

# Part 7

## PRIMARY PRODUCTION

### *Land Settlement and Irrigation*

#### **Land Utilization**

##### *Introduction*

The climatic conditions of Victoria (for details see pages 25 to 44) 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 pages 524 and 536-537).

The pattern of land use is more or less clearly defined in each of the statistical districts (see map on page 549). 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 7·6 mill. acres.

The soils of the district being light in texture are easily and cheaply cultivated and the main farming enterprise is cereal cropping, associated with wool, and fat lamb production. The principal crop grown is wheat and about 1 mill. acres are sown to this crop each year. In addition, some 350,000 acres of oats, including 20,000 acres for hay and 70,000 acres for grazing, and 150,000 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 16 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 1·8 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 700,000 acres are sown to wheat each year, the average yield being close to 24 bushels per acre. Other major crops are oats (265,000 acres, including 40,000 acres for hay and 25,000 acres for grazing), and barley (65,000 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 45 mill. lb. of wool. As is the case in the Mallee, dairying and beef cattle production are only of minor importance.

### *Northern District*

This is an area of plains country extending from the Central Highlands in the south to the River Murray in the north. The total area of the district is 6.3 mill. acres, of which 5.5 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 a number of different farming enterprises are carried out.

Wheat growing is an important industry. The area sown averages about 400,000 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 200,000 acres of oats are sown each year, including 30,000 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 350,000 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 76,000 beef cattle.

*North-Eastern District*

The district has a total area of 7·2 mill. acres, but includes substantial areas of Crown lands, many of which are very steep and heavily timbered. The area occupied is 3·7 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 8,000 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 230,000 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 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 grown 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 9·5 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 close to 425,000 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-Ballararat 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 about 490,000 dairy cattle. Pig raising is associated with dairy farming, and there are over 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, 1961, this comprised :—

	Acres
Lands alienated in fee-simple .. ..	31,531,121
Lands in process of alienation .. ..	1,470,988
Crown lands .. ..	23,243,651
Total .. ..	56,245,760

The Crown lands comprise :—

	Acres
Permanent forests (under Forests Act) ..	4,860,170
Timber reserves (under Forests Act) ..	709,777
State Forest and timber reserves (under Land Act)	151,499
Water reserves .. ..	316,268
Reserves in the Mallee .. ..	410,000
Other reserves .. ..	548,570
Roads .. ..	1,650,105
Water frontages, beds of rivers, lakes, &c., unsold land in cities, towns, and boroughs ..	3,845,574
Land in occupation under—	
Perpetual leases .. ..	1,093,497
Leases of former agricultural college lands	28,655
Other leases and licences .. ..	1,872
Temporary grazing licences and leases ..	*5,259,528
Unoccupied .. ..	4,368,136
Total .. ..	23,243,651

\* In addition, 75,281 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 1957 to 1961. 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		£
1957.. ..	2,070	1,120	3,190	123,726	141,545
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

### Transfer of Land Act and Assurance Fund

Information on these topics will be found on pages 451–452 of the Victorian Year Book 1961.

### Government Assistance to the Farming Industry

From the foundation of the State one of the chief functions of government has been to encourage the use of the land for farming purposes. The policy of governments has been to prevent large scale aggregation of land under individual owners and to encourage family farm units. Early experience in the 1860's showed the great difficulties which settlers faced when trying to establish themselves as farmers on uncleared or partly cleared land. Conditions of purchase from the Crown were made progressively easier until, during the 1890's, it became clear that the Crown would have to make financial loans to settlers if men with little capital were to succeed. At the same time the scheme of re-purchasing large estates from their owners, subdividing them, and then letting them to settlers under Conditional Purchase Leaseholds was developed. The statistical results of these policies are set out on pages 529 to 531.

A survey of the history of land settlement in the State shows clearly the extent to which success has depended on the world position of agriculture and the relative prices of its products. In the early years of occupation by the pastoralists in the 1830's progress was rapid until 1844 when, the world production of wool having exceeded consumption,

the price fell sharply. All through the remainder of the 19th century periods of general farming prosperity were followed by other and longer periods of depression. Of the latter, that of the 1890's was world-wide. Settlers in the period 1900-1915 had the benefit of low prices of farm requisites and some increase in technical efficiency, while the prices of agricultural products were generally rising. The latter years of the First World War brought a short-lived boom during which many farming settlers did well. By 1922 these conditions began to deteriorate and the Great Depression of the 1930's saw a critical state of affairs in the countryside. Government action through currency devaluation, moratoria, and, ultimately debt adjustment, substantially helped a large number of farmers. The Second World War created conditions of prosperity which reached a climax in the wool boom of 1951.

The development of State-financed water supply schemes for stock and domestic and irrigation purposes is set out on pages 532 to 535. Although rates are levied on the individual users, these normally only cover the cost of distribution ; the money for the provision and for the amortization of the cost of the headworks is borne by the State in the expectation that the extra incomes which will be earned as a result of irrigation will provide the necessary return.

The Department of Agriculture (pages 545 to 547) is provided for by direct Government vote. Its work is partly regulatory and in that regard it assists the farming industries by supervising the regulations which have been enacted to prevent pests and diseases from spreading and to ensure that standards are maintained in the produce of farms and processing factories. In this regard it operates in conjunction with the Commonwealth departments concerned in the standards of consignments for exports.

The Department has a considerable research organization ; the success of its breeding programme is shown by the fact that usually over 95 per cent. of the cereal varieties are departmental in origin. The research stations and the trial plots which it maintains demonstrate new methods and are the points from which local information is available to farmers either directly or through the medium of district officers. Some of these are specialists for industries such as sheep and wool, dairying, or horticulture, while others are general farming advisers. The whole scheme, which is supported by radio and television programmes and the production of a journal, many bulletins, and leaflets, attempts to raise the standard of farming practices.

The same objective is sought through the support of agricultural societies, of the Young Farmers Movement, and of agricultural education through the two agricultural colleges and the Schools of Agriculture and Veterinary Science at the University of Melbourne.

Although there is agreement between the Department and the Commonwealth Scientific and Industrial Research Organization that research of a more fundamental character shall in general be carried out by the latter, the translation of that research into practice on the farms often requires careful investigation if any new discovery is to be of economic value. Although these activities stimulate efficiency in production, they



cannot necessarily make farming a profitable way of life from the financial point of view. The Government has endeavoured to assist by the construction of railways in rural areas and these often operate at a loss. It took over several abattoirs and meat processing works in country districts where these had failed financially under private or co-operative management; it also operated a sugar beet factory at Maffra for some years. A successful venture has been the Grain Elevators Board which handles almost all the wheat grown in the State (see pages 558-559).

The marketing of farm produce has gradually become a matter for Government supervision, and sometimes control. The Milk Board which regulates the supply of whole milk to the Metropolitan Area has brought orderly marketing out of a chaotic situation. Its activities are gradually extending to other centres. Boards have also been set up from time to time for marketing other products—wheat, eggs, chicory, and potatoes, &c. Their success is only partial except in those cases (e.g., wheat) where other States have passed similar legislation, thus enabling an all-Australian Board to be constituted with powers to control the interstate movement of the commodity concerned. Where such Australia-wide agreement has not been reached and a commodity is produced in several States, there is nothing to prevent an interested party from moving a commodity across a State boundary in order to take advantage of a favourable price situation. Section 92 of the Commonwealth Constitution prevents any interference with such trade and various referenda to amend this position have failed. Danger to the health of humans, plants, or animals are the only reasons which a State can use to prevent such interstate transfer.

Direct financial assistance is afforded to farming industries which are in difficult circumstances. This is mainly a matter for the Commonwealth Government which has power to grant bounties. Such assistance has at times been used to foster an industry in its initial stages, e.g., flax growing or cotton—but the chief development has been in the assistance to dairying which now amounts to £13,500,000 annually; wheat growers have also received grants since the export price began to be below the ascertained cost of production. Indirect financial aid from the Commonwealth has also taken the form of a bounty on superphosphate for a time and one on sulphuric acid, which is used in its manufacture. The Commonwealth has also assisted various rural industries by tariffs, by an occasional embargo on imports, and by financial assistance in such matters as the control of Cattle Tick. At times, when disaster strikes a particular district through flood or fire, or when some industry is in distress, special grants have been made.

Finally, the amenities available to country people have been improved in a variety of ways with the intention of reducing the disparity between services in country areas and those available in cities. Examples are lower licensing fees for country motor cars, allocations for highways through the Country Roads Board, the extension of the electric supply system into areas which would be economically marginal, and special rates for telephone installations. The State Government supports the Council of Adult Education in its work of affording opportunities for mental recreation.

### **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 to remove stone, gravel, and soil.

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

#### *Group Conservation*

The Authority always encourages conservation by groups of farmers as the most efficient and economical method of improving land-use.

The success of this approach is being currently demonstrated in the 800 square mile Eppalock Catchment Project in Central Victoria, as well as in other places. The specific purpose in the Eppalock Catchment is the protection of Victoria's fourth largest reservoir and special provisions were made for financial assistance to ensure that the work is performed.

New legislation was passed in 1962 to encourage landholders to initiate group conservation areas. The legislation provides for a group of landholders to submit a proposal to the local District Advisory Committee of the Soil Conservation Authority that their properties be included in a group conservation area. If the Committee favours the proposal, it is recommended to the Authority which may alter or amend the boundaries proposed, and prepare a complete project which is discussed at a meeting of the landholders involved. Upon acceptance, the project is declared a group conservation area and the Authority pays for all erosion work it considers necessary, provided the respective landholders carry out recommended conservation and land improvement works. Any dispute as to the nature and extent of works to be carried out by participants is resolved by the District Advisory Committee.

The purpose of the Act is to ensure co-operation and participation from the outset until completion of the project.

#### **Further References**

Further information about the Authority is set out on pages 490–491 of the Victorian Year Book 1963, pages 62 to 65 of the Victorian Year Book 1962, and pages 452 to 454 of the Victorian Year Book 1961.

#### **Land Utilization Advisory Council**

The activities of this Council are described on pages 473–474 of the Victorian Year Book 1962.

#### **Destruction of Vermin and Noxious Weeds**

Information on this topic will be found on pages 491–492 of the Victorian Year Book 1963.

## **Land Settlement and Finance**

### *General*

In December 1961, legislation was passed which constituted the Rural Finance and Settlement Commission to succeed to the functions and powers of the Rural Finance Corporation and the Soldier Settlement Commission.

The new Commission came into office on the 17th March, 1962 and comprised two separate branches, the Finance Branch handling matters under the Rural Finance Act, and the Settlement Branch matters pertaining to the *Soldier Settlement Act and the Land Settlement Act 1959*.

### *Soldier 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.

An Agreement was finally concluded between the Commonwealth and the various States in 1945 on this matter. This Agreement provided that Victoria, New South Wales, and Queensland would act as principal States, and that Western Australia, South Australia, and Tasmania would act as agents for the Commonwealth Government.

In 1945, the Victorian Government completed an Agreement with the Commonwealth Government. The State Parliament ratified the Agreement and also passed legislation constituting the Soldier Settlement Commission which was to have three full-time members and was given the necessary authority to appoint staff.

Soldier Settlement in all States has now reached the closing-down stages and the achievements of Victoria in this form of land settlement have been most satisfactory.

Under the Victorian legislation, soldier settlement was carried out under two separate schemes. Firstly, there was the general settlement scheme where the Soldier Settlement Commission acquired freehold land or Crown land for subdivision and development into holdings for application by ex-servicemen and 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 3,277.

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 £11,955,913.

The Soldier Settlement Act provided for the Commission to make advances where required to both general settlers and Single Unit Farm settlers to assist them in the purchase of stock, plant, and equipment. For this purpose £6,031,427 has been advanced to settlers, and of this amount, £5,283,118 has been repaid as at 30th June 1962.

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 summary sets out the position in Victoria as at the 30th June, 1962 :—

VICTORIA—RURAL REHABILITATION OF EX-SERVICEMEN,  
1945 TO 1962

Act	Number of Ex-Servicemen
<i>Soldier Settlement Act—</i>	
Number allotted a holding under the general subdivisional scheme .. .. .	3,048
Number allotted a holding under the general subdivisional scheme but for various reasons such as ill-health, death, compulsory forfeiture, &c., have relinquished the holdings granted to them .. .. .	229
Number granted Single Unit Farm Loans .. .. .	2,878
<i>Commonwealth Re-establishment and Employment Act 1945—</i>	
Number granted agricultural loans for purchase of land ..	548
Number granted agricultural loans for purchase of stock, plant, &c., to work properties .. .. .	979
Total .. .. .	7,682

*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 general scheme for soldier settlement—the main difference 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.

Generally speaking, 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.

Up to the 30th June, 1962, the land being developed for allocation under this Scheme has been on three developmental projects. These are Heytesbury near Cobden, Yanakie on Wilson's Promontory, and the East Goulburn Project in the Parish of Dunbulbalane.

The demand for all holdings allotted to date has been exceedingly keen and the 160 farms allocated attracted over 5,500 applications.

Further details about the Commission's development projects will be found on pages 495-496 of the Victorian Year Book 1963.

### Rural Finance Act

The Corporation was established in April, 1950. Its functions, which have since been taken over by the Commission, are set out in section 5 of the *Rural Finance Corporation Act 1958* and 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 or arrangement between him and his creditors.

Revenue, expenditure, &c., for each of the five years 1957-58 to 1961-62 are given in the following table:—

VICTORIA—RURAL FINANCE ACT : REVENUE,  
EXPENDITURE, ETC.  
(£'000)

Particulars	1957-58	1958-59	1959-60	1960-61	1961-62
<b>REVENUE</b>					
Interest .. .. .	337	381	405	437	475
Other .. .. .	5	7	10	12	9
Total Revenue .. ..	342	388	415	449	484
<b>EXPENDITURE</b>					
Administration .. .. .	47	49	54	58	60
Interest .. .. .	202	250	261	278	299
Sinking Fund .. .. .	23	19	20	20	22
Other .. .. .	8	21	9	16	12
Total Expenditure .. ..	280	339	344	372	393
Net Surplus .. .. .	62	49	71	77	102
Loans and Advances Outstanding at 30th June .. .. .	8,147	8,611	8,731	9,365	9,859
Loan Indebtedness to State Government at 30th June .. .. .	7,223	7,734	7,836	8,323	8,906

### 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, 1962, it had spent about £75 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 ..	250,000	„ „
Loddon ..	Cairn-Curran ..	120,600	„ „
	Tullaroop ..	60,000	Maryborough town supply ; diverters ; and Goulburn- Loddon System
Murray ..	Hume Reservoir ..	2,500,000*	Murray
	River Murray Weirs ..	222,840*	„
Macalister ..	Glenmaggie Reservoir	154,300	Macalister
Werribee ..	Pykes Creek Reservoir	19,400	Bacchus Marsh District
	Melton Reservoir ..	15,500	Werribee District
		6,446,740†	

\* Half storage capacity credited to Victoria under the River Murray Agreement.

† In addition to the storages named, there is 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 feet. 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 1961-62 :—

VICTORIA—AREA OF SYSTEMS AND LANDS IRRIGATED, AND WATER DELIVERED, 1961-62

System or District	Total Area within Constituted District	Pastures		Area Irrigated						Water Deliveries	
		Native	Sown	Lucerne and Sorghum	Vineyards	Orchards	Market Gardens	Others	Total		
					acres						acre-ft.
Goulburn-Loddon System	1,289,515	24,507	402,200	26,725	309	22,731	3,635	26,358	506,465	712,650	
River Murray System—											
Torrumbarry System* ..	341,012	25,964	182,771	7,956	4,287	1,904	1,310	10,593	234,785	241,662	
Murray Valley Area ..	274,155	2,668	91,571	8,280	41	5,689	499	1,755	110,503	190,955	
Pumped Supply Districts†	80,761	300	595	555	36,596	3,029	279	624	41,978	123,140	
Total River Murray	695,928	28,932	274,937	16,791	40,924	10,622	2,088	12,972	387,266	555,757	
Macalister District ..	130,455	2,643	54,658	1,101	..	..	208	93	58,703	89,642	
Werribee-Bacchus Marsh ..	16,343	136	5,801	798	..	616	4,382	72	11,805	22,551	
Other Northern Systems ..	19,735	696	11,347	1,623	..	3,456	723	303	18,148	29,550	
Other Southern Systems ..	‡	..	..	..	..	..	1,104	213	1,317	..	
Private Diversions ¶ ..	‡	12,591	81,982	10,683	3,330	5,246	10,057	10,307	134,196	..	
Grand Totals ..	\$2,151,976	69,505	830,925	57,721	44,563	42,671	22,197	50,318	1,117,900	1,410,150	

\* Includes 35,406 acres irrigated by private diversion.

† Including First Mildura Irrigation Trust (14,132 acres irrigated), supervised by the Commission.

‡ Not available.

§ Incomplete.

¶ Does not include 334,321 acre-ft. of private diversion.



### *Works under Construction and Projected*

The most important works under construction are the £15 mill. channel enlargement and remodelling in the Goulburn–Loddon Irrigation System. This has been necessitated by the enlargement of Eildon Reservoir, and the construction of Cairn–Curran and Tullaroop Reservoirs, which have enabled more than twice as much water to be supplied to the System as was previously available. Half of the new channel works has been finished, and at the present rate of progress the programme should be completed in six years, subject to the availability of funds.

The embankment of Eppalock Dam, under construction on the Campaspe River, was completed to its designed height, and the storage of water commenced in the reservoir in May, 1962. The completion of the ancillary works and the pipeline to Bendigo is in progress.

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.

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.

### **Further References**

The history of State irrigation is described on pages 479 to 483 of the Victorian Year Book 1962.

Articles on the Wimmera–Mallee Region Water Supply and Flood Protection, River Improvement, and Drainage will be found on pages 499 to 502 of the Victorian Year Book 1963.

### **Water Supply in Victoria**

#### *River Flow*

The gross water resources expressed as total mean annual stream flow in Victoria, but including catchments in New South Wales in the Murray Basin above Albury and in the Snowy Basin north of the border, are about 18,935,000 acre-ft., of which it is estimated that 16,535,000 acre-ft. runs off to streams in Victoria proper.

