

6 LAND USE

Historical background

Major Thomas Mitchell crossed the Murray River at Swan Hill in 1836 and travelled down the Loddon Valley. He turned west through Wedderburn and, on his way to the Grampians and Portland, he descended into a charming scene; the turf, the woods, and the grassy banks of a murmuring stream that went rippling onward with strong eddies through the vale, gave him the impression of a richly-ornamental English park, so perfect seemed the disposition of all its elements. To this stream he gave the name of the Avoca. Here the oat-grass waved in little seas, and on it were pasturing herds of kangaroos' (Sutherland 1888).

As a result of Mitchell's praises for the beautiful pastoral country, squatters moved in and took up large tracts of land on the open grassy plains in the 1840s. The discovery of gold in 1851 had a very great influence on the region. Regardless of the location, the effect was always the same: thousands of people came from all directions - from Melbourne, Sydney, Portland, Adelaide and the settlements on the Murray to the north. Initially they won the gold by simply washing the surface alluvium, but later they explored deeper river beds, then sank deep shafts. These activities needed an endless quantity of timber to line the mines and to generate steam for working the pumps and driving the huge batteries and winches.

The rapid influx of population naturally increased the demand for food, and so the pastoral and agricultural resources were developed to supply meat, grain, hay, fruit, vegetables and wine.

By 1888 direct rail links had been developed from Melbourne via Maryborough to Avoca, Bealiba, Stuart Mill and St Arnaud and via Sandhurst (Bendigo) to Wedderburn. Amphitheatre, Bealiba, Moonambel, Redbank, Stuart Mill and Burkes Flat were all thriving towns in the gold-rush days, but have reverted to small out-of-the-way communities with only an impressive bank, post office or hotel to remind us of their past glory.

Travelling through the area, one is conscious of the excessive demands made on the natural resources during those hectic days – large areas of dug-over river flats resembling minefields in a war-ravaged country, steep hills completely cleared of trees and showing the scars of sheet and gully erosion, saline drainage lines marked with dead trees, deep ugly gullies and wet flat areas devoid of grass and white with salt - scenes that Major Mitchell would not have believed were part of the magnificent country he once visited.

Agriculture

The predominant use on the flat, gently sloping land is a mixture of grazing and cropping, with the emphasis towards grazing in the south and cropping in the north. Wheat is grown on the extensive red calcareous soils around Charlton and the river flats to the south, but as the rainfall increases to the south, oats become the favoured crop.

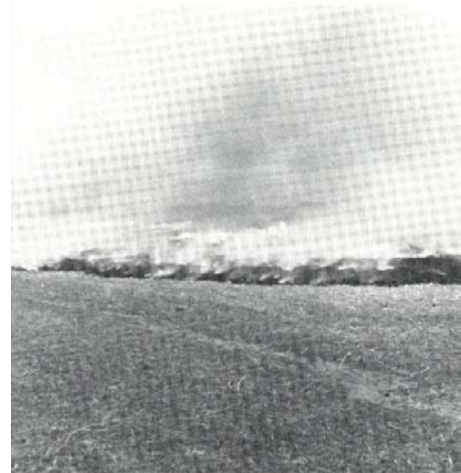
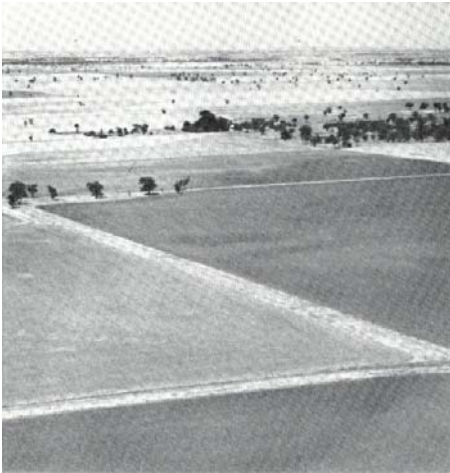
Yields of pastures have increased due to replacement of native species with introduced legumes and grasses. The main legumes are subterranean clover (*Trifolium subterraneum*), annual medics (*Medicago* spp.) and the perennial lucerne (*Medicago sativa*). The main grasses are Wimmera ryegrass (*Lolium rigidum*) and phalaris (*Phalaris tuberosa*). In the moister south, cocksfoot (*Dactylis glomerata*) and perennial ryegrass (*Lolium perenne*) are also sown.



