
Total ..	13,694	14,935	16,267	19,583	20,008
Total Primary Industries	323,487	351,671	369,336	355,300	387,636

* Figures for 1962–63 not strictly comparable with those for earlier years. See section on Quarrying, pages 563 to 564.

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	1958–59	1959–60	1960–61	1961–62	1962–63
Rural—					
Agriculture ..	73,661	68,912	104,031	88,245	96,986
Pastoral	110,392	135,630	116,181	115,528	132,563
Dairying	44,382	47,469	50,947	43,522	55,067
Poultry	13,011	13,650	14,346	12,439	12,406
Bee-farming ..	408	428	319	415	240
Total Rural ..	241,854	266,089	285,824	260,149	297,262
Non-rural	31,962	34,981	34,604	37,056	37,397
Total Primary ..	273,816	301,070	320,428	297,205	334,659
Manufacturing ..	610,969	688,389	703,282	717,327	801,467
Total All Industries ..	884,785	989,459	1,023,710	1,014,532	1,136,126