After the Snowy Mountains Hydro-electric Scheme is completed the mean annual gross volume in Victoria will be somewhat as follows :—

VICTORIA—ESTIMATED MEAN ANNUAL GROSS WATER RESOURCES

Particulars	Flow
Total, Victoria, plus Upper Murray and Snowy waters from New South Wales .. .. .	'000 acre-ft. 18,935
<i>Less (to New South Wales)—</i>	
(a) Half River Murray Flow at Albury .. ..	1,910
(b) Three-quarters of Snowy Waters Diverted Inland ..	675
	2,585
Total Estimated Victorian Volume .. ..	16,350

The natural resources represented by the larger figure of 18,935,000 acre-ft. are distributed as follows :—

VICTORIA—MAIN NATURAL WATER RESOURCES

Catchments	Mean Annual Natural Flow	Discharging to—
	'000 acre-ft.	
<i>Northern Streams—</i>		
Upper Murray, Mitta, and Kiewa*	3,820 *	River Murray at Albury
Ovens .. .. .	1,350	River Murray at Yarrowonga
Broken .. .. .	240	Lower Goulburn River
Goulburn .. .. .	2,480	River Murray at Echuca
Campaspe .. .. .	220	River Murray at Echuca
Loddon .. .. .	230	River Murray above Swan Hill
Avoca .. .. .	60	Lake Bael Bael
Wimmera and Others .. ..	185	Lake Hindmarsh, &c.
Total, Northern Streams ..	8,585	
<i>South-eastern Streams—</i>		
Yarra .. .. .	980	Port Phillip Bay
Bunyip and Others, Including Dandenong Creek	380	Westernport Bay and Port Phillip
South Gippsland Ranges .. ..	740	Bass Strait
Latrobe, Macalister, Thomson, and Avon	1,770	Gippsland Lakes
Mitchell and Tambo .. ..	1,170	Gippsland Lakes
Snowy† and East Gippsland Streams	2,400	Tasman Sea
Total, South-eastern Streams	7,440	

\* Shared equally between New South Wales and Victoria in accordance with the River Murray Waters Agreement 1915.

† Headwaters diverted to the Tumut and Murrumbidgee Rivers in accordance with the Snowy Mountains Agreement—diversion works to Swampy Plain and River Murray are in progress.

VICTORIA—MAIN NATURAL WATER RESOURCES—*continued*

Catchments	Mean Annual Natural Flow	Discharging to—
	'000 acre-ft.	
<i>South-western Streams—</i>		
Glenelg, Streams in the Portland Area, and the Hopkins	1,390	Southern Ocean
Otway Ranges .. .. .	900	Southern Ocean
Lake Corangamite Internal Drainage Basin	140	Lake Corangamite
Barwon and Moorabool .. .. .	310	Bass Strait
Little River, Werribee, and Maribyrnong	170	Port Phillip Bay
Total, South-western Streams	2,910	
Total .. .. .	18,935	

This assessment is based on systematic recording of river flows at gauging stations throughout the State over many years, with discharge measurements from time to time to correct and allow for changes in conditions of stream channels.

River gauging commenced on the Coliban River at Malmsbury in Central Victoria in 1875, and on the Goulburn at Murchison in 1881. There were 20 river stations in 1900, 47 in 1925, 122 in 1950 and 182\* in 1962, as well as a number maintained by the State Electricity Commission and the Melbourne and Metropolitan Board of Works.

Between 1875 and 1945, the average number of discharge measurements never exceeded two per gauging station per annum. These have now increased to more than six per annum. At the end of the Second World War, only ten automatic water level recorders were installed; in July, 1962, there were 115 on streams and a large number on the main irrigation channels. These instruments are a great improvement on the daily-read gauge staff as they provide a continuous record and minimize human error.

The storage capacity of reservoirs necessary to regulate (i.e., make less variable) the flow of any particular stream depends on the variation of flow above and below the average. In this respect Victorian rivers are in two broad geographic areas, the dividing line being the Sydney-Melbourne railway. Streams to the west have a much more variable flow pattern than those to the east of this line.

*Water Use in Northern Victoria*

The settlement of Northern Victoria in relatively small holdings had its genesis in the discovery of gold in the Colony in 1851, a large increase of population in the years 1851-1855, and the election of the first Parliament in 1856. Many of the gold seekers were disappointed, and there was much unemployment in Melbourne in 1858 and 1859.

\* Excluding stations on the Lower Murray maintained for the River Murray Commission.

This, in turn, led to the Selection Acts of 1860 and 1862, under which settlers were able to acquire up to 640 acres at £1 an acre on very easy terms.

Those who settled in Northern Victoria suffered great hardship in the 1881 to 1885 drought, which led to a Royal Commission on Water Supply, the Irrigation Act of 1886, and the beginning of Irrigation from the Goulburn, Loddon, and Murray Rivers.

At the turn of the century, the capacity of reservoirs to support this embryo development was less than 100,000 acre-ft., which proved quite inadequate to give a supply through the very severe 1901 to 1903 drought. By 1912, storage had been increased to 350,000 acre-ft., mainly because of the belated completion of the first stage of Waranga Reservoir, an off-river storage filled by diversion (at Goulburn Weir) of waters of the Goulburn River through what is now known as the Stuart Murray Canal.

The water supply failed again in the 1913 to 1915 drought, but after the First World War, the position began to improve, and by 1940, with irrigation established over Northern Victoria from Shepparton to Boort, storage capacity was about 1,750,000 acre-ft. Despite this, water shortages occurred during 1944 and 1945.

After the end of the Second World War, accelerated irrigation expansion made necessary the provision of further storage to enable a high degree of control to be imposed on waters of the Upper Murray, Mitta, Goulburn, Campaspe, and Loddon Rivers. The situation in 1962 was as follows :—

**VICTORIA—RIVER FLOW, STORAGE, AND SUPPLY IN  
NORTHERN VICTORIA, 1962**  
( '000 acre-ft.)

River	Mean Annual Flow	Storage Capacity	Supply (Twelve Months)	River and Evaporation Losses, &c. (Est.)	Total Usage plus Losses, &c. (Est.)
Murray at Albury (N.S.W. and Victoria) .. .. .	3,820	2,500	..	452	..
Murray (Victoria) .. .. .	1,910	1,250	1,324*	226	1,550‡
Ovens .. .. .	1,350	Nil	19*	..	19
Broken .. .. .	240	Nil	10*	..	10
Goulburn .. .. .	2,480	3,083	1,345†	130	1,475
Campaspe .. .. .	220	306	93§	24	117
Loddon .. .. .	230	193	88*	22	110
Avoca .. .. .	60	Nil	6*	..	6
Wimmera and Upper Glenelg** ..	284	546	135††	53	188
Total .. .. .	6,774	5,378	3,020	455	3,475

\* Diversions from the river 1961-62.

† Diversions from Goulburn River (1,271), plus depletion of Waranga Reservoir (74), 1961-62.

§ Available in 1962-63 following completion of Eppalock Reservoir.

‡ Supplied in part by the unregulated flow of Victorian tributaries to the Murray.

\*\* A south-flowing stream diverted northward.

†† Supplied from storages and the Wimmera River, 1961-62.

*Water Use in South-eastern Victoria*

The pattern of water supply development in the South-east is in striking contrast to the dry North. The climate is kinder; water, relatively speaking, is plentiful, and stream flow is less variable.

The streams which are used now, and on which most attention is likely to be focussed in future, are the Yarra, Bunyip, Latrobe, and the Thomson, for which the total mean annual flow is a little over 3 mill. acre-ft. of which approximately 80 per cent. is not used. In addition, the Mitchell and the Tambo, which are hardly used at all, discharge an annual average of 1,170,000 acre-ft. and the Snowy about 1 mill., after deducting volumes which it is expected will be diverted by the Snowy Mountains Authority.

The position in 1962 was as follows :—

**VICTORIA—RIVER FLOW, STORAGE, AND SUPPLY IN  
SOUTH-EASTERN VICTORIA, 1962**  
(’000 acre-ft.)

River Basin	Main Streams	Mean Annual Flow	Total Mean Annual Flow	Storage Capacity	Available Annual Supply plus Losses (1962)
Yarra .. ..	Lower Yarra ..	622	..	..	..
	Upper Plenty ..	6	..	..	..
	Watts .. ..	104	..	..	..
	O’Shannassy ..	92	..	..	..
Bunyip .. ..	Upper Yarra ..	156	980	240	300
	Upper Bunyip and Tarago	49	..	..	11
	Lower Bunyip, Dandenong Creek, and Others	331	380	3	9
Latrobe .. ..	Latrobe above Yalourn	530	..	7	40*
	Tyers above Moondarra Reservoir	110	..	28	69
	Lower Latrobe ..	160	800	25	5
Thomson .. ..	Thomson above Cowwarr Weir	324	..	..	..
	Macalister above Glenmaggie Reservoir	480	..	..	..
	Avon, &c. ..	166	970	154	202
Mitchell .. ..	All Streams ..	850	850	..	2
Tambo .. ..	{ Tambo .. ..	179 }	320	..	2
	{ Nicholson and Others	141 }			
Snowy .. ..	Lower Snowy ..	1,008†	1,008	..	..
East Gippsland ..	All Streams ..	500	500	..	2
South Gippsland ..	Tarwin, Jack, Agnes, &c.	740	740	..	3
Total .. ..	.. ..	6,548	6,548	457	645

\* A much greater volume is diverted for (S.E.C.) cooling, most being returned to the river.

† Allowances have been made for the effects of the diversion of the waters of the Upper Snowy River to the River Murray and Murrumbidgee River (approx. 892,000 acre-ft. per annum when the Snowy Scheme is completed).

Of the total in the last column (645,000 acre-ft.), about 425,000 acre-ft. would be for the City of Melbourne and for other towns and industry, including water used for, or in connexion with, power generation in the Latrobe Valley, expressed as the difference between water actually diverted and that returned to the river. Most of the remainder is used (or is available for) irrigation on the lower reaches of the Thomson and its main tributary, the Macalister. This supply comes from diversion (without storage) of the former at Cowwarr Weir, supported by diversion (with storage) of the Macalister—at Glenmaggie Reservoir and Maffra.

#### *Water Use in South-western Victoria*

The pioneers of the well-favoured Western District of Victoria came from Tasmania to Portland Bay and Port Phillip, pushed inland with great enterprise, and took up the countryside in large sheep runs. Closer settlement of this region, possibly the most fertile tract in Australia, is gradually changing the pattern of land tenure, bringing problems of surface water management, some of which are most unusual.

The reason for this lies, to some extent, in the physiography of Western Victoria, which developed following a geologically recent period of intense volcanic activity. Thick lava flows engulfed the former drainage system, forming the great treeless plains, broken by strange basaltic rises and immature streams. The new pattern developed with numerous lakes in closed depressions, including Corangamite and Gnarpurt, which had a combined surface area of about 76,000 acres in March, 1962.

Stream flow is much less than would be expected from the rainfall, because of retention of run-off in swamps and lakes, flat gradients, and the relatively high porosity of the basalt itself. Flow is also most irregular—much more so than in Eastern Victoria—and comparable with the Loddon and Wimmera.

On the other hand, underground water is plentiful, but is mineralized by salts taken into solution from the basalt. Stream flow at low stages is also saline, but livestock bred in the District do well on water from both sources.

The salinity of the many lakes varies with the volume of water they contain from time to time and the frequency with which they overflow. Lake Corangamite contained (March, 1962) about 850,000 acre-ft. of water and probably 25 mill. tons of dissolved salts. It is fairly certain that nothing has overflowed since 1838 when the lakeside was first settled, although this event was imminent in 1875, 1956 and, 1960\*.

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\* A spillway channel 25 miles long, leading to the Barwon River, via Warrambine Creek, was completed in 1959.

A rise in level and volumetric contents in the period 1951 to 1960 was, in the main, due to higher-than-average rainfall over this 10-year period (taken as a whole), but it seems likely that the drainage of small lakes and swampy lands in the catchment was also a contributing factor.

The first works of water supply in the District were at Ballarat. The Water Commissioners of this City, who recently celebrated 100 years of activity, and those of the Geelong Trust, have controlled the headwaters of Leigh or Yarrowee, and the Moorabool to a relatively high degree. Headwaters of the Barwon are also diverted for Geelong and nearby towns, and the western branch of this stream will be effectively controlled by storage of 18,000 acre-ft. to be impounded by a dam approaching completion near Forrest.

The headwaters of the Gellibrand and its tributaries are diverted (including withdrawals by high pressure pumps) for town supplies at Colac, Camperdown, Terang, Warrnambool, and smaller towns.

The Werribee River has been developed to a moderate degree for irrigation. The storages (Pykes Creek and Melton Reservoirs), although not large enough to give security of supply in a drought of exceptional severity such as that experienced during the Second World War, have provided a good supply in subsequent dry periods of shorter duration.

In order to facilitate industrial growth adjacent to the coal fields on the outskirts of Bacchus Marsh, without increasing the already appreciable risk of short supply for irrigation in the Werribee valley, water is impounded in the small (2,700 acre-ft.) Newlyn Reservoir, situated at the foot of the Northern slope of the Great Dividing Range, in the Loddon River catchment. From this storage water may be pumped at the rate of 21 acre-ft. per day over the Range into the Moorabool catchment. It is then routed via existing streams and channels (with some additions) to Bacchus Marsh. These works—known as the Central Highlands Scheme—were commissioned in May, 1962, when storage in the Werribee Basin was almost exhausted.

The only other significant development is the diversion northward of the Upper Glenelg to support the Wimmera-Mallee domestic and stock system. The topography in this case was favourable because it was found possible to provide a reservoir (Rocklands) with a capacity about three times the average annual stream flow, giving almost complete control of the stream. Overflow is expected to be of the order of only 10 per cent. of the total flow but, because of the comparatively shallow average depth, evaporation losses from the surface of the reservoir are relatively high. The outlet of this large storage (272,000 acre-ft.) is higher than the Divide, which made possible the building of an aqueduct (including a  $\frac{3}{4}$ -mile long tunnel) from Rocklands to the Wimmera.

The situation in detail in 1962 was as follows :—

VICTORIA—RIVER FLOW, STORAGE, AND SUPPLY IN  
SOUTH-WESTERN VICTORIA, 1962  
(’000 acre-ft.)

Basin	Main Streams or Sections	Mean Annual Flow	Total Mean Annual Flow	Storage Capacity	Available Annual Supply plus Losses (1962)
Maribyrnong ..	Maribyrnong ..	90	90	Nil	2
Werribee .. ..	Above Melton Reservoir Lower Werribee and Others	70 10	80	34	28*
Little River ..	Little River ..	3	3	..	1
Barwon .. ..	West Barwon .. East Barwon .. Lower Barwon .. Leigh .. .. Upper Moorabool .. Lower Moorabool ..	20 8 136 66 30 47	307	70†	41
Corangamite (Internal Drainage Basin)	Pirron Yallock, &c. Woody Yaloak ..	95 45	140	§	§
Otway Ranges ..	Gellibrand, Arkins Creek Others	45 855	900	Nil	6
Hopkins .. ..	Hopkins, Mt. Emu Creek, &c.	280	280	Nil	3
Portland .. ..	Moyne, Fitzroy, Eumeralla, &c.	340	340	Nil	3
Glenelg .. ..	Above Rocklands .. Wannon to Nigretta Falls Lower Glenelg ..	100 50 620	.. .. 770	355† .. ..	90 1 3
Total All Streams .. ..	.. ..	2,910	2,910	459	178
Total Excluding the Glenelg River above Rocklands Reservoir (Diverted North) ..	.. ..	2,810	2,810	104	88

\* Subject to restriction in drought.

† Includes off-river reservoirs.

§ Storage on the Woody Yaloak (Cundare Pool terminal storage) is 73,000 acre-ft., but water is saline at present. This storage is operated on a flood-mitigation routine.



*Summary*

The following table shows the river flow, storage, and supply of water in Victoria :—

VICTORIA—RIVER FLOW, STORAGE, AND SUPPLY  
(’000 acre-ft.)

Region	Mean Annual Stream Flow	Storage Capacity	Supply and Losses by Evaporation, &c.	Water Used as Percentage of Mean Annual Stream Flow
Northern Victoria, Including the Upper Glenelg .. ..	6,774	5,378	3,475*	51·3
South-east, Excluding Upper Snowy	6,548	457	645	9·9
South-west, Excluding the Upper Glenelg .. ..	2,810	104	88	3·1
Total Victoria .. ..	16,132	5,939	4,208*	26·1

\* Excludes volumes passed to South Australia.

*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 millet, 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*

Victoria's demand for water is high because of its industrial and rural development and its density of population. In the past, surface water supplies have been generally adequate, but with increased development there is now a greater need for additional use of its underground water resources. This increased water demand has shown the need for further knowledge of the underground water resources.

An investigation is being carried out by the Department of Mines in collaboration with the State Rivers and Water Supply Commission to indicate areas of demand and priority. In present practice this investigation follows two distinctly different lines. One is to meet the need for specific water supplies, such as for town use, and the other is the hydrogeological survey of the State. This survey is a long term project with the aim of determining the total underground water resources. Both these projects usually involve drilling which is carried out by the Mines Department. The Department fulfils a function as the main drilling contractor to the other departments and instrumentalities, with the exception of the State Electricity Commission. Drilling is coupled with geological service.

Departmental projects are in progress in the Wimmera, Mallee, and Northern Victoria, the Western District, and Gippsland. These projects are of a regional nature, but where necessary, the programme is designed to develop underground water to meet local needs. This may be to assist irrigation in areas above channel level or where insufficient surface supply is available. Included in this category are parts of the north and north-west of the State and also parts of Gippsland. In the Western District, the main emphasis is on providing town water supplies.

The general procedure in all of this work is for drilling to be continued down to bedrock to test all possible aquifers in the Cainozoic and possibly also the Upper Cretaceous rocks. To make best use of limited facilities, the work is concentrated in the younger sedimentary basins. Occasionally, when requested by other departments, an investigation may be carried out in areas of older rocks if a small water supply only is required. The service to private landowners and industry is limited to geological advice. Drilling is not undertaken, except under special circumstances, or when sub-surface geological information is required for departmental purposes. The discovery of new sub-surface water supplies provides scope for development and exploitation by private enterprise.

Drilling equipment operated by the Department for exploration of underground water includes rigs with depth capabilities ranging between 500 and 5,500 feet. Both cable tool and hydraulic rotary types are used. Electric logging techniques are employed in the rotary drilled holes. A core library has been established and contains samples obtained since the latter part of last century. Laboratory facilities are available for the chemical analysis of underground water and the determination of rocks, minerals and the various types of macro- and micro-fossils found during the investigations. Office records cover all departmental and some private bores and are available to the public on request.