Light grazing country near Avoca.

Superphosphate is the main fertiliser applied to crops and pastures, the rates varying according to soil type and former usage. For clover establishment, molybdated superphosphate is applied to hilly country with shallow soils and to the more acidic soils, which also require lime. Other nutrients such as potash, nitrogen, copper and zinc may be required, particularly on soils of low fertility.

Many of the steeper hills have been cleared for grazing, but the returns are low because of the shallow stony soils. The uncleared Pyrenees Range and the box-ironbark forests have a limited amount of grazing, controlled by grazing licences.



Cropping is the predominant land use in the Charlton area, and stubble-burning (right) is still a common practice when several crops are grown in succession.

Between Avoca and Redbank along the foot of the Pyrenees Range there are several vineyards. The area is free from frost and the soils are well drained. Water is provided by overhead sprinklers or by drip irrigation, which is a more economical use of the limited water supply.

Forestry

Hardwood timber from the Mount Lonarch-Mount Cole forest supplies the timber mills at Beaufort, Ararat, Stawell and, to a minor extent, Elmhurst. The valuable species include *Eucalyptus obliqua*, *E. viminalis*, *E. st-johnii* and *E. baxteri*. The same hardwood species, plus *E. macrorhyncha* from the Pyrenees forest, supply the Stawell and Avoca mills.

Pinus radiata has been planted on a small area of the Great Dividing Range in the higher-rainfall zone south of Amphitheatre.



Vineyards on the gentle slopes near Moonambel are a relatively new form of land use.

The box-ironbark forests provide a source for fence posts, railway sleepers and firewood. *E. sideroxylon*, *E. leucoxyton* and *E. microcarpa* are the main species, with some *E. polyanthemos* and *E. macrorhyncha* also being used. Railway sleepers are cut each year from the forests in the St Arnaud and Wehla areas; firewood from Bealiba and Avoca is still an important source of fuel for heating.

These forests have slow growth rates, and the management varies according to their use; however, thinning encourages trees to grow to a size suitable for posts and sleepers in approximately 40 years.

The mallee scrub north-east of St Arnaud and to the west of Wedderburn yields eucalyptus oil.



Establishment of Pinus radiata has commenced on the Great Dividing Range south of Amphitheatre.

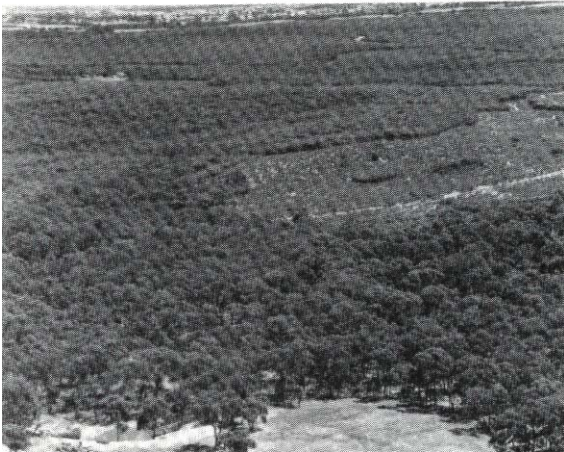
Apiculture

The timbered areas are favoured for honey production. Bee-keepers tend to place hives on the boundary of the forests to take advantage of the flowering eucalypts, particularly the sweet-smelling *E. melliodora*, as well as clovers and capeweed in the improved pastures.

Mining

To the south of St Arnaud, deposits of quartz river gravels are used by local councils as road-making material.

Mining for gold has ceased, but part-time prospectors still wander the creeks and gullies looking for a bit of colour .