## *Agricultural Research, Extension, and Education*

### **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.

### **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.

The Agricultural Education Division is also closely associated with the Royal Agricultural Society of Victoria in the administration and fostering of the Senior Sections of the Young Farmers' Clubs in Victoria and, through a representative Advisory Council, administers an annual government grant for this purpose. The Division also takes a prominent part in the organization of training of visiting Fellows who have been awarded fellowships for training in Australia either through the Colombo Plan or the Food and Agricultural Organization.

#### *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 the 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 activities at the School of Agriculture cover a wide field including agronomy, agrostology, and animal nutrition and physiology, with basic work in the fields of soil chemistry and agricultural biochemistry as related to both the plant and the animal. Research into various aspects of agricultural economics and farm management, together with studies of the sociological relationships of the farming community and of the farmer himself, are also undertaken.

## *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 330 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 1961-62 season, shows the position of farming in Victoria relative to other States :—

AUSTRALIA—PRINCIPAL ITEMS OF FARM ACTIVITY,  
1961-62

Particulars	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	N.T. and A.C.T.	Australia
<b>Rural Holdings—</b>								
Number .. .. .	76,949	69,866	43,287	28,886	22,082	11,117	501	252,688
Area ('000 acres) .. ..	172,327	37,754	374,501	156,897	252,783	6,551	171,622	1,172,435
<b>Principal Crops—</b>								
<b>Wheat—</b>								
Area ('000 acres) .. ..	4,498	2,849	750	2,229	4,380	16	1	14,723
Production ('000 bush.) ..	78,350	56,879	12,018	33,854	65,700	345	32	247,178
<b>Oats—</b>								
Area ('000 acres) .. ..	713	774	27	324	1,231	27	1	3,097
Production ('000 bush.) ..	13,225	16,312	412	4,391	20,187	587	16	55,130
<b>Barley—</b>								
Area ('000 acres) .. ..	201	225	177	1,271	490	19	..	2,383
Production ('000 bush.) ..	4,137	4,654	3,532	21,292	7,282	607	..	41,504
<b>Hay—All Types—</b>								
Area ('000 acres) .. ..	594	922	95	209	294	157	3	2,274
Production ('000 tons) ..	923	1,585	212	286	396	285	6	3,693
<b>Tobacco—</b>								
Area (acres) .. .. .	3,078	9,286	14,069	..	191	..	..	26,624
Production (dried leaf '000 lb.) .. .. .	3,117	6,515	12,751	..	196	..	..	22,579
<b>Onions—</b>								
Area (acres) .. .. .	490	4,456	3,173	753	479	60	*	9,411†
Production (tons) .. ..	3,082	23,784	17,921	6,915	6,290	327	*	58,319†
<b>Potatoes—</b>								
Area (acres) .. .. .	20,209	36,469	14,466	5,316	6,828	11,129	30	94,447
Production (tons) .. ..	83,301	196,032	70,675	48,479	56,171	55,645	234	510,537
<b>Other Vegetables—Area (acres)</b>	49,612	38,422	36,056	10,672	8,485	19,822	214	163,283
<b>Fruit—Area (acres) .. ..</b>	94,246	72,712	41,872	38,548	24,532	21,859	201	293,970
<b>Vineyards—Area (acres) ..</b>	17,607	45,105	3,203	57,836	9,194	..	*	132,945†
<b>Grapes for Table (tons) ..</b>	5,917	7,775	3,510	1,037	2,525	..	*	20,764†
<b>Wine Made ('000 gall.) ..</b>	6,442	3,605	36	30,836	867	..	..	41,786
<b>Currants (tons) .. .. .</b>	505	2,715	..	2,782	1,941	..	..	7,943
<b>Sultanas and Raisins (tons)</b>	11,867	64,412	..	8,620	66	..	..	84,965
<b>Livestock Numbers, 31st March, 1962—</b>								
Sheep ('000) .. .. .	69,498	27,533	22,123	16,415	18,314	3,531	300	157,714
Dairy Cattle ('000) .. ..	1,272	1,824	1,208	275	235	229	3	5,046
Beef Cattle ('000) .. ..	3,127	1,332	5,890	385	983	196	1,108	13,021
Pigs ('000) .. .. .	471	325	433	170	174	76	4	1,653
<b>Livestock Slaughtered for Human Consumption—</b>								
Sheep ('000) .. .. .	5,954	7,369	2,062	1,645	1,473	511	47	19,061
Lambs ('000) .. .. .	5,572	5,098	356	1,495	1,016	649	41	14,227
Cattle ('000) .. .. .	1,075	833	1,206	133	221	91	32	3,591
Calves ('000) .. .. .	534	478	379	68	20	44	1	1,524
Pigs ('000) .. .. .	755	587	597	232	264	120	9	2,564
<b>Wool Production ('000 lb.) ..</b>	701,168	330,639	230,333	206,985	192,155	34,443	2,743	1,698,466
<b>Principal Items of Machinery on Rural Holdings—</b>								
Tractors (No.) .. .. .	70,251	67,418	56,194	31,788	28,006	9,997	415	264,069
Shearing Machines (Stands)	68,778	38,758	18,957	27,278	19,381	4,113	312	177,577
Milking Machines (Units)	43,369	95,661	47,486	18,831	10,562	12,220	99	228,228
<b>Gross Value of Production†—</b>								
Agriculture (£'000) .. ..	127,349	115,112	105,275	62,011	74,361	19,835	204	504,147
Pastoral (£'000) .. .. .	216,747	143,880	106,198	55,925	52,655	11,655	4,432	591,492
Dairying (£'000) .. .. .	66,748	71,588	33,012	14,924	9,899	9,777	294	206,242

\* Not available for publication.

† Incomplete.

‡ Subject to revision.



Figure 13. Counties and Statistical Districts of Victoria.

## Land Occupied in Different Districts, 1961-62

For the season 1961-62, the number of occupiers of rural holdings was 69,866, the area devoted to agriculture 6,819,457 acres, and the total area occupied 37,754,022 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 1961-62

(Areas of 1 acre and upwards)

Statistical District	Total Area of Districts (Acres)	Number of Holdings	Acres Occupied				Total
			For Agricultural Purposes*	For Pasture		Unproductive	
				Sown Grasses, Clover, or Lucerne†	Natural Grasses		
	'000	No.		'000			
Central ..	4,065	14,523	302	1,230	848	288	2,668
North-Central ..	2,930	4,438	111	626	1,204	159	2,100
Western ..	8,775	12,857	396	3,817	1,859	502	6,574
Wimmera ..	7,395	6,090	1,885	1,651	1,956	497	5,989
Mallee ..	10,784	6,235	2,727	783	3,168	888	7,566
Northern ..	6,337	11,670	1,176	1,641	2,436	286	5,539
North-Eastern ..	7,221	5,032	125	959	1,795	799	3,678
Gippsland ..	8,739	9,021	98	1,308	1,257	977	3,640
Total ..	56,246	69,866	6,820	12,015	14,523	4,396	37,754
PERCENTAGE OF ABOVE TO AREA OCCUPIED							
Central ..	..	..	11.32	46.10	31.78	10.80	100.00
North-Central ..	..	..	5.29	29.81	57.33	7.57	100.00
Western ..	..	..	6.02	58.06	28.28	7.64	100.00
Wimmera ..	..	..	31.47	27.57	32.66	8.30	100.00
Mallee ..	..	..	36.04	10.35	41.87	11.74	100.00
Northern ..	..	..	21.22	29.63	43.98	5.17	100.00
North-Eastern ..	..	..	3.40	26.08	48.80	21.72	100.00
Gippsland ..	..	..	2.69	35.94	34.53	26.84	100.00
Total ..	..	..	18.06	31.82	38.47	11.65	100.00
PERCENTAGE IN EACH DISTRICT OF TOTAL IN STATE							
Central ..	7.23	20.79	4.43	10.24	5.84	6.55	7.07
North-Central ..	5.21	6.35	1.63	5.21	8.29	3.62	5.56
Western ..	15.60	18.40	5.81	31.77	12.80	11.42	17.41
Wimmera ..	13.14	8.72	27.64	13.74	13.47	11.30	15.87
Mallee ..	19.17	8.93	39.98	6.51	21.81	20.20	20.04
Northern ..	11.27	16.70	17.24	13.66	16.77	6.51	14.67
North-Eastern ..	12.84	7.20	1.83	7.98	12.36	18.18	9.74
Gippsland ..	15.54	12.91	1.44	10.89	8.66	22.22	9.64
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		343	
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
<b>Total Classified Holdings</b>	<b>58,470</b>	<b>36,042,098</b>	<b>110,930</b>	<b>4,542,567</b>	<b>2,106,043</b>	<b>9,211,063</b>	<b>20,071,495</b>
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
<b>Total All Holdings</b>	<b>69,778</b>	<b>37,736,530</b>	<b>116,121</b>	<b>4,576,617</b>	<b>2,180,266</b>	<b>9,407,051</b>	<b>21,456,475</b>

Artificial Fertilizers

In 1961-62 artificial fertilizers were used on 2,821,546 acres of wheat; 1,000,425 acres of other cereal crops; 73,695 acres of vegetables; 94,236 acres of orchards; 203,734 acres of other crops; and 9,660,923 acres of pastures. Superphosphate is the main fertilizer used on both crops and pastures and in 1961-62 amounted to 171,898 tons or 82 per cent. of the total artificial fertilizer used on all crops and 537,323 tons or 95 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 1957-58 to 1961-62 :—

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
1957-58 ..	41,167	3,690	191	43,234	9,684	548
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

\* Not available.

*Aerial Agriculture*

One of the earliest applications of an agricultural chemical by an aeroplane occurred in Louisiana, U.S.A., in 1917, when a cotton field was dusted with an insecticide. The first recorded application by aircraft in Australia was in 1929, when a pine forest near Ballarat, Victoria, was treated in an attempt to control the lesser case moth. This method of pest control was not continued, however, and it was not until 1948 that the aerial application of fertilizers and sprays began to be appreciated.

About this time farmers and graziers realized the benefit of using aircraft for pasture improvement and for the control of insects and weeds. Terrain which was too steep or rough for topdressing by ground machinery could now be treated by aircraft, giving the property a natural increase in carrying capacity. The spraying of crops could also be more effectively conducted and the aeroplane is, in fact, the best practicable distributor for the spraying of crops such as tobacco, which cannot be treated without damage by existing ground equipment.

The aerial agriculture industry in Victoria grew 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. A recent large scale air liberation of fish was conducted by the Department of Fisheries and Wildlife. On each stage flight, an aircraft dropped 33,000 fish and the operation represented a considerable saving over the cost of normal ground liberation.

As the demand for aerial agriculture has grown, it has been necessary to provide aircraft capable of lifting greater loads with greater safety than the war surplus machines which were once adequate. Aircraft which are capable of carrying more than a ton of topdressing or spraying material are now used, together with other types with carrying capacities of 8 cwt. to 15 cwt. These latter may be used when the topography of the area under treatment is such that landing strips of suitable dimensions for the larger aircraft are not available, or when greater manœuvrability is necessary. Modern and expensive aircraft, loading equipment, highly trained aircrews, and loader operators are now part of the aerial agriculture industry.

Since 1956-57, statistical information has been collected by the Department of Civil Aviation and details for each of the years 1957-58 to 1961-62 are shown in the following table:—

### VICTORIA—AERIAL AGRICULTURE

Particulars	Unit	Year Ended 31st March—				
		1958	1959	1960	1961	1962
Total Area Treated * † ..	acres	339,019	505,805	616,531	806,592	972,269
Topdressed or Seeded ..	acres	253,596	253,489	372,597	580,169	676,219
Sprayed or Dusted Materials Used—	acres	85,423	155,256	134,561	196,297	231,098
Superphosphate ..	cwt.	341,300	317,900	459,520	749,020	877,200
Seed ..	lb.	7,240	8,320	24,000	1,624	5,135
Aircraft Utilization (Flying Time) ..	hours	6,662	6,523	6,622	9,598	8,545

\* Areas treated with more than one type of material in one operation are counted once only.  
† Includes 97,660 acres baited for rabbit destruction in 1959, 109,373 acres in 1960, 29,981 acres in 1961, and 64,952 acres in 1962; 345 acres treated for mosquito eradication in 1961; and 290 acres for fly eradication in 1962.

### Farm Machinery

The number 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—				
	1958	1959	1960	1961	1962
Milking Machines—Units ..	83,819	85,608	89,657	92,315	95,661
Shearing Machines—Stands ..	34,955	35,951	37,015	37,926	38,758
Tractors—Wheeled Type ..	55,263	57,818	59,438	62,730	65,487
—Crawler Type ..	1,652	1,684	1,730	1,807	1,931
Rotary Hoes ..	8,777	9,429	9,180	9,284	9,777
Fertilizer Distributors and Broad- casters ..	26,692	27,290	27,948	29,035	29,349
Grain Drills—Combine ..	18,360	19,428	18,517	18,749	19,016
—Other ..	8,531	8,525	9,531	9,501	9,709
Maize Planters ..	972	1,020	998	*	*
Headers, Strippers and Harvesters ..	13,641	13,507	14,216	13,888	14,065
Pick-up Balers ..	6,173	7,073	8,040	8,968	9,282
Stationary Hay Presses ..	2,658	2,518	2,465	2,584	2,213

\* Not collected.

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

### Further Reference

An article on the mechanization of farming will be found on pages 493 to 495 of the Victorian Year Book 1962.

### Progress of Cultivation

The first Statistical Register of Victoria published in 1854 shows that in 1836 there were 50 acres of land under cultivation in the Colony of Victoria. By 1840 this figure had increased to 3,210 acres.

This progress continued until 1852 when 57,471 acres were under cultivation. With the discovery of gold in Victoria, agricultural progress received a temporary setback, the area of land cultivated declining to 34,816 acres in 1854. However, with the influx of population came a demand for agricultural products and, by the end of 1860, the area of land under cultivation amounted to 407,740 acres.

The following table shows the annual average area under cultivation in each decennium from 1856 to 1955 and the actual area for each of the following seven seasons 1956 to 1962 :—

### VICTORIA—ACREAGE CULTIVATED ANNUALLY

Period or Year (Ended March)	Annual Average Area in Each Decennium, 1856-1955, and Actual Area Each Year 1956-1962, 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

\* Until 1960 the area of crop included pasture cut for hay and seed. For 1961 and 1962, 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 1961-62 :—

### VICTORIA—AREA, YIELD, AND GROSS VALUE OF CROPS, 1961-62

Crop	Area	Yield	Gross Value*
	acres		£
Cereals for Grain—			
Barley—			
2 row .. .. .	212,400	4,415,434 bushels .. ..	2,426,130
6 row .. .. .	13,092	239,033 bushels .. ..	101,867
Maize .. .. .	3,309	191,774 bushels .. ..	123,797
Oats .. .. .	774,404	16,311,610 bushels .. ..	5,732,173
Rye .. .. .	17,849	136,725 bushels .. ..	92,498
Wheat .. .. .	2,848,781	56,878,353 bushels .. ..	42,696,883
Hay—			
Barley and Rye .. .. .	5,717	8,664 tons .. ..	74,799
Lucerne .. .. .	61,241	130,621 tons .. ..	987,462
Meadow .. .. .	651,587	1,116,855 tons .. ..	11,199,185
Oaten .. .. .	172,366	282,811 tons .. ..	2,961,142
Wheaten .. .. .	31,121	46,209 tons .. ..	414,933

\* 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.

VICTORIA—AREA, YIELD, AND GROSS VALUE OF CROPS, 1961-62—  
*continued*

Crop	Area	Yield		Gross Value*
				£
Green Fodder .. ..	117,811			1,091,179
Grey and Other Field Peas .. ..	20,115	410,396 bushels		338,253
Grass and Clover Seed .. ..	20,355	25,485 cwt.		368,538
Industrial Crops—				
Broom Millet .. ..	506	{ 1,950 cwt. fibre		20,475
Linseed .. ..	17,711	{ 1,059 cwt. seed		1,748
Hops .. ..	513	243,700 bushels		426,475
Mustard .. ..	635	7,606 cwt.		320,339
Tobacco .. ..	9,286	3,402 cwt.		21,102
Tobacco .. ..		58,168 cwt.		3,639,383
Vegetables—				
Onions .. ..	4,456	23,784 tons		793,902
Potatoes .. ..	36,469	196,032 tons		6,523,649
Other .. ..	38,422	206,953 tons		8,668,970
Stock Fodder—				
Pumpkins .. ..	379			16,108
Turnips, Beet, &c. .. ..	20,971			492,819
Vineyards—				
Grapes—				
Table .. ..	2,104	7,775 tons		545,823
Wine .. ..	4,657	16,263 tons		344,889
Drying .. ..	35,779	271,053 tons producing—		
		58,725 tons of sultanas		7,488,937
		6,137 tons of raisins		801,813
		2,715 tons of currants		396,147
Vines, Unproductive .. ..	2,565			
Orchards—				
Productive .. ..	50,658			12,677,535
Unproductive .. ..	22,054			
All Other Crops .. ..	7,315			3,323,375
Total Crops .. ..	5,204,628			115,112,328

\* For footnote see page 555.

The following table shows the numbers of growers of certain primary products, in each statistical district of the State, for the season 1961-62.

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 1961-62

Crops Grown	Growers in Each Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Grain Crops—									
Wheat ..	571	398	937	3,956	2,695	3,537	500	63	12,657
Oats ..	547	578	1,898	2,620	1,382	2,428	691	39	10,183
Barley ..	607	89	383	547	715	732	80	66	3,219
Maize ..	7					3	66	195	271
Green Fodder—									
Maize ..	669	91	305	12	1	36	97	971	2,182
All Other ..	1,021	441	1,435	57	60	482	492	1,054	5,042
Other—									
Potatoes ..	1,663	483	639	19	19	28	182	525	3,558
Onions ..	326	2	264	8	17	4	1	8	630
Other									
Vegetables	1,393	29	269	44	348	593	26	114	2,816
Orchards ..	1,821	157	91	129	1,273	1,030	136	63	4,700
Vineyards ..	2	1		8	2,377	115	23		2,526
Grass and Clover Seed	18	52	138	32	8	59	82	9	398
Tobacco ..						67	299		366*

\* Excluding share-farmers.

A summary of the area under cultivation in each statistical district of the State for the season 1961-62 is given in the following table :—  
**VICTORIA—AREA UNDER CULTIVATION, SEASON 1961-62**  
 (Acres)

Crop	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Grain Crops—									
Wheat ..	37,032	27,262	70,391	842,247	1,275,012	545,621	47,452	3,764	2,848,781
Oats ..	22,278	21,978	122,724	205,512	213,544	163,346	23,943	1,079	774,404
Barley ..	41,484	2,204	16,364	39,263	81,569	38,412	3,557	2,639	225,492
Maize ..	74	..	..	..	..	9	482	2,744	3,309
Field Peas ..	11,284	587	7,589	179	89	15	149	223	20,115
All Hay ..	130,721	54,539	284,484	53,900	22,066	185,959	69,215	121,148	922,032
Green Fodder ..	24,272	9,432	37,949	1,891	6,596	10,897	7,471	19,303	117,811
Grass and Clover for Seed ..	901	2,231	8,150	1,806	620	3,267	2,922	458	20,355
Tobacco ..	..	..	..	..	..	1,332	7,954	..	9,286
Potatoes ..	19,873	6,294	5,058	65	70	94	816	4,199	36,469
Onions ..	1,761	1	2,572	9	33	3	..	77	4,456
All Other Vegetables ..	20,086	105	8,150	154	2,998	5,360	152	1,417	38,422
Vines ..	4	30	..	810	42,147	674	1,440	..	45,105
Orchards ..	23,564	2,617	685	3,922	7,455	32,402	1,613	454	72,712
All Other Crops	10,434	1,047	22,298	889	18,109	2,389	1,719	8,994	65,879
Total Area under Crop ..	343,768	128,327	586,414	1,150,647	1,670,308	989,780	168,885	166,499	5,204,628
Land in Fallow	51,731	17,149	42,623	750,580	1,063,424	317,068	9,690	34,506	2,286,771
Total Area under Cultivation ..	395,499	145,476	629,037	1,901,227	2,733,732	1,306,848	178,575	201,005	7,491,399

The following table shows the yields, in statistical districts, of the principal crops for the season 1961-62 :—

**VICTORIA—YIELDS OF PRINCIPAL CROPS, SEASON 1961-62**

Crop	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	Northern	North-Eastern	Gippsland	
Grain Crops—									
Wheat bush.	807,313	650,444	1,758,060	20,757,011	20,734,227	10,887,233	1,223,759	60,306	56,878,353
Oats ..	632,395	643,379	3,926,315	4,064,698	2,760,687	3,537,204	727,460	19,472	16,311,610
Barley ..	1,170,260	58,071	529,580	733,276	1,260,129	757,307	90,009	55,835	4,654,467
Maize ..	3,090	..	..	..	..	368	17,286	171,030	191,774
Field Peas ..	206,091	14,486	179,391	2,716	778	347	3,047	3,540	410,396
All Hay tons	211,346	98,040	540,638	78,155	28,293	297,794	124,460	206,434	1,585,160
Grass and Clover for Seed cwt.	1,053	3,303	9,963	2,292	1,177	4,729	2,853	115	25,485
Tobacco ..	..	..	..	..	..	9,074	49,094	..	58,168
Potatoes tons	98,593	37,351	29,834	248	293	306	3,674	25,733	196,032
Onions ..	7,740	3	15,454	48	191	14	..	334	23,784
Wine Made gall.	*	*	*	*	*	*	*	*	3,604,607
Dried Vine Fruits—									
Raisins tons	..	..	..	..	6,132	5	..	..	6,137
Sultanas ..	..	..	..	..	58,725	..	..	..	58,725
Currants ..	..	..	..	..	2,715	..	..	..	2,715

\* 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*

Wheat is the main crop grown in Victoria, occupying approximately 2½ million acres or about half the total acreage under crop. The average annual production for the five seasons ended 1961-62 was about 48 million bushels, of which 70 per cent. was exported. Only 1 per cent. of the area sown is cut for hay. Grain yield averages 20 bushels per acre, but can be as high as 60 bushels per acre on individual farms in good seasons. The highest yield officially recorded is 78·8 bushels per acre for 50 acres grown at Murtoa in 1960.

The main wheat belt lies in the Mallee, Wimmera, and Northern Districts, where 93 per cent. of the crop is grown. The average annual rainfall varies from 10 inches in the northern Mallee to about 20-22 inches at the southern and eastern boundaries of the main wheat belt. There have been significant changes in the agricultural practices followed by Mallee farmers during the last ten years and these are described on pages 517 to 519 of the Victorian Year Book, 1963.

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

Sheep are run on most wheat farms for wool and/or fat lamb production. Wheat crops are generally grown on bare fallow land, seeding taking place from April to June. Superphosphate is applied at seeding to virtually all crops. The crop is harvested in December-January. Diseases are not a major problem, but occasionally some heavy losses can occur due to stem rust and root rot. Weeds are controlled by fallow cultivation and crop spraying.

The wheat varieties grown in Victoria are of the soft white class. The environment does not generally favour the production of wheat of very high baking quality, but recent developments, including the adoption of clover and medic ley rotation systems and the production of high yield, high quality varieties are leading to considerable quality improvement.

Victorian wheat is marketed by the Australian Wheat Board in one grade known as fair average quality (f.a.q.).

### *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, 205 country receiving elevators and a shipping terminal have been constructed, the necessary finance being obtained from loans totalling £5,572,794. 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 80 million bushels of wheat. The largest quantity of wheat delivered to railway stations by Victorian growers in any one season prior to the 1960–61 season was 59,175,593 bushels in 1915–16. A new record was established during the 1960–61 season when 63,233,548 bushels were delivered. It is anticipated that the 1962–63 deliveries to the Board will exceed the 1960–61 record deliveries.

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—				
	1958	1959	1960	1961	1962
<b>REVENUE</b>					
Australian Wheat Board—Operating and Maintenance Expenses ..	480	478	513	704	685
Australian Wheat Board—Capital Facilities Allowance .. ..	312	342	350	370	385
Interest on Investments .. ..	53	63	90	103	154
Other .. ..	1	1	1		1
<b>Total Revenue .. ..</b>	<b>846</b>	<b>884</b>	<b>954</b>	<b>1,177</b>	<b>1,225</b>
<b>EXPENDITURE</b>					
Operating and Maintenance Ex- penses .. ..	268	281	291	462	431
Administration Expenses .. ..	119	101	107	128	126
Depreciation and Renewals .. ..	93	96	114	114	128
Interest on Loans .. ..	177	178	188	207	267
Sinking Fund Charges .. ..	31	32	34	42	50
Appropriations to Reserves .. ..	113	131	252*	164	206
Other .. ..	7	7	7	6	6
<b>Total Expenditure .. ..</b>	<b>808</b>	<b>826</b>	<b>993</b>	<b>1,123</b>	<b>1,214</b>
Net Surplus .. ..	38	58	—39	54	11
Fixed Assets (At 31st October) ..	4,064	4,229	4,429	4,663	5,628
Loan Indebtedness (At 31st October)—					
State Government .. ..	955	946	935	924	913
Public .. ..	2,774	2,838	3,195	3,895	4,666

\* 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 current Stabilization Plan, ending with the 1962-63 season, provides 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. For season 1961-62, it was fixed at 15s. 9d. per bushel and for season 1962-63, at 15s. 10d. per bushel.

Total deliveries by wheat growers to the Victorian Branch of the Australian Wheat Board during season 1961-62 were 55,119,467 bushels, including 2,062,402 bushels delivered to Victorian controlled receival points in southern New South Wales. Throughout the growing period, the State did not receive a general rain, and the rainfall in this period was below average to the extent of 2 to 3 inches in the Mallee, and 4 to 5 inches in the Wimmera. Abnormally high temperatures were experienced in late September and October, when Stations in the North recorded temperatures above 90°F. on seven days. The dry conditions hastened the ripening of crops and the harvest was about a month earlier than usual. Although the crops did not receive sufficient moisture by rainfall, the moisture in the sub-soil was apparently adequate, as the average yield per acre was about 20 bushels. The quality was excellent.

*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, 1957-58 to 1961-62 are shown :—

### VICTORIA—WHEAT STATISTICS

Season	Holdings Growing Wheat (20 Acres and over)	Area	Production	Yield per Acre	Gross Value	Weight of Bushel of Wheat, f.a.q.
	No.	'000 acres	'000 bush.	bush.	£'000	lb.
1957-58 ..	8,856	1,835	32,134	17·51	22,065	65½
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

\* The production and yield per acre for 1960-61 were records.

#### Wheat Breeding

The breeding of improved varieties of wheat for cultivation by the Victorian wheat grower is a function of the Victorian Department of Agriculture. The overall objective of the breeding work is to provide the grower with new varieties which will increase yields, reduce losses due to disease and drought and improve the milling and baking quality of the grain which he produces. The increased yields resulting from the introduction of these varieties assist in offsetting increased production costs and assure the grower of a higher monetary return from his crop, while the improved quality of the grain produced ensures a better demand for Victorian wheat both in local and oversea markets.

The Victorian wheat improvement programme is an extremely comprehensive one, involving the co-operation of the wheat breeders with the cereal agronomists, chemists, and plant pathologists of the Department of Agriculture.

New wheat varieties bred by the Department of Agriculture occupy a very large percentage of the Victorian wheat area and have significantly increased local production. This represents an increased monetary return to the wheat grower. In addition, the introduction of these varieties has resulted in a substantial improvement in the quality of the grain produced with a corresponding improvement in the baking quality of the local flour.

Eight new varieties have been released for sowing since 1946 :—

1946—Insignia	1956—Olympic
1946—Pinnacle	1957—Beacon
1947—Diadem	1960—Stockade
1953—Sherpa	1963—Emblem

The following table shows the areas under the principal varieties of wheat, including wheat for hay, for the seasons 1959-60, 1960-61, and 1961-62. Varieties are tabulated in order of popularity for the last mentioned season.

VICTORIA—PRINCIPAL VARIETIES OF WHEAT SOWN

Variety (In Order of Popularity), Season 1961-62	1959-60		1960-61		1961-62	
	Acres Sown	Percentage of Total Area Sown	Acres Sown	Percentage of Total Area Sown	Acres Sown	Percentage of Total Area Sown
Insignia ..	981,765	42.64	1,325,742	48.96	1,357,440	47.13
Pinnacle ..	574,979	24.97	582,312	21.50	683,027	23.72
Olympic ..	316,148	13.73	384,599	14.20	482,194	16.74
Sherpa ..	163,818	7.11	135,351	5.00	107,724	3.74
Quadrat ..	119,428	5.19	94,646	3.50	78,494	2.73
Insignia 49 ..	64,463	2.80	91,036	3.36	71,235	2.47
Beacon ..	8,452	0.37	14,638	0.54	19,261	0.67
Baldwin ..	21,613	0.94	16,342	0.60	15,099	0.52
Gabo ..	7,383	0.32	14,638	0.54	10,260	0.36
Sabre ..	8,691	0.38	11,831	0.44	9,098	0.32
Heron ..	..	..	398	0.01	7,743	0.27
All Other Varieties ..	35,698	1.55	36,498	1.35	38,327	1.33
Total ..	2,302,438	100.00	2,708,031	100.00	2,879,902	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 551.

*Oats*

The area sown to oats in Victoria is about 1.1 mill. acres, of which about 70 per cent. is harvested for grain, 15 per cent. cut for hay, and 15 per cent. grazed completely. Some of the area harvested for grain is also grazed during the winter. The average annual grain production is about 16 mill. bushels (40 lb. per bushel) and the average hay production 325,000 tons. Average grain yield is 20 bushels per acre and average hay yield is 1½ tons per acre.

About 75 per cent. of the area sown for grain is in the Mallee, Wimmera, and Northern Districts, and 16 per cent. in the Western District. Oat grain is used on farms for stock feeding and is often held in large quantities for this purpose as an insurance against drought losses. Grain is sold on an open market through merchants or through the voluntary oat pool, and prices fluctuate widely according to seasonal conditions and supplies available. Better quality oats may be bought at a premium for milling purposes.

Oaten hay is grown for farm use in all districts and for sale in areas where chaff mills operate (i.e., near Melbourne and Ballarat). About 33 per cent. of the area sown to hay is in the Mallee, Wimmera, and Northern Districts, and 28 per cent. in the Western District.

Most of the oat area grazed completely is grazed by sheep in the winter, but in dairying districts oats are sometimes sown for autumn and winter grazing to supplement pasture growth. About 30 per cent. of the completely grazed acreage is in the Mallee District. Most oat crops are grown on stubble land with very little preparation and with a smaller amount of superphosphate (if any) than is used on wheat crops. About 88 per cent. of the area sown to oats is sown to the varieties Orient, Algerian, Avon, Algeribee, and Ballidu.

The area harvested (season 1961-62) for hay was 172,366 acres, and for grain 774,404 acres, which produced 282,811 tons of hay, and 16,311,610 bushels of grain respectively. The area of oats sown for grazing purposes amounted to 172,609 acres. The following table shows the area, yield, and gross value of oats for grain for each of the five seasons 1957-58 to 1961-62 :—

#### VICTORIA—OATS FOR GRAIN

Season			Area	Production	Yield per Acre	Gross Value
			'000 acres	'000 bushels	bushels	£'000
1957-58	..	..	622	9,528	15.31	5,313
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

\* Record production

#### Barley

Barley is sown on about 300,000 acres in Victoria each year, from which about 6 mill. bushels (50 lb. per bushel) of grain are harvested. The average yield is about twenty bushels per acre. Most of the barley sown is two-row or malting type barley, only a very small acreage being sown to the six-row, feed type.

Barley production is centred in two main districts which have favourable soil and climatic conditions for growing good quality grain suitable for malting. The most important area is the south-western Mallee and the adjoining northern Wimmera, where barley is grown on sandy soils usually in association with wheat. In this district, barley is either sown on wheat stubble land or on ley land cultivated in the autumn just before sowing. The variety Prior is almost exclusively sown, usually with superphosphate. The average district yield is about 15 bushels per acre.

The other important area is in southern Victoria between Geelong and Bacchus Marsh. In this district, barley is the main crop and is usually sown on fallowed land dressed with superphosphate. The varieties Research, and to an increasing extent, Resibee released in 1961, are grown here, and the average yield is about 30 bushels

per acre. This area is close to the main shipping terminals and growers' freight costs are considerably lower than in the northern areas. Barley is grown less intensively in other districts and the quality is rarely up to malting standard.

Barley is marketed through the Australian Barley Board, which provides an orderly marketing system for the barley produced in Victoria and South Australia. The Board classifies growers' grain, on sample, into three qualities—malting, milling, and feed—with price differentials between each quality and grades within quality.

Practically all of the malting quality barley is malted in Australia for local use or for export as malt, but most of the milling and feed grades are exported to Europe and Asia.

The following table shows the area, yield, and gross value of barley for each of the five seasons 1957-58 to 1961-62 :—

#### 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
1957-58 ..	334	18	5,201	246	15.57	13.91	15.49	3,280
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

#### 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, 1957-58 to 1961-62, are given in the following table :—

#### VICTORIA—MAIZE PRODUCTION

Season	For Green Fodder	For Grain								Gross Value
		Area			Production			Yield per Acre	£	
		Hybrid	Other	Total	Hybrid	Other	Total			
acres			bushels							
1957-58 ..	8,122	3,459	819	4,278	208,444	33,320	241,764	56.51	158,708	
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	

### Rye

Cereal rye is a minor crop in Victoria, with about 22,000 acres sown to it annually. This acreage, however, is many times greater than the pre-war area of just over 1,000 acres. The average production is about 155,000 bushels (60 lb. per bushel) per year, and the average yield is about 7 bushels per acre.

Rye is not a cash crop and it is sown mainly for control of sand drift on sandhills in the Mallee District and, to a much lesser extent, for winter grazing in the colder winter districts. Not all of the area sown is harvested, so that the average yield per acre is probably higher than that recorded. The variety sown is almost exclusively South Australian rye. Superphosphate is used as a fertilizer, with a portion of the Mallee area sown with a mixture of superphosphate and ammonium sulphate.

In recent years, European migrants to Australia have created a small demand for rye for human consumption.

The following table shows the area, yield, and gross value of rye for each of the five seasons 1957-58 to 1961-62 :—

VICTORIA—RYE PRODUCTION

Season	Area	Production	Yield per Acre	Gross Value
	acres	bushels		£
1957-58 .. .. .	17,807	84,975	4.77	72,229
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

### 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, 1961–62

Kind	Area	Production	Yield per Acre
	acres	tons	
Wheaten .. .. .	31,121	46,209	1·48
Oaten .. .. .	172,366	282,811	1·64
Lucerne .. .. .	61,241	130,621	2·13
Barley, Rye, &c. . . . .	5,717	8,664	1·52
Grasses and Clovers .. .. .	651,587	1,116,855	1·71
Total .. .. .	922,032	1,585,160	1·72

The following table shows, in respect of each statistical district of the State, the quantity of ensilage made during the 1961–62 season, and the stocks of ensilage and hay held on rural holdings at the 31st March, 1962 :—

VICTORIA—ENSILAGE MADE AND FARM STOCKS OF  
ENSILAGE AND HAY  
(Tons)

Statistical District	Ensilage Made, 1961–62	Stocks at 31st March, 1962	
		Ensilage	Hay
Central .. .. .	62,496	28,796	196,208
North-Central .. .. .	7,655	7,211	102,652
Western .. .. .	53,739	31,719	480,935
Wimmera .. .. .	2,966	13,420	169,489
Mallee .. .. .	2,631	13,210	71,032
Northern .. .. .	17,070	20,930	381,998
North-Eastern .. .. .	28,289	28,082	185,930
Gippsland .. .. .	87,038	38,015	259,481
Total .. .. .	261,884	181,383	1,847,725



*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.

With few exceptions, potatoes are grown in the better soils in higher rainfall areas on and south of the Central Dividing Range, the main districts being Koroit, Beech Forest, Bellarine Peninsula, Ballarat to Trentham, Kinglake, Gembrook, Koo-Wee-Rup and the Gippsland hill country.

Over the past 20 years there has been a substantial increase in the volume of potato production in Victoria. This is due, not to greater area, but to improvement in the average yield, which has nearly doubled. Higher yielding varieties now being grown, improved cultural methods, availability of reputable seed through certification and approval schemes, and wider use of irrigation have contributed to this improvement. Potato growing has become increasingly mechanized and this has precipitated the trend for production of this crop to pass to specialist growers having larger individual areas.