Harvesting the mallee scrub near Wedderburn for the eucalyptus oil.

Nature conservation

Examples of the major land systems in or near their pre-settlement condition are needed to preserve landscape features, flora and fauna. Such areas can also serve as scientific reference areas enabling measurements to be made of changes brought about by settlement, including changes in soil conditions.

The catchment contains several timbered reserves on Palaeozoic sediments, notably the steep Pyrenees Range. Gentler lands with reserves are the box-ironbark forests and the mallee scrublands near Wedderburn. Relatively undisturbed stringybark forests on the low-fertility Tertiary gravelly plains are also well represented. Timbered areas on granitic rocks are not well represented except for the steep hills near Melville Caves. Unfortunately no significant undisturbed areas on the Riverine Plain occur within the study area.



Road-making material is quarried from metamorphosed Ordovician sediments near Charlton.

Table 9 - Avoca River discharge (megalitres)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Amphitheatre												
Average	121	162	50	84	261	288	1056	1379	1060	877	151	66
Minimum	10	0	0	25	64	61	ill	149	100	48	21	21
Maximum	1188	1906	127	299	1358	1533	3969	3760	4626	3931	535	128
Coonoor Bridge												
Average	2728	5110	649	1103	7226	8069	12745	20434	21754	26218	3693	1583
Minimum	0	0	0	0	0	299	497	901	448	285	27	0
Maximum	33001	72462	3116	6685	57149	40038	56425	76637	106940	192911	31445	10422

Source: State Rivers and Water Supply Commission (personal communication, 1979)

Recreation

Land-based recreation is limited, but preferred sites include the Teddington Reservoir for fishing, Melville Caves for walking and the box-ironbark forests for the large variety of native shrubs, wildflowers and birds. The Pyrene Range offers excellent views through the trees from the ridgetop road.

Residential use

St Arnaud (with population in 1976 of 2790) is the largest town, followed by Charlton (1360) and Avoca (990). Other townships and villages include Amphitheatre, Barrakee, Bealiba, Carapoee, Lamplough, Logan, Moonambel, Natte Yallock, Redbank and Stuart Mill.



Gravel-stripping occurs on isolated Tertiary gravel deposits in the west.

Water supply

The only water storages of note are two small reservoirs at the base of the forested Pyrenees Range, supplying Avoca from Number Two Creek and Stuart Mill from Strathfillan Creek. No major water storage exists on the Avoca River itself.

St Arnaud and Charlton are supplied with water by the State Rivers and Water Supply Commission via channels from Lake Bellfield in the Grampians.

The main tributaries of the Avoca River are the Fentons, Campbell, Cochranes, Cherry Tree and Middle Creeks.

Table 9 shows the extreme variation in discharge from two measuring stations. Amphitheatre, although in the higher-rainfall zone, has a relatively small catchment area (120sq.km), whereas Coonooer Bridge is downstream from the main tributaries. The lack of sustained flow is a result of the small watershed area in the higher-rainfall zone along the Great Dividing Range. More than half the catchment is in the rainshadow of the Pyrenees Range. The Avoca River also has limited recharge from groundwater aquifers. (P. G. Macumber, personal communication.)

When the monthly discharge at Coonooer Bridge is zero, there is often a small but definite flow at Amphitheatre. The small flow is lost by evaporation, seepage and loss to the deep lead system.

The river has a mean salinity of 1000-3000 mg per litre, usually increasing as flow decreases. Thus in dry years, when it is most needed, water from streams has the poorest quality. Maximum salinities recorded have been 5300 mg per litre.



Old gold-mines and their associated mullock heaps are common on the alluvial plains near Avoca.

The water is more salty than that in adjacent catchments - possibly because of the low rainfall and the fact that most of the catchment has been cleared, with consequent release of stored salts in the soil to the river.

Small areas of lucerne between Logan and Natta Yallock are irrigated with water pumped from the river. However, when irrigation is required during the summer months, water flow has usually ceased and the salinity levels in the waterholes can increase to levels unsuitable for spray irrigation.