The following table shows the area, yield, and value of potatoes for each of the five seasons 1957-58 to 1961-62 :—

VICTORIA—POTATO PRODUCTION

Season			Area	Production *	Yield per Acre	Gross Value
			acres	tons		£'000
1957-58	..	..	49,846	251,159	5.04	3,326
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

\* Includes amounts held on farms for seed, stock feed, &c., as follows :— 53,842 tons in 1957-58 ; 42,345 tons in 1958-59 ; 31,951 tons in 1959-60 ; 23,910 tons in 1960-61, and 25,506 tons in 1961-62.

*Onions*

The principal onion growing areas are in the Central and Western Districts. In the season 1961-62 these areas were responsible for 98 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 1957-58 to 1961-62 :—

## VICTORIA—ONION PRODUCTION

Season			Area	Production	Yield per Acre	Gross Value
			acres	tons		£'000
1957-58	..	..	5,368	40,678	7.58	638
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

*Linseed*

Linseed, first grown commercially in Victoria in 1947, is the major oil-producing crop and is a valuable adjunct to the agricultural crops grown in the 20-30-in. rainfall areas in the western part of the State. In the period to 1955, areas sown and average yields per acre were low because of disease susceptible varieties and the fact that technical knowledge concerning the growing and handling of the crop was still being developed.

The release of disease resistant varieties such as Uruguay and Hazeldean has substantially increased average yields per acre. Increased sowings of the new variety Bonnydoon should further increase average yields. Other factors influencing the expansion of the industry have been the improved technical knowledge available to growers, the decline of flax growing, and price stability.

Linseed oil is one of the chief components of paints, varnishes and linoleum, and has many other industrial uses. The presscake or meal which remains after the oil has been extracted from the crushed seed is a valuable stock food.

The following table shows the area, yield, and value of linseed for each of the five seasons 1957-58 to 1961-62 :—

## VICTORIA—LINSEED PRODUCTION

Season			Area	Production	Yield per Acre	Gross Value
			acres	bushels		£
1957-58	..	..	4,091	45,946	11.23	78,558
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

*Tobacco*

Tobacco has been grown in Victoria for about 100 years. The history of the industry is punctuated by periods of prosperity alternating with long intervals of recession, and in the period between 1932 and 1948, the tobacco acreage established in Victoria declined from over 12,000 acres to less than 1,000. This contraction indicates the uncertainty then inherent in the industry, and it is only in recent years that it has exhibited any degree of stability.

The following table shows the area, yield, and gross value of tobacco in each of the five seasons 1957-58 to 1961-62 :—

VICTORIA—TOBACCO PRODUCTION

Season			Area	Production	Yield per Acre	Gross Value
			acres	cwt. (dry)		£'000
1957-58	..	..	3,252	32,884	10·11	1,862
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

Further reference to tobacco will be found on pages 531 to 533 of the Victorian Year Book 1963.

*Fruit*

Victoria produces almost one-third of Australia's tree-fruit production, three-quarters of the canned fruit production, and two-thirds of the Commonwealth's dried fruits. Approximately 118,000 acres are devoted to orchards and vineyards.

Fruit producing areas north of the Great Dividing Range have a rainfall which varies from 10 inches per annum in the Mallee to 20 inches to 40 inches per annum. Many orchards in southern areas in this part of the State rely on irrigation. Distribution is mostly by gravity except for small areas of citrus under spray irrigation.

In the south of the State, where apples, pears, plums, cherries, dessert peaches, lemons, and berries are produced, rainfall varies from 20 inches to 40 inches per annum. Many orchards in southern Victoria are irrigated from dams, rivers, or town supplies.

The largest area under a single horticultural crop is the vineyard area embracing Mildura, Swan Hill, and the War Service Land Settlement area at Robinvale.

Most of the dried fruit production is exported, mainly to the United Kingdom. The pome fruits are next in importance, most of the apples being sold locally or interstate, while most of the pear production is exported to the United Kingdom.

Peaches, pears, and apricots for canning are produced in the Goulburn Valley, where large co-operative canneries are also located.

The total output of 5,217,000 cartons\* of canned fruits for the 1962 season comprised apricots, 504,000 cartons; peaches (including 268,000 cartons of mixed fruits), 2,024,000 cartons; and pears, 2,689,000 cartons.

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 1957-58 to 1961-62 are given in the following table:—

### VICTORIA—FRUIT GROWING

Particulars	1957-58	1958-59	1959-60	1960-61	1961-62
Number of Growers .. .. .	5,044	5,065	5,076	4,783	4,700
Area .. .. . acres	66,221	66,746	68,657	71,415	72,712
Gross Value of Fruit Produced (£'000)	11,743	10,328	10,530	12,679	12,678
Kind of Fruit—					
Apples .. .. . bushels	3,125,088	2,969,521	3,005,669	3,134,917	3,045,808
Pears .. .. . "	3,730,427	3,279,535	3,582,549	3,704,278	4,605,808
Quinces .. .. . "	39,941	31,431	19,595	20,563	32,564
Apricots .. .. . "	692,139	291,547	468,055	206,521	631,810
Cherries .. .. . "	74,387	97,872	101,189	90,297	137,494
Nectarines .. .. . "	19,875	18,770	18,896	14,981	16,940
Peaches .. .. . "	1,287,011	1,033,712	1,210,021	955,224	1,686,496
Plums .. .. . "	157,332	139,579	156,940	106,833	184,723
Prunes .. .. . "	28,878	20,540	26,594	23,853	24,383
Lemons .. .. . "	159,085	162,616	156,217	199,535	150,738
Oranges—					
Navels .. .. . "	359,627	410,086	447,817	343,659	399,168
Valencias .. .. . "	396,997	385,228	538,710	314,730	543,832
Other Oranges .. .. . "	40,001	34,801	42,184	31,024	42,167
Mandarins .. .. . "	15,773	24,180	20,081	27,095	27,824
Grapefruit .. .. . "	55,900	66,894	67,214	69,844	80,902
Figs .. .. . "	4,414	4,660	3,218	2,273	2,349
Passion-fruit .. .. . "	5,609	4,800	2,197	2,680	2,288
Olives .. .. . "	12,510	12,281	11,741	23,425	13,178
Gooseberries .. .. . cwt.	1,250	953	1,172	703	775
Loganberries .. .. . "	2,262	2,458	2,462	2,144	1,787
Raspberries .. .. . "	2,150	2,486	2,862	2,616	2,936
Strawberries .. .. . "	8,211	7,739	6,692	6,531	10,712
Youngberries .. .. . "	1,823	3,383	3,833	4,172	4,649
Other Berries .. .. . "	†	†	1,505	625	679
Almonds .. .. . lb.	121,937	92,838	115,444	74,900	141,819
Filberts .. .. . "	7,827	6,615	6,590	7,244	15,510
Walnuts .. .. . "	137,544	139,660	149,136	148,357	135,254

\* Basic export carton containing 24 cans of No. 2½ size.

† 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 572 to 574.

**VICTORIA—DRIED TREE-FRUITS**  
(lb.)

Year Ended 31st March—	Apricots	Peaches	Pears	Prunes	Others	Total
1958 .. .. .	24,841	2,105	744	401,108	3,686	432,484
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

*Orchards*

Information on the number of trees of each variety is collected triennially, the latest figures relating to 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								Total
	Central	North-Central	West-ern	Wim-mera	Mallee	North-ern	North-East-ern	Gipps-land	
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	..	3	148	415,759	137,616	1,817	..	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.

Dried fruits production in these districts for the season 1961-62 amounted to 58,725 tons of sultanas, 2,715 tons of currants, and 6,137 tons of raisins. After dipping and sun drying by the grower, the dried fruit is processed and packed in packing houses. Approximately 72 per cent. of Victorian produce for the season 1961-62 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.

### *Growing of Grapes for Wine*

Wine growing is as old as Australia's settled history. The first vines were brought out by Governor Phillip in 1788, who planted them at Farm Cove, now Sydney's Botanic Gardens.

From Sydney and the Hunter Valley, wine-growing fanned out north, west, and south. In Victoria, as in New South Wales, most of the early vineyards developed near the capital.

The first was planted by William Ryrie at Yering, near Lilydale in 1838. He brought cuttings and plants with him when he shifted his sheep and cattle to Victoria from the Monaro Plains in the far south of New South Wales. Yering produced some promising wines. Later, when the vineyard was acquired by two Swiss vigneronns, Paul and Hubert de Castella, it sent to Europe some fine light dry reds that won prizes in open competition with the world's best.

While the Swiss Vignerons were producing their light reds, vineyards south of Melbourne, near Geelong, were yielding some high quality wines of a slightly fuller type.

Near the Bendigo goldfields, in the great gold rush of the 1850's, vines were being planted and wine was being made. All these later ceased producing grapes—either because of the devastation of the deadly vine disease, phylloxera, or through diversion of the land to more profitable agriculture.

Other Victorian districts, however, were developing by now. Most extensive of them was the Murray District, on the south side of the river from the Albury-Corowa vineyards in New South Wales. This area is now sometimes called the Rutherglen District. It includes, besides Rutherglen, Wahgunyah, Chiltern, Barnawartha and other places in north-east Victoria. But viticulture also reaches westward along the river to Mildura and beyond, into dry, sandy country that requires irrigation from the river.

The man who planted the first vines near Rutherglen was Lindsay Brown. He was a farmer at Gooramadda in the early 1850's. It has gone on record that this great wine lover, whenever he came across a luckless gold prospector, would plead earnestly with him to "sink about 18 inches and plant vines." Many of them took his advice, and as many others, watching the vines prosper, followed suit, the Rutherglen district by the 1860's led all the rest in Victorian wine production.

Rutherglen is, today, specially famous for its sweet wines. These, when the grapes can be allowed to develop high maturity, are in the liqueur class. But the district also produces, here and there, some notable dry wines, both red and white, generally of the full-bodied type.

In the west of Victoria, between Ararat and Stawell, on the over-land line between Melbourne and Adelaide, another wine area was opened up by a French girl. Mademoiselle Blampied and her 16-year-old brother left their family in Lorraine in the 1850's to try their luck on the Victorian goldfields. In 1860 they moved over to the west of the goldfields and planted St. Peter's vineyard, near Stawell. Other vineyards followed. Today their centre is the town of Great Western.

One of the famous men in this district in its early days was Hans Irvine. He brought out from Europe experts in sparkling wines. For maturing his products, he tunnelled out of decomposed granite an elaborate network of vaults and cellars. These cellars have now been extended to a length of three and a half miles. The district's champagne has been acknowledged by Continental experts as being high in quality.

The phylloxera plague of the 1870's and 1880's reduced Victorian viticulture to a mere shadow. In some areas there remained only a tenth of the original vineyards. But gradually some of this loss was made up.

Today, Victoria is producing an average of 2½ mill. gallons of wine a year. The record quantity of 3,604,607 gallons was produced in 1961-62.

Although Victoria's total production is slight compared with South Australia, or even New South Wales, the output, ranging from the lightest dry wines to the richest desserts, is significant for its variety and quality.

A considerable portion of Victorian wine is marketed in Great Britain, New Zealand, and Canada.

Particulars of vine production for the five seasons 1957-58 to 1961-62 are given in the following table :—

VICTORIA—VINE-FRUIT PRODUCTION

Season	Number of Growers	Area		Production				
		Bearing	Not Bearing	Grapes Gathered	Wine Made	Dried Fruits		
						Raisins	Sultanas	Currants
		acres		'000 cwt.	'000 gall.	cwt.		
1957-58 ..	2,467	42,089	2,678	5,188	2,582	122,628	1,012,220	83,063
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

### 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 £9 mill. each year to Victoria are harvested from about 38,000 acres.



Most of the vegetables are grown in southern Victoria close to Melbourne. These areas are fairly frost free and also have a well distributed rainfall of from 20 to 35 inches. Soils on which vegetables are grown in southern Victoria vary widely and include sands, sandy loams, clay loams, peats, and volcanic types. In general, most of these soils require 5 to 12 cwt. of fertilizer per acre for each crop.

The northern portion of the State is warm in summer, but more subject to frost in winter. It contains many areas which are ideal for growing early spring crops and is the home of tomato production, particularly for processing. In this warmer climate vegetables can be planted earlier and mature earlier than in most of the southern districts.

Prior to the season 1942-43, statistics dealing with vegetable growing were collected only from those market gardeners who cropped an area of 1 acre or more. Only the surface area employed for vegetable growing was tabulated and, as a consequence, due to double cropping, the actual area utilized was understated. Furthermore, vegetables grown between trees and vines in orchards and vineyards were not recorded.

From the season 1942-43, however, particulars were obtained of all vegetables grown on areas of 1 acre and upwards, including those grown in orchards and vineyards, and allowance was made for double cropping. These changes in practice, therefore, invalidate any comparison with previous years.

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 567-568.

VICTORIA—VEGETABLES FOR HUMAN CONSUMPTION,  
1961-62

Type	Area Sown	Production	Gross Value
	acres	tons	£'000
Carrots .. .. .	1,828	21,115	1,324
Parsnips .. .. .	773	7,452	567
Beetroot .. .. .	566	5,399	330
Tomatoes .. .. .	5,267	62,279	1,751
French Beans .. .. .	2,718	5,052	395
Green Peas—			
Sold in Pod .. .. .	7,253	8,678	669
Canning .. .. .	6,957	5,952	206
Cabbages .. .. .	1,766	20,774	396
Cauliflowers .. .. .	2,826	33,582	993
Brussels Sprouts .. .. .	728	2,587	309
Lettuce .. .. .	2,443	8,447	761
Pumpkins .. .. .	2,051	11,589	281
Other Vegetables .. .. .	3,246	14,047	687
Total .. .. .	38,422	206,953	8,669

*Minor Crops*

There are other crops cultivated in Victoria in addition to those enumerated on pages 555 to 557. 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 1958 to 1962. 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 1st 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 " " ..	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
1958 " " ..	80	1,708	1,017	27,036	274
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

\* 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 551.

**Changing Patterns in Animal Husbandry**

An article on this subject appears on pages 539 to 541 of the Victorian Year Book 1963.

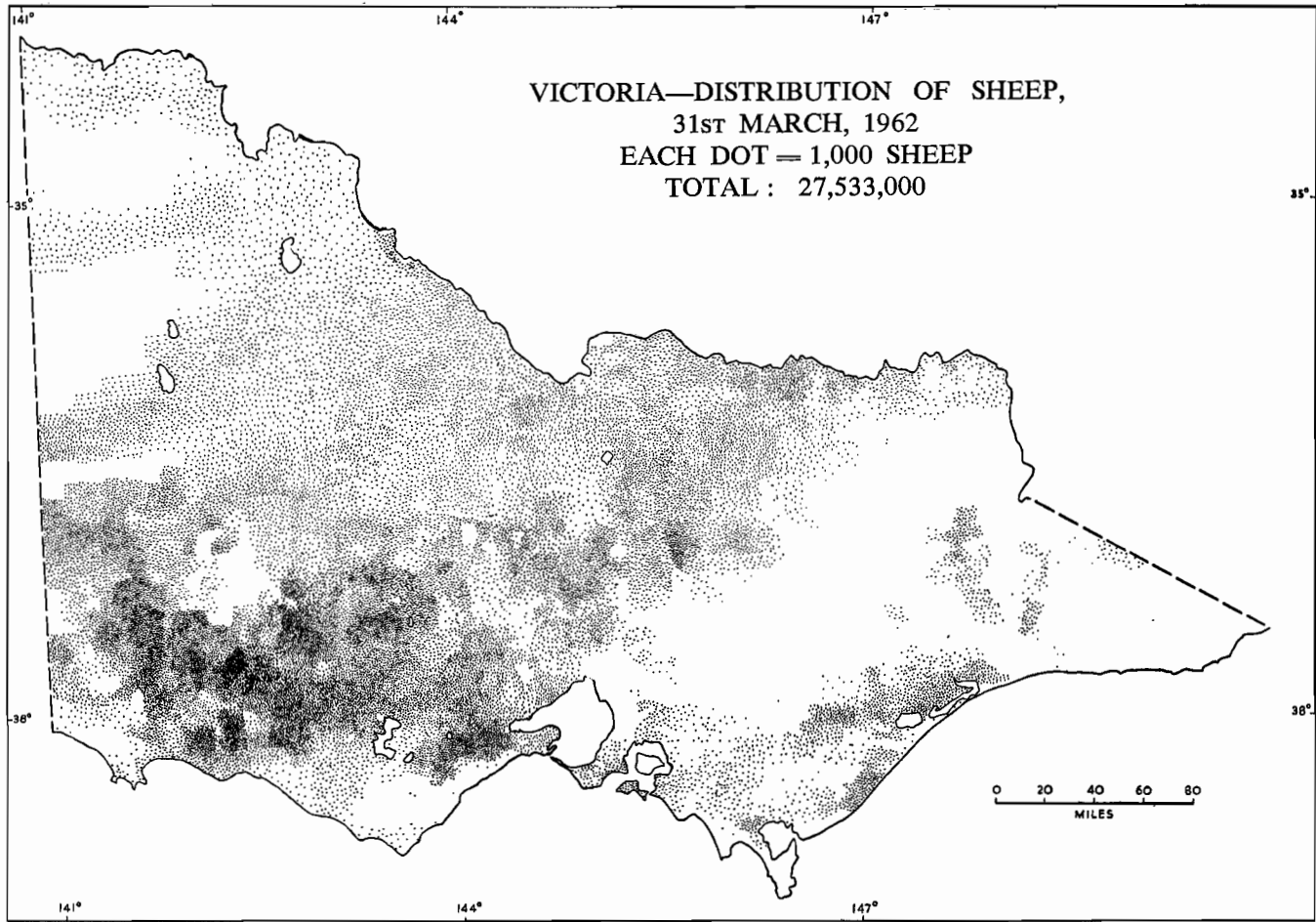


FIGURE 14.

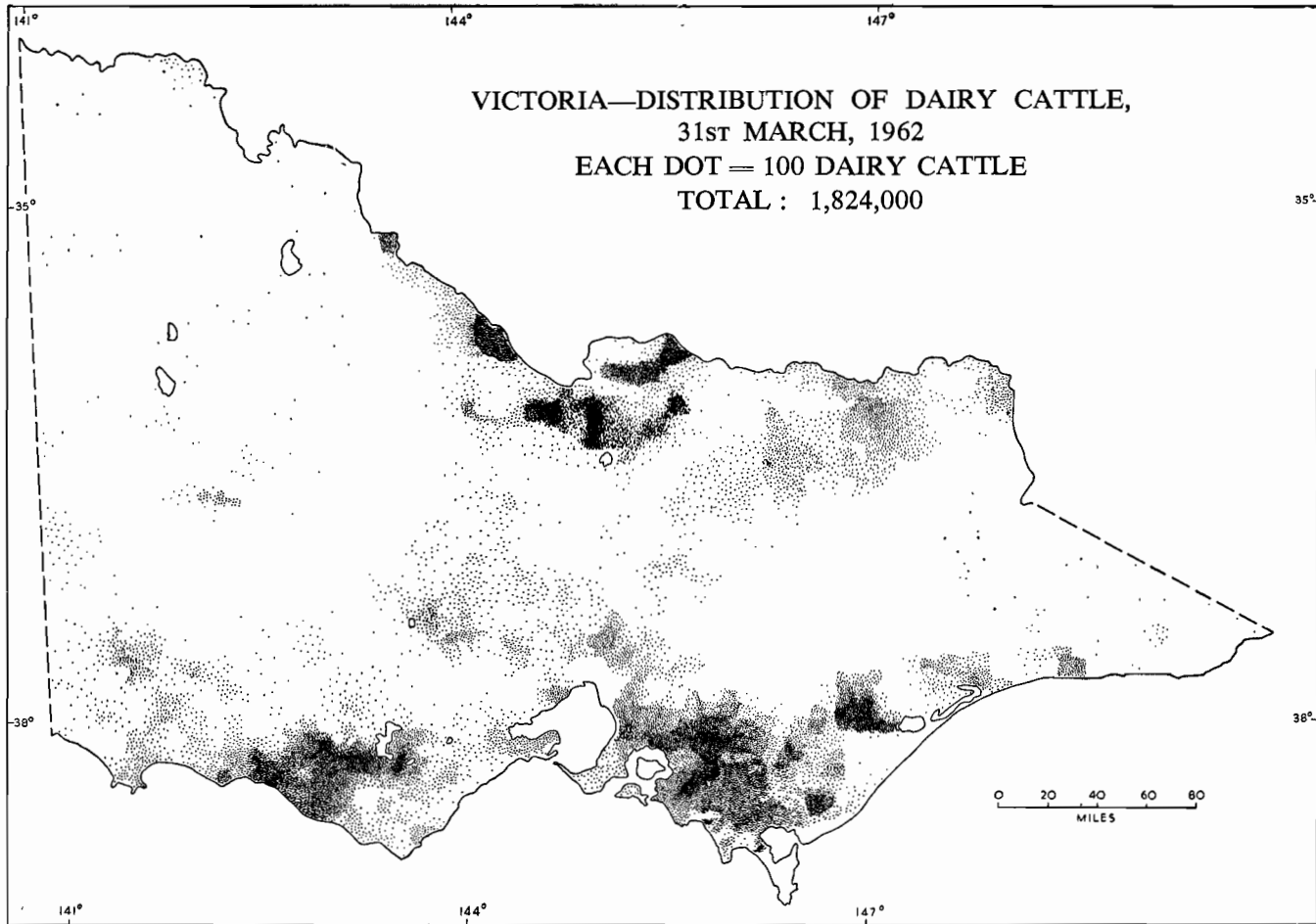


FIGURE 15.

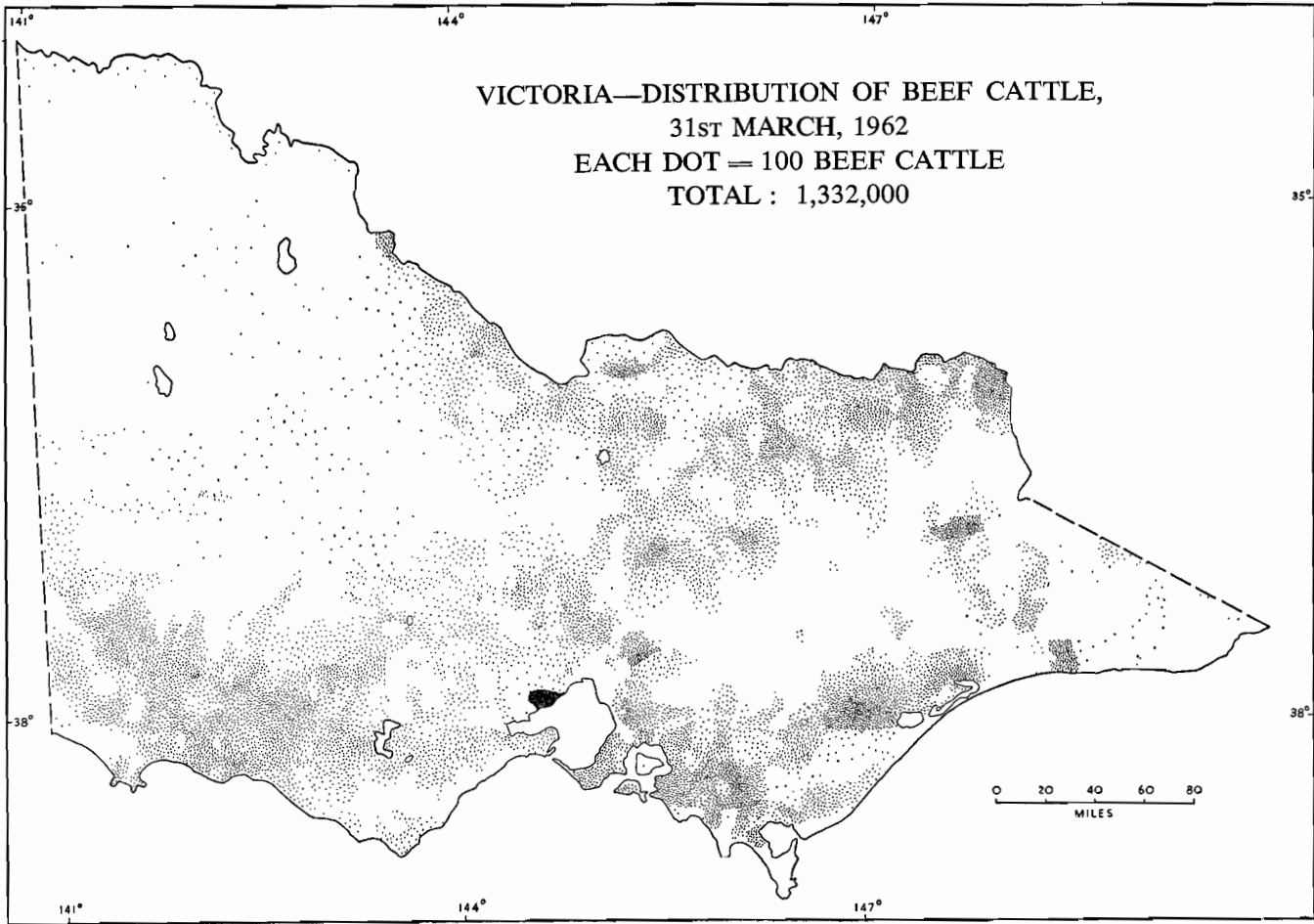


FIGURE 16.

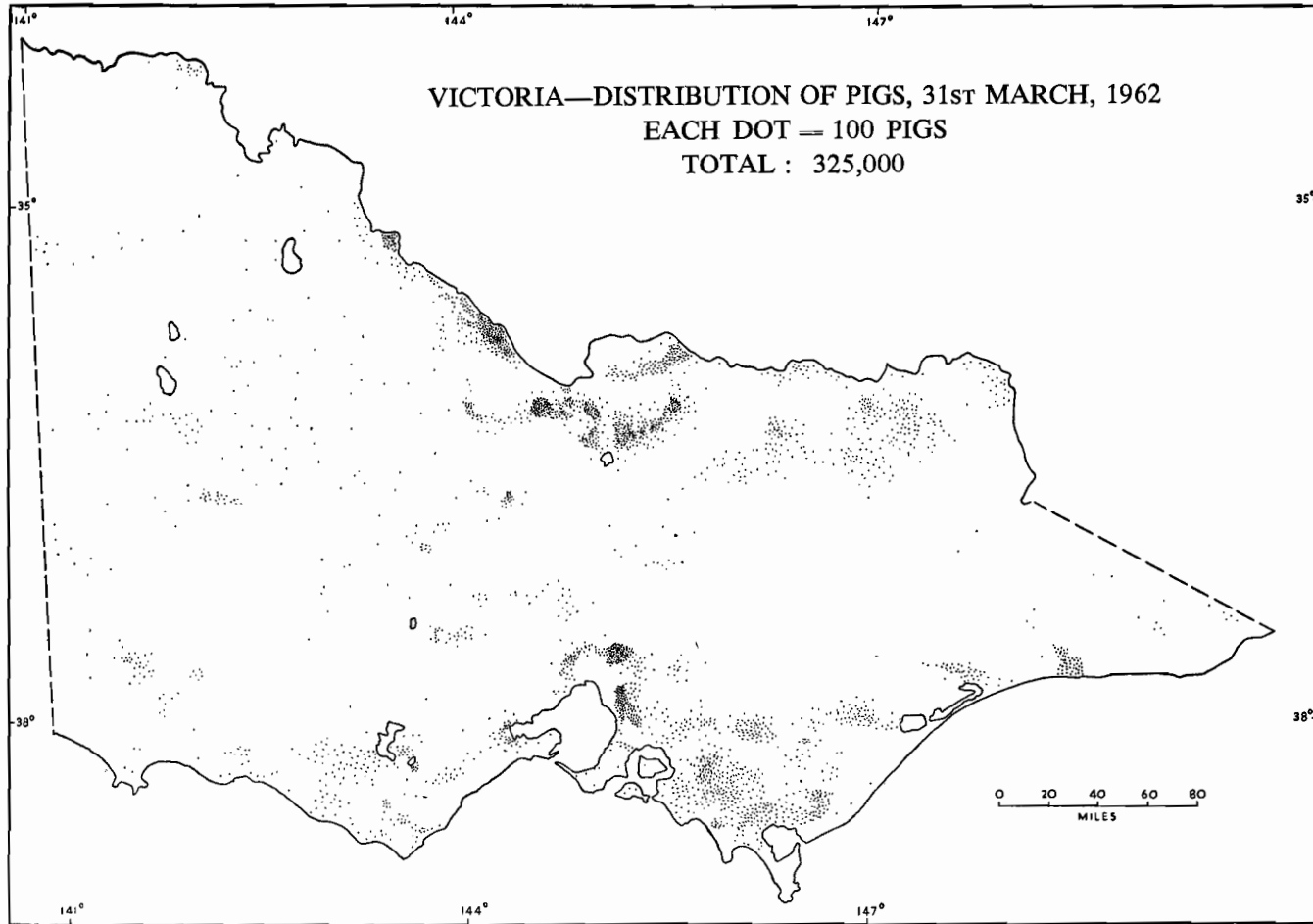


FIGURE 17.

The following table contains particulars of livestock in each statistical district of the State at 31st March, 1962 :—

VICTORIA—DISTRIBUTION OF LIVESTOCK, MARCH, 1962  
(‘000)

Particulars	Statistical District								Total
	Central	North-Central	West-ern	Wim-mera	Mallee	North-ern	North-East-ern	Gipps-land	
Horses .. ..	14	4	13	4	3	9	7	8	62
Dairy Cattle—									
Cows in Milk or Dry	181	23	261	25	18	212	92	318	1,130
Springing Heifers ..	18	3	33	3	2	24	18	33	134
Other Heifers for Dairying ..	34	5	49	5	3	43	13	48	200
Calves, under 1 Year—									
Heifer .. ..	41	7	62	7	5	61	23	74	280
Other .. ..	5	2	8	4	2	7	4	5	37
Bulls, 1 Year and over	7	1	10	2	1	8	3	11	43
Total Dairy Cattle	286	41	423	46	31	355	153	489	1,824
Beef Cattle—									
Cows .. ..	89	36	188	19	12	63	109	113	629
Calves, under 1 Year	53	23	110	13	9	52	72	80	412
Bulls, 1 Year and over	4	2	9	1	1	3	5	4	29
Other .. ..	33	16	64	6	5	33	49	56	262
Total Beef Cattle ..	179	77	371	39	27	151	235	253	1,332
Total All Cattle ..	465	118	794	85	58	506	388	742	3,156
Pigs .. ..	57	10	32	15	20	96	33	62	325
Sheep .. ..	2,237	2,093	9,688	4,288	1,868	3,932	1,860	1,567	27,533

### 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 the year round. Each year, in the dry summer and autumn typical of our Mediterranean-type climate, pastures dry off and die, and in the winter they may be extremely slow growing. These regular periods of pasture shortage for the grazing animal must be provided for by mechanically harvesting surplus pasture growth in the usual flush spring season, processing and storing it, and later feeding it back to the animals during the periods of shortage.

### Further References

Further information about fodder conservation is set out on pages 565 to 566 of this issue, and pages 543 to 545 of the Victorian Year Book 1963.

### Dairying Industry: Some Economic Problems in Victoria

#### Introduction

Victoria is well endowed with the physical means of dairy production. It is free of the snow-induced “winter droughts” which are common to dairying countries of the Northern Hemisphere and although summer and autumn dryness can certainly reduce production, its effect is not drastic here.

The dairying industry does, however, encounter problems other than those of production technique. Some are geographically imposed hindrances to the distribution of products to those who need them, while others stem from the system of trade and economics which has been evolved.

### *Organization*

Most dairy herds are relatively small and support only one farm family; few would support three or more families. Thus, producers consist of a large number of independent farmers, each tending his own herd in some degree of isolation. The industry, therefore, lacks some of the unity of purpose and organization of its competitors. Only in recent years has it begun to use collective funds for research and promotion of sales of butter and cheese in Australia.

Milk is "harvested" every day of the week over the greater part of a year. Because of its perishable nature there can be no question of stockpiling milk, rush-processing it when the market is good, and curtailing activity when prices are lower. Once a cow commences her lactation, incomplete milking in any one week, or any lowering of her yield due to a lower level of feeding, will tend to reduce her yield in succeeding weeks and so lower the overall margin of profit over costs.

As compared with manufacturing industries, in which working hours can be regulated, any type of animal farming suffers a disadvantage, since the animals must be fed every day. The dairy farmer, in addition, must milk his cows twice a day, seven days a week. Efficient workers, sometimes including members of the farmer's own family, thus tend to be attracted to other employment which can offer shorter working hours and free week-ends. The dairy farmer is left to do all the farm work himself with the aid of machinery, or to seek less efficient help, or to engage help on a profit-sharing basis as in share farming.

### *Marketing*

Production of butter and cheese in Victoria is far in excess of local requirements and a substantial surplus is available for export overseas.

The United Kingdom market, which absorbs most of Australia's exports, is very sensitive to changes in supply. A relatively small increase from any source may cause a significant drop in price and this, of course, affects the returns to all exporting countries.

Most western countries have fostered local dairy industries to ensure fresh milk supplies and because inclusion of grazing animals in the farming system helps maintain soil fertility. Any surplus milk is processed and Australian exports are competing with these products of the locally protected industry as well as those of other exporting countries.

Reconstituted liquid milk from powder and sterilized liquid milk do not yet offer acceptable substitutes for local milk supplies. Expansion of the preserved milk market depends, therefore, on the acquisition of



a taste for these products in areas not now well served with fresh milk and upon the ability of the countries concerned to balance their payments with exports of their own products or services.

### *Capital Investment and Profitability*

In general, an efficient dairy farmer can make his business profitable if it is large enough, if the total capital invested does not exceed £350 per milking cow, and if expenditure on bought-in feed is not unduly high. In fact, dairying land often changes hands at prices which raise the investment beyond this figure.

A typical dairy farm in Victoria must be able to support 45 or more milking cows, together with herd replacement stock, if it is to prove profitable when bought at current prices. There are farms coming on the market, however, which are unprofitable because they are too small, or because they are in a marginal climate, are too difficult to work, have a weed or pest problem, or are simply over-capitalized.

### *Manufacturing*

On the manufacturing side, the trend is to fewer and larger factories, equipped to make a number of different products and to change from one to another as market prospects dictate. Victoria now has about three-quarters of the number of dairy factories it had in 1945 although production is significantly higher now.

Diversification brings its own problems, however, either because expensive plant is idle or working below capacity when supplies are low or because less profitable products are made when seasonal supply is at its peak. Factories equipped to make a number of products need skilful management and highly qualified technicians, especially as the choice of products to be made rests with the management of each individual factory.

### *Management Problems*

The individual dairy farmer does not enjoy an ideal environment for good business management due to prolonged physical effort from early morning till evening. He can do little about increased cost or lower prices except by deferring maintenance or reducing his personal expenditure. The remedy on an uneconomic farm almost always lies in the direction of increased output. He can rarely diversify to any extent as his holding is too small for any other broadacre industry and too large for intensive culture. Capital equipment also commits him to dairying and if he has a refrigerated milk tank, he is restricted to the sale of milk rather than cream. He may feel compelled to employ family or hired labour uneconomically so that there will be someone to milk and feed the cows if he should fall ill.

On the other hand, gradual increase in farm carrying capacity may compel him to increase his already high capital investment in machinery as a substitute for labour since he would have to increase the herd by at least twenty cows merely to meet the cost of employing an extra full-time helper.

The owner of a farm of the minimum profitable size also has a retirement problem, since the farm which kept his family will not support both his household and that of a son, share farmer, or employee who is required to do the farm work.

### Statistics

Victoria is the principal milk producing State and in 1961-62 the Victorian output (642 mill. gall.) represented 44 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
1958 .. .. .	48,451	1,235	565,439	65,431
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

\* 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
1958 .. .. .	194,596	33,294	96,810	24,854	21,515
1959 .. .. .	198,652	39,140	87,288	24,585	22,764
1960 .. .. .	201,394	43,152	99,063	23,822	19,133
1961 .. .. .	201,447	44,799	87,321	22,396	22,576
1962 .. .. .	215,328	53,633	87,406	23,745	27,362

\* 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, 1957, 1958, and 1960 to 1962. Details for 1959 are not available.

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

At 31st March—	Number of Herds—							Total
	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	
1957.. ..	6,183	2,916	1,953	3,448	6,893	8,042	1,310	30,745
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

\* Includes cows in milk and dry and springing heifers.

The numbers of farmers with less than five cows were:—18,408 in 1957, 18,414 in 1958, 16,865 in 1960, 16,858 in 1961, and 16,015 in 1962. These numbers were excluded from the above table as the groups were considered too small to be classed as dairy herds.

#### *Eradication of Tuberculosis*

An article on this subject appears on pages 525–526 of the Victorian Year Book 1962.

#### *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, 1962, was 325,120. About 76 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, 1962

Statistical District	Boars	Breeding Sows	All Other	Total Pigs	Pig Keepers
Central .. ..	1,114	9,170	46,087	56,371	1,385
North-Central .. ..	300	1,498	7,996	9,794	472
Western .. ..	842	5,431	26,043	32,316	1,359
Wimmera .. ..	408	2,222	12,337	14,967	996
Mallee .. ..	514	3,009	16,559	20,082	1,003
Northern .. ..	1,960	14,980	78,616	95,556	2,126
North-Eastern .. ..	908	5,567	27,433	33,908	1,233
Gippsland .. ..	1,573	9,786	50,767	62,126	1,873
Total .. ..	7,619	51,663	265,838	325,120	10,447*

\* Of this number 2,491 had herds of under 5 pigs, 1,282 herds of 5 and under 10, 1,877 herds of 10 and under 20, and 4,795 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.

A description of the types and qualities of wool in the wool growing districts of the State appears on pages 534 to 536 of the Victorian Year Book 1962.

The numbers of sheep in Victoria in selected years since 1861 are shown in the table on page 576. The distribution of all livestock is shown in the table on page 581 and the dot maps on pages 577 to 580.

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 1958 to 1962 :—

#### VICTORIA—LAMBING

Season	Ewes Intended for Mating	Ewes Actually Mated	Lambs Marked	Proportion of Lambs Marked to Ewes Mated*
				%
1958 .. .. .	10,794	10,173	8,455	83
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

\* Prior to 1958 this proportion was based on farmers' intentions at the beginning of the season.

### 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, 1962, 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, 1962 ( '000 )

Particulars	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	North-ern	North-Eastern	Gipps-land	
Rams .. .. .	30	22	111	46	25	60	25	17	336
Breeding Ewes*	1,010	830	3,900	1,707	1,096	2,199	958	685	12,385
Other Ewes ..	79	66	539	196	25	78	49	53	1,085
Wethers .. ..	709	804	2,962	1,414	266	756	488	485	7,884
Lambs .. .. .	408	371	2,176	925	457	839	340	327	5,843
Total Sheep and Lambs	2,236	2,093	9,688	4,288	1,869	3,932	1,860	1,567	27,533

\* Includes breeding ewes not mated (975,615 at 31st March, 1962).

## VICTORIA—LAMBING, 1961 SEASON

Particulars	Statistical District								Total
	Central	North-Central	Western	Wimmera	Mallee	North-ern	North-Eastern	Gipps-land	
Ewes Mated '000 ..	961	761	3,318	1,603	1,066	2,217	894	620	11,440
Lambs Marked '000 ..	858	644	2,767	1,325	931	1,940	758	550	9,773
Percentage ..	89	85	83	83	87	87	85	89	85

VICTORIA—LAMBING FORECAST, 1962 SEASON  
(As Advised by Farmers at 31st March, 1962)  
( '000)

Breed of Rams Used	Ewes Mated or Intended to be Mated (For Lambing during 1962 Season)								Total
	Statistical District								
	Central	North-Central	Western	Wimmera	Mallee	North-ern	North-Eastern	Gipps-land	
Merino ..	150	250	1,448	883	159	310	176	168	3,544
Corriedale or Polwarth ..	190	107	1,081	233	86	188	122	66	2,073
Shortwool Breeds ..	512	280	504	236	440	1,117	439	266	3,794
Longwool Breeds ..	82	116	424	192	379	506	172	127	1,998
Total	934	753	3,457	1,544	1,064	2,121	909	627	11,409

*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 districts) at the 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, 1962 :—

VICTORIA—BREEDS OF RAMS, 31ST MARCH, 1962

Statistical District	Merino	Corriedale	Polwarth	Border Leicester	Dorset Horn	South-down	Other	Total
Central .. ..	3,849	4,451	1,875	1,562	9,283	4,868	4,012	29,900
North-Central .. ..	7,287	2,830	441	2,459	4,507	2,700	2,292	22,516
Western .. ..	52,440	20,940	11,623	2,001	7,691	3,995	12,494	111,184
Wimmera .. ..	26,784	6,544	456	3,857	5,534	283	2,561	46,019
Mallee .. ..	3,973	1,934	112	8,236	8,916	101	1,402	24,674
Northern .. ..	9,454	5,000	618	13,341	22,981	4,474	3,814	59,682
North-Eastern .. ..	4,401	2,300	860	3,875	7,550	2,349	3,516	24,851
Gippsland .. ..	4,034	1,340	300	1,390	3,757	2,524	3,588	16,933
Total .. ..	112,222	45,339	16,285	36,721	70,219	21,294	33,679	335,759



*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 1961-62

Statistical District	Shorn		Wool Clipped (Including Crutchings)		Average	
	Sheep	Lambs	Sheep's	Lambs'	Per Sheep	Per Lamb
	'000		'000 lb.		lb.	
Central ..	2,122	513	21,391	1,524	10·08	2·97
North-Central	2,027	453	20,448	1,309	10·09	2·89
Western ..	8,813	2,358	88,117	6,919	10·00	2·93
Wimmera ..	4,143	1,076	44,818	3,215	10·82	2·99
Mallee ..	1,565	529	17,105	1,579	10·93	2·99
Northern ..	3,793	1,099	38,475	3,276	10·14	2·98
North-Eastern	1,775	411	16,872	1,071	9·51	2·60
Gippsland ..	1,426	408	13,786	1,101	9·67	2·70
Total ..	25,664	6,847	261,012	19,994	10·17	2·92

## 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.	
1957-58 ..	24,832	7,182	240,510	19,487	9·69	2·71
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

## 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.
1957-58 ..	259,997	36,493	296,490	76,255	61·73
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

*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 to the Wool Marketing Auction Systems will be found on pages 560–561 of the Victorian Year Book 1963.

*Wool-growing Districts*

A description of the main wool-growing districts in Victoria will be found on pages 534 to 536 of the Victorian Year Book 1962.

**Further Reference**

A history of the pastoral industry in Victoria will be found on pages 549 to 556 of the Victorian Year Book 1963.

**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 1957-58 to 1961-62 :—

**VICTORIA—STOCK SLAUGHTERED**

Particulars	Stock Slaughtered in Establishments and on Farms and Stations				
	Year Ended 30th June—				
	1958	1959	1960	1961	1962*
			'000		
Sheep .. ..	5,500	5,940	7,623	6,374	7,389
Lambs .. ..	4,123	4,573	4,888	5,002	5,099
Bulls and Bullocks ..	271	256	215	165	263
Cows .. ..	394	441	367	267	356
Young Cattle .. ..	180	173	199	172	216
Calves .. ..	559	527	497	436	508
Pigs .. ..	473	462	458	514	588
			No.		
Number of Slaughter-houses .. ..	320	316	306	296	282

\* Average dressed weights per carcass during 1961-62 were : Sheep 46·24 lb. ; Lambs 34·10 lb. ; Bulls and Bullocks 620·55 lb. ; Cows 418·95 lb. ; Young Cattle 279·17 lb. ; Calves 47·60 lb. ; Pigs 104·65 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 1957-58 to 1961-62 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
1958 .. .. .	24,694	1,335	35,193	3,227
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

**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 the State's forest

productivity is the annual harvest of honey taken from many species of eucalyptus in all parts of the State. Today, Victoria ranks second among the States in its apicultural activities.

With an average registration of some 1,250 apiarists and some 300–400 large commercial operators, Victoria's honey production averages about 8 mill. lb. per annum. Hive yields are relatively good and range between 90 and 150 lb. per hive per annum.

Eucalyptus species provide the bulk of the honey crop—up to 95 per cent. of the total—with the balance made up of clover and one or two minor species of ground flora.

The industry is, of necessity, migratory, whole apiaries with the necessary plant being moved by road transport from one part of the State to another following the flowering of the eucalyptus species in the forests. 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 thousands of colonies are hired out to fruit and seed growers to ensure profitable sets of fruit and seed.

Marketing is the great problem of the industry. Violent fluctuations in the annual honey crop are, in the absence of any organized marketing arrangements, attended by similar fluctuations in the prices of produce and, in some cases, considerable carry-over from one season to the next.

Governmental interest in the industry is authorized by the *Bees Act* 1958 and extends to disease control, advisory services and research into problems of apiculture.

Prior to the season 1936, the statistics of honey and beeswax were based on returns received from apiarists who were permanent occupiers of holdings of 1 acre and upwards. As a consequence, production was understated because of the exclusion of (a) hives on areas of less than 1 acre, and (b) travelling beekeepers who were not occupiers of rural holdings. Commencing with the season 1935–36, all beekeepers were required to furnish returns. The collection was further revised in 1958 to exclude apiarists with less than five hives. Particulars relating to apiculture for the five years 1958–1962 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.		£	
1958 ..	1,086	104,265	5,884,381	67,431	429,069	20,721
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

\* Apiarists with 20 hives and over numbered 779 in 1958, 771 in 1959, 818 in 1960, 822 in 1961, and 830 in 1962.

## Primary Industries Other than Farming

## Forestry

## Forest Estate

Of the 56,245,760 acres in Victoria, the forest estate consists of 5,569,947 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 1958 to 1962 :—

## VICTORIA—FOREST TIMBER

('000 Cubic Feet)

Item	Unit	Year Ended 30th June—				
		1958	1959	1960	1961	1962
<b>Logs for Sawing, Peeling, Slicing, or Pulping—</b>						
Forest Hardwoods .. ..	'000 cub. ft.	69,281	67,175	67,546	63,779	60,789
<b>Softwoods—</b>						
Indigenous Forest Pines .. ..	.. ..	469	406	152	217	205
Plantation Grown Pines .. ..	.. ..	5,913	7,102	7,554	7,822	8,139
Total Logs .. ..	.. ..	75,663	74,683	75,252	71,818	69,133
<b>Hewn and Other Timber (Not Included above)</b>						
Firewood (a) .. ..	.. ..	12,320	10,790	9,481	10,942	9,385
Other (b) .. ..	.. ..	6,160	4,427	5,274	4,956	4,676

(a) Excludes mill waste used as firewood.

(b) Includes telephone and electric supply transmission poles, bridge and wharf piles and beams fencing timbers, railway sleepers, and mining timbers.

During the year ended 30th June, 1962, forest industries felt the full impact of the lower rate of economic activity since November, 1960. Output of mill logs was the lowest since 1953–54 and some 12 per cent. lower than in the peak year of 1956–57.

The decline in consumption of firewood, which has been noticeable for several years, has continued, despite the temporary check in the previous year. Having regard to the alternative sources of heating and power which are now available, wood fuel is unlikely to make up the ground which it has lost.

Output of pulpwood also decreased during the first half of the financial year, but in the latter part the demand recovered well. During the year the largest user of pulpwood renewed the agreement for supply at an increased royalty rate.

The demand for items included under "other" in the preceding table is influenced by so many factors, some of which are only temporary, that output trends are obscured in the collective total, but by and large the demand for wood products is being well sustained.

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, 1962, was 51,902 acres.

*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 36,600 acres. Many of the areas originally planted with other conifers are now being converted to this species.

Present stands are principally 12 to 32 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
1958	..	..	..	..	1,692	662
1959	..	..	..	..	1,861	925
1960	..	..	..	..	2,129	1,143
1961	..	..	..	..	2,196	1,392
1962	..	..	..	..	2,659	1,527

\* In previous editions of this publication this table was given in terms of thousands of super feet Hoppus Log Volume. At a recent conference of heads of Australian forest services it was decided to publish statistics in terms of cubic feet, true measure under bark, and the present table has been prepared accordingly.

Privately owned softwood plantations were estimated to comprise 61,600 acres at 30th June, 1961, 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, National Parks, and privately owned lands within 1 mile of them (except in the Mallee country, lands under the control of the Melbourne and Metropolitan Board of Works, and some urban fire districts). 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 all operations 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 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.

A new development which is still in the testing stage is the use of foam on fires—this foam being generated by use of the exhaust gases from the motor of the tanker.

#### Telecommunications

The radio system consists of 37 base stations, 144 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 1957–58 to 1961–62 were as follows :—

#### VICTORIA—CAUSES OF FOREST FIRES

Cause	Number of Fires				
	1957-58	1958-59	1959-60	1960-61	1961-62
Grazing Interests .. ..	15	6	8	2	2
Landowners, Householders, &c. ..	139	103	141	101	200
Deliberate Lighting .. ..	76	62	91	44	59
Sportsmen, Campers, Tourists ..	76	33	58	59	82
Licensees and Forest Workers ..	25	18	19	18	34
Smokers .. ..	53	43	65	59	44
Lightning .. ..	29	59	100	187	133
Tractors, Cars, Trucks, Locomotives, and Stationary Engines ..	42	39	33	47	30
Children .. ..	26	19	27	30	39
Sawmills .. ..	12	13	20	10	7
Miscellaneous Known Causes ..	80	39	107	80	94
Unknown Origin .. ..	54	31	59	25	60
Total .. ..	627	465	728	662	784



VICTORIA—AREAS OF STATE FOREST BURNT  
(Acres)

Year Ended 30th June—				Commercial Area	Non-Commercial Area	Total
1958	..	..	..	61,428	156,644	218,072
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

### Laboratory Research

The number of viable seeds per capsule and per unit weight of seed and chaff of Victorian eucalypts is being studied. Longevity studies of stored Victorian eucalypt seeds and of *Pinus radiata* seeds are also being made. Research has been carried out to determine the influence of temperature and seed moisture content on germination of dodder laurel (*Cassytha melantha*). Other trials have been initiated to determine the longevity of dodder seeds when stored under and on the surface of the field seed-bed.

### Field Research

A comprehensive study of flowering, natural seedfall, germination, and establishment of seedlings has been commenced in riverain forests of river redgum (*E. camaldulensis*). This programme also includes investigation of the effects of inundation and of grazing by animals on the establishment and form of seedlings.

Further trial plantings and natural regeneration experiments have been carried out with various eucalypt species and hybrids. Measurements and other relevant data from experimental plots throughout the State have been recorded regularly.

A series of plots has been laid down to determine the optimal rates of thinning for re-growth stands of mountain ash (*Eucalyptus regnans*) and alpine ash (*E. delegatensis*) of various ages, site qualities, and stand densities. Studies of damage to crop trees during thinning have been commenced.

Certain fungicides and insecticides have been used in trials to isolate an effective animal repellent for application to seedlings to reduce losses to vermin in the first year after planting out.

Tree breeding work with the plantation species, *Pinus radiata*, has been commenced in recent years. Improvement of the type of tree to be grown in the future is sought in all the aspects which influence the yield and quality of the final product, i.e., vigour, trunk straightness, branch development, presence or absence of cone holes, wood quality, and freedom from disease.

A survey of Victorian plantations was undertaken following which the most outstanding trees have been vegetatively propagated in large numbers by grafting. Progeny and clonal\* trials designed to assess the quality of these selected trees have been commenced. Controlled cross pollination will be undertaken between selected trees with a view to combining particular tree characters in "pedigreed" progeny.

Large scale production of seed from selected parent trees will be achieved in the "seed orchard"—an area isolated from the pollen of other specimens of the pine, in which many grafted plants of the superior trees have been established. Each grafted plant is genetically identical to the original tree from which the scion was collected. Cross pollination between the superior parent trees in the seed orchard gives rise to seed which should be genetically superior to seed obtained by normal collection methods.

Grafting of the required number of plants from the sixteen best Victorian trees has been undertaken for use as parental stock in the seed orchard. Planting of the first 15 acres was completed in 1962. The first yield of seed for plantation use may be expected by 1965–66.

Various pathological and entomological investigations have also been carried out. One of the most serious insect pests to enter Australia is *Sirex noctilio*, the European horntail wood wasp. It was identified in pine trees in the vicinity of Melbourne in December, 1961, and since then intensive search activity to delineate the extent of its establishment in Victoria and concentrated eradication measures in an endeavour to control the insect have been undertaken. If not brought under control or eradicated, this insect could cause widespread destruction in commercial pine plantations and among farmers' shelter belts and shade trees.

Another infestation which has attained serious proportions, particularly in north-east Victoria, is the phasmatid, *Didymuria violescens*, one of the stick insects. Following serious outbreaks of damage in New South Wales eucalypt forests, this insect is now in plague proportions in some peppermint and gum forests and also, to some extent, in valuable alpine ash forests. Research work is proceeding on the insect's life history along with intensive egg counts and surveys to determine the limits of infestation and the likely severity of future attacks, so that control measures can be determined.

## 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.

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\* A clone includes all plants which have been propagated vegetatively from one parent plant.

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.

### *Commercial Fisheries in Victoria*

The Victorian fish catch ranges between 10 mill. lb. and 13 mill. lb. (landed weight) per year and is worth about £2 mill. to fishermen.

The main species caught (by weight) are barracouta, flathead (tiger, sand and rock), crayfish, shark, Australian salmon, mullet, garfish, whiting (both trawled and King George), bream, snook, and snapper.

The estuaries provide the high quality fish which are the basis of the fresh fish trade. Garfish, flounder, King George whiting, snapper, and bream are taken by mesh and seine nets as well as by amateur gear.

The barracouta fishery is centred at Lorne and extends to Lakes Entrance in the east and Portland in the west. Formerly the catch from this fishery supplied only the "fish-and-chip" trade. In recent years the relatively low cost of production has been a factor in its increasing use for canning.

The edible shark fishery of Bass Strait is of recent origin, having started in the late 1920's. Shark livers were a valuable source of Vitamin A during the war years and the absence of bones in the fillets is a factor of considerable importance in the growing demand for the flesh for the fried fish trade.

The Australian salmon is a species of fish which occasionally heads the production list in Victoria. Aircraft are used to locate and watch the shoals along the Ninety Mile Beach until such time as it is appropriate for beach seine operations to commence. The bulk of the catch is canned.

The Danish seine trawl fishery based at Lakes Entrance is one of the most important for quantity and value of the fish landed, which is mostly tiger flathead and school whiting. However, this fishery is limited by the presence of a bar which restricts access to the port, and for its future development it will need to solve this problem.

The southern crayfish provides the only crustacean fishery in south-east Australia. The Victorian production is utilized mainly for the home market with some export of cooked crayfish to the United States of America and Europe.

Two fisheries with great potential for development in Victoria are the tuna and the pilchard. The tuna fishery has increased spectacularly elsewhere in Australia, and several Victorian canneries are now equipped to process this fish, which is sighted regularly off the Victorian coast.

The pilchard is already the basis of a small fishery in Port Phillip. The Australian pilchard belongs to the sardine group and preliminary canning trials demonstrated that local pilchards would provide a good-quality canned product.

The State Development Committee enquired into the Victorian fishing industry in 1960 and, following the publication of its Report, greater attention is being given to the commercial fisheries. Additional research and technical staff have been appointed, and the Commercial Fisheries Council, with Government and industry representation, has been set up to advise the Government and the Fisheries and Wildlife Department.

The Southern Pelagic Project Committee, with Federal and State research and technical staff, has been appointed, and the Commercial fisheries research in south-east Australia. The work of this Committee supplements the research and management programme of the Department.

Other notable achievements in fisheries relate to fisheries education on an Australia-wide basis with an annual School, and to the acceptance of a uniform system of fisheries statistics.

#### *European Carp (Cyprinus carpio)*

The European carp, because of its method of feeding, its highly successful reproduction rate, and the violence of its spawning habits, can, under certain circumstances, so alter the aquatic environment that the welfare of other fish species, and of aquatic wildlife is threatened. One environmental change is a very high level of turbidity in the water and this can seriously impair the quality of water supplies for industrial and domestic purposes.

The Parliament of Victoria, in May, 1962, passed amending legislation declaring European carp "noxious fish" and making it an offence, *inter alia*, for any person to rear, release, or keep this fish. The legislation also makes provision for the seizure, removal, and/or destruction of noxious fish. Another important provision of the Act is that any species of fish which offers a potential threat to established natural resources may be declared noxious.

#### *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 1957-58 to 1961-62 :—

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
1958 .. ..	937	699	732	171	11,185	1,094	1,230	186
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

\* 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 1957-58 to 1961-62 :—

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

Type of Fish	Year Ended 30th June—				
	1958	1959	1960	1961	1962
Marine Fish—					
Australian Salmon ..	2,274	1,241	1,951	1,050	636
Barracouta .. ..	2,084	1,996	3,004	3,608	3,308
Bream .. ..	78	50	128	225	329
Flathead .. ..	1,289	1,427	1,815	1,880	2,318
Garfish .. ..	222	172	211	310	479
Morwong .. ..	179	111	71	138	318
Mullet .. ..	1,053	1,224	769	710	964
Pilchard .. ..	25	137	280	192	349
Shark* .. ..	1,839	1,673	1,488	1,873	2,181
Snapper .. ..	130	143	153	132	279
Whiting .. ..	218	367	464	537	402
Other† .. ..	1,554	1,121	2,176	1,265	1,258
Total Marine Fish..	10,945	9,662	12,510	11,920	12,821
Freshwater Fish ..	240	201	190	220	244
Total Fish .. ..	11,185	9,863	12,700	12,140	13,065

\* Includes catch by Victorian fishermen in Tasmanian waters.

† Includes quantities of shark livers for oil extraction.

Further References

An article describing wildlife in relation to other natural resources will be found on pages 544 to 546 of the Victorian Year Book 1962, and one on Introduced Fish in Victorian Waters appears on pages 569-570 of the Victorian Year Book 1963.

**Mining***General*

The discovery of gold at Ballarat in 1851 led to an early and vigorous spread of mining activities throughout Victoria. The rapid succession of rich gold strikes at Bendigo, Castlemaine, Stawell, Maryborough, and other localities was a major factor in the development of the State, leading to a rapid increase in population and defining the general pattern of growth of inland towns and communications.

The establishment of an effective Geological Survey and the activities of prospectors during the gold rushes stimulated the collection of data pertaining to the metalliferous deposits of Victoria and a substantially complete picture of the situation was available by the turn of the century. The greater part of the ore reserves had in fact been worked out at that stage and a gradual decline in the importance of this type of mining had set in, with the emphasis changing from shaft and hydraulic winning of metallic ores to open-cut operations on non-metallic deposits.

Apart from the gold deposits, the State has shown little mineralization of economic interest. Gold production which reached a peak of 3 mill. ounces in 1856, had declined to less than 30,000 ounces in 1962. Small amounts of tin, lead, and antimony have been won intermittently, but the future value of mineral products in Victoria appears to reside almost wholly in activities concerned with the supply of coal for electric power generation and the quarrying of bulk low-cost materials for secondary industries, especially the building industry. Exploratory drilling for oil is in progress and has recently resulted in small shows of gas of no economic significance to date.

*Coal*

Black coal occurs in numerous localities in the Jurassic rocks of Gippsland and the Otway Ranges, but the beds are generally too thin and disturbed by faults to permit economic working. The main production has come from the Wonthaggi district, but with the growth of brown coal briquette utilization and the change to diesel fuel in the Victorian Railways, the amount of black coal won from local sources has decreased to an insignificant proportion of the total fuel requirements of the State.

Brown coals occur throughout many of the Tertiary formations across Victoria from Gippsland through the Melbourne region to the Western District. The largest deposits, in the Latrobe Valley, contain seams hundreds of feet in thickness and square miles in extent. Most of these are under the control of the State Electricity Commission which operates very large open-cut mines in the Yallourn-Morwell area. These supply essentially all the mineral fuel requirements of the State apart from imported oil products and metallurgical coke brought from interstate sources. (See also pages 667 to 678.)

Smaller deposits of brown coal are worked by private industry in the Bacchus Marsh, Winchelsea, and Anglesea areas. The Anglesea material is of high quality and will find application in cement manufacture and in an aluminium refining plant. The other coals are marginal in quality and are used as boiler fuels.

### *Limestone*

Extensive deposits of soft limestone of Tertiary age occur throughout all parts of southern Victoria. The material is typically of too low a grade for use in lime manufacture, but is well suited to cement production and forms the main kiln feed in cement plants near Geelong. The cement plant at Traralgon uses a similar material blended with higher-grade hard limestone from much older deposits in the region.

The reserves of hard pure limestone in the State are restricted mainly to Gippsland and transport to centres of industry and population poses economic problems. Melbourne is supplied largely from an isolated deposit of medium grade stone at Lilydale.

Production of all types of limestone is steadily increasing. The cement industry is by far the largest consumer, but appreciable quantities are used in a ground condition for agricultural and neutralizing purposes and as a filler material, whilst lump stone is burnt to lime at the Lilydale deposit.

### *Clays*

Brick, pipe, and tile clays of varied characteristics are relatively abundant throughout most of the State and constitute about 95 per cent. of the total production recorded. As the red-burning clays from pits in the Melbourne area have been worked out, new pits have been opened in districts fringing the city, but an increasing quantity of white clay for the production of cream bricks has had to be brought from outlying areas such as Campbellfield and Bacchus Marsh.

Apart from clays used in the building industry, production is restricted to medium grade fireclays from pits near Dandenong and Bacchus Marsh, kaolin from Egerton, Lal Lal, and Bulla, and plastic clays for ceramic purposes from Axedale, Rowsley, Heyfield, and other scattered localities. The kaolins are used in local industries concerned with ceramics, paper, paint, and rubber products. More than half the total State requirements of such clays is locally produced and minor quantities are exported, but most of the special clays and allied materials are imported. Bentonite occurs in Victoria, but production is insignificant.

### *Stone, Sand, and Gravel*

The extensive basalt flows of central and western Victoria provide abundant sources of bluestone suitable for concrete aggregate, road construction, and special building purposes. Most major quarries to the west of the City of Melbourne produce this type of stone, generally in the form of crushed massive rock, though quantities of scoria are quarried in country districts as a road surfacing material.

To the east of Melbourne, indurated sandstones and hard silicious volcanic rocks are quarried extensively in the areas near the Dandenong Ranges, where basalts do not exist. In central Victoria granitic rocks provide a source of stone. Quarries such as that at Harcourt yield good-quality ornamental granite blocks of large size. Apart from this and the bluestones, the production of structural stone in the State is essentially limited to a type of marble from Buchan and a range of soft sandstones and coarse slates.

Sands and gravels of all types are produced at a great number of localities scattered throughout the State. Melbourne is well supplied with fine sands from the Frankston and Cranbourne areas, though the coarser gradings of sand and gravel are brought in from deposits further afield, such as those near Pyalong and West Gippsland.

Glass-making sands of acceptable purity have been won from pits in the Mornington Peninsula, but current production now comes largely from Gippsland. The main source of high-purity silica is reef quartz from Allendale. In coarse granules, it is used in the building industry and as a finely ground product in a variety of manufacturing industries.

### *Minor Products*

Gypsum occurs in north-western Victoria in surface deposits near Swan Hill. These are worked as a source of material for soil-conditioning and plaster manufacture. Salt is harvested from seasonal lake deposits in the same general area.



Diatomaceous earth is found at a number of localities near Woodend, Linton, Kilmore, and Talbot, but the quality is generally only medium because of clay contamination and fine particle size. Most of the material is used in insulation.

Bauxite has been mined in the Mirboo district, largely for conversion into aluminium salts used in water treatment. The deposits are not on a large scale, but limited quantities of high-grade material are available.

Fluorspar has been mined intermittently near Walwa in north-east Victoria, but reserves are not extensive. Limited quantities of manganese ore are found in the Buchan district and some production of limonitic materials for use in gasworks has come from the same region.

### *Underground Water*

An article on this subject appears on pages 544–545 of this volume.

### *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, 1961 and 1962, is shown in the following table :—

#### VICTORIA—MINERAL PRODUCTION

Minerals	1961		1962	
	Quantity	Value	Quantity	Value
	fine oz.	£	fine oz.	£
<b>Precious Metals—</b>				
Gold .. .. .	26,229	469,450*	28,262	473,297*
Silver .. .. .	573	226	472	195
	ton	£	ton	£
<b>Other Minerals—</b>				
Antimony Ore .. .. .	2	400	0.5	200
Bauxite .. .. .	3,539	14,008	4,413	15,862
Coal, Black .. .. .	66,363	359,457	56,721	316,341
Coal, Brown .. .. .	16,279,168	7,721,671	17,137,438	7,841,004
Copper Concentrate .. .. .	2	66	26.5	856
Copper Ore .. .. .	50	1,650	46	1,482
Fire Clay .. .. .	25,584	23,432	28,207	26,617
Gypsum .. .. .	80,223	79,655	78,728	81,531
Kaolin and Other White Clays	516,454	515,164	450,218	493,682
Limestone .. .. .	1,243,154	594,614	1,214,391	609,609
Other .. .. .	1,197½	10,823	862	22,328

\* Includes gold subsidy, £63,036 for 1961, and £50,579 for 1962.

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 1962 :—

## 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

\* Value of output at the mine.

## 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. The value of quarry products may vary from that shown on page 611 which is on an industry basis. It is realized that there is considerable quarry production unrecorded due mainly to contractors who, requiring material from a source adjacent to the work for which they are suppliers, open up quarries for that purpose or exploit stone outcrops, mine tailings, &c. This work is usually only of a temporary nature.

## VICTORIA—CONSTRUCTION MATERIALS\*

Year Ended 31st December—	Number of Returns	Main Kinds of Stone Extracted—				Approximate Value of All Quarry Products†
		Bluestone	Sandstone	Granite	Limestone	
		cub. yds.		tons		
1955 ..	141	2,644,392	117,082	179,964	27,464	3,931,657
1956 ..	142	3,240,699	113,241	215,609	39,826	4,738,013
1957 ..	133	3,416,132	191,232	204,590	61,495	4,952,773
1958 ..	132	3,852,012	146,016	173,096	63,230	5,202,993
1959 ..	121	4,556,604	162,091	215,227	35,129	5,841,988
1960 ..	126	5,423,000	175,287	266,181	69,060	6,581,290
1961‡	252	7,157,401	370,498	299,461	133,235	9,216,965

\* Since 1952-53, limestone quarried for the manufacture of cement, lime, &c., has not been included in this table. It will be found in "Mineral Production" on page 607.

† Wholesale selling value of all quarry products (including sand and river gravel), exclusive of delivery charges.

‡ Figures not comparable with previous years. Increased coverage, involving an additional 126 informants (59 being mainly sand and gravel quarries) accounted for bluestone 688,819 cub. yds; sandstone 182,204 cub. yds; granite 58,814 tons; limestone 58,687 tons; with a total additional value of £1,605,457.

## 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 547. 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	1957-58	1958-59	1959-60	1960-61	1961-62
Agriculture .. ..	88,198	101,058	92,411	132,918	115,112
Pastoral .. ..	137,854	134,015	160,138	139,414	143,880
Dairying* .. ..	65,431	65,264	70,471	72,004	71,588
Poultry and Bees .. ..	23,266	22,263	24,691	27,290	23,728
Trapping .. ..	3,621	3,862	3,749	3,156	3,024
Forestry .. ..	16,274	17,525	19,111	18,232	17,965
Fisheries .. ..	1,294	1,433	2,045	2,064	2,016
Mining .. ..	12,728	13,694	14,935	16,267	19,583
Total Primary Industries	348,666	359,114	387,551	411,345	396,896

\* Includes Subsidy—1957-58, £6,696,000; 1958-59, £6,223,000; 1959-60, £6,204,000; 1960-61, £6,710,000; 1961-62, £6,544,000.

## 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	1957-58	1958-59	1959-60	1960-61	1961-62
<b>Agriculture—</b>					
Barley .. ..	2,710	3,375	2,042	2,364	1,989
Maize .. ..	130	114	113	106	89
Oats .. ..	4,072	4,716	3,573	4,910	4,459
Wheat .. ..	18,460	23,567	22,421	40,721	36,671
Onions .. ..	425	894	842	628	650
Potatoes .. ..	2,222	3,874	4,966	8,313	5,378
Other Vegetables .. ..	9,219	8,217	8,703	9,410	8,104
Hay and Straw .. ..	16,331	17,789	13,836	20,854	13,734
<b>Fruit—</b>					
Orchards .. ..	9,422	7,884	7,914	10,084	10,423
Vineyards .. ..	8,106	8,342	6,188	7,236	7,960
Other Crops .. ..	3,836	6,679	8,532	9,850	9,281
<b>Total .. ..</b>	<b>74,933</b>	<b>85,451</b>	<b>79,130</b>	<b>114,476</b>	<b>98,738</b>
<b>Pastoral—</b>					
Wool .. ..	68,520	51,786	67,758	61,095	63,475
Sheep, Slaughtered .. ..	20,865	22,375	27,766	23,655	20,482
Cattle, Slaughtered .. ..	36,004	45,623	49,891	40,963	43,017
<b>Total .. ..</b>	<b>125,389</b>	<b>119,784</b>	<b>145,415</b>	<b>125,713</b>	<b>126,974</b>
<b>Dairying—</b>					
<b>Whole Milk Used for—</b>					
Butter .. ..	29,027	28,522	30,829	30,796	30,711
Cheese .. ..	2,973	3,650	4,329	4,742	4,901
Condensing, Concentrating, &c. .. ..	6,520	5,979	6,667	6,070	6,100
Human Consumption and Other Purposes .. ..	12,243	12,744	13,122	13,552	14,238
<b>Subsidy Paid on Whole Milk for Butter and Cheese .. ..</b>					
.. ..	6,696	6,223	6,204	6,710	6,544
Pigs, Slaughtered .. ..	5,459	5,540	6,460	7,177	5,773
<b>Total .. ..</b>	<b>62,918</b>	<b>62,658</b>	<b>67,611</b>	<b>69,047</b>	<b>68,267</b>
<b>Poultry and Bees—</b>					
Eggs .. ..	15,516	13,545	15,493	17,839	14,138
Poultry .. ..	5,589	6,533	6,765	6,895	6,185
Honey and Beeswax .. ..	268	408	428	319	415
<b>Total .. ..</b>	<b>21,373</b>	<b>20,486</b>	<b>22,686</b>	<b>25,053</b>	<b>20,738</b>

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

Produce	1957-58	1958-59	1959-60	1960-61	1961-62
Trapping, &c.					
Rabbits and Hares ..	2,501	2,717	2,560	2,310	2,285
Rabbit and Hare Skins, &c. ..	786	845	932	635	525
Total ..	3,287	3,562	3,492	2,945	2,810
Forestry—					
Sawmills ..	9,782	9,552	10,157	9,225	9,068
Hewn Timber ..	1,300	998	1,426	1,358	1,261
Firewood ..	4,030	5,455	5,913	6,036	6,041
Bark for Tanning ..	120	128	86	58	46
Other ..	21	15	36	36	33
Total ..	15,253	16,148	17,618	16,713	16,449
Fisheries—					
Fish ..	937	1,062	1,495	1,347	1,357
Crayfish ..	158	199	260	420	353
Oysters ..	6	1	1	2	1
Other ..	3	3	15	18	30
Total ..	1,104	1,265	1,771	1,787	1,741
Mining—					
Gold ..	736	694	585	471	470
Coal—					
Black ..	556	528	455	418	359
Brown ..	5,227	5,418	6,123	6,845	7,722
Other Metals and Minerals ..	1,256	1,851	1,930	2,007	1,815
Quarrying ..	4,953	5,203	5,842	6,526	9,217
Total ..	12,728	13,694	14,935	16,267	19,583
Total Primary Industries	316,985	323,048	352,658	372,001	355,300

*Net Value of Production*

The ultimate aim of the valuation of production is to arrive at the sum available for distribution among those concerned in each class of industry. These include :—

- (1) Workers in all grades of industry ;
- (2) proprietors (including landlords) of any of the instruments of production concerned ; and
- (3) providers of capital, including debenture holders and mortgagees.

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. Details for primary industries and manufacturing are shown in the table below :—

**VICTORIA—NET VALUE OF PRODUCTION**  
(£'000)

Division of Industry	1957-58	1958-59	1959-60	1960-61	1961-62
<b>Rural—</b>					
Agriculture .. .. .	64,971	73,661	68,912	104,031	88,245
Pastoral .. .. .	115,970	110,392	135,630	116,181	115,528
Dairying .. .. .	46,153	44,382	47,469	50,947	43,522
Poultry .. .. .	14,042	12,572	14,636	17,011	12,439
Bee-farming .. .. .	268	408	428	319	415
Total Rural .. .. .	241,404	241,415	267,075	288,489	260,149
Non-rural .. .. .	29,588	31,962	34,981	34,603	37,051
Total Primary .. .. .	270,992	273,377	302,056	323,092	297,200
Manufacturing .. .. .	568,685	610,969	688,389	703,282	717,327
Total All Industries .. .. .	839,677	884,346	990,445	1,026,374	1,014,527