CHAPTER 7

Between ‘the water famine and the fire demon’:¹
Drying up the catchment

The lower portion of Gippsland, sheltered, as it is, to the northward and westward by the dividing range, and watered by five fine rivers, may be rendered, by irrigation, a most flourishing portion of the colony.

Strzelecki, 1845²

I have seen cattle die upon the common for want of water – die in dry water-holes, trying to lick the mud. I have seen the grass so burnt up that a beast could not get a mouthful, and when a little rain came, and the fresh grass came up, they were dropping down in all directions.

Michael Landy, 1885³

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¹ GT, 10 March 1882.
Introduction

Colonial Gippslanders preferred their hydrological conditions on the wet and permanent side, echoing the conditions in their European birthplaces. They were most happy when rain was regular and well spaced, and when it flowed in defined river channels. This chapter tells the opposite story; what happened when conditions were dry, irregular and undependable.

All species are a form of embodied water. Without at least one litre of water a day, human beings perish. Second only to oxygen, water is our most essential need. Water hydrates, cleanses and keeps our organs functioning. That vital few kilograms of grey matter, the brain, is 85 per cent water, the body 66 per cent. Losing 10 per cent of your embodied water paralyses, losing 20 per cent spells death.4 An absence of water is therefore a profound physical and psychological threat. While the evaporative part of the hydrological cycle returns water to the sky to make life-giving rain, and thus is an essential part of the cycle, it also ensures that it is no longer available for human use.5

The counterbalance to precipitation, evaporation is defined as ‘the transferal of liquid water into a gaseous state and diffusion into the atmosphere’. For evaporation to occur, there must be water to evaporate, energy to do it and somewhere for it to go, that is a dry atmosphere.6 Its rate is affected by the action of winds, and its obvious impact is on surface water availability. With high evaporation, the water levels of rivers, lakes and dams can drop markedly. Australian average evaporation rates are high, at 87 per cent, compared to the approximate average of 60 per cent for Europe and North America.7

The hydrological reality of evaporation is an important constraint in the success of agricultural societies, and it has, for millennia, been entirely out of human control. In large portions of Europe, however, this was not a major problem. In the nineteenth century, as noted in Chapter 2, Europeans lived in one of the most temperate of climates Earth has to offer. Coming

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from a part of the planet where droughts were measured in mere weeks, colonial settlers were in for an unpleasant surprise. They had emigrated from one of the most constant hydrological regimes to the least constant.8 For a people relying on the success of an agricultural model that required high precipitation and low evaporation, trouble and grief were inevitable.

This chapter provides a brief exploration of the role of evaporation in the hydrological cycle, explores what settlers understood about evaporation and dryness, and the positive and negative aspects to it in daily life. It pays particular attention to the experience of fire and drought in the 1880s, then discusses settlers’ principal responses to ameliorating the threat, particularly focusing on the increasing availability of irrigation technology.

The evolving science of evaporation

The science of evaporation follows a similar path to that laid out in previous chapters; that is, a period of theorising in ancient Greece was followed by a long period of inactivity dominated by Christian theology. After this, the emergence of science saw improved understanding of evaporation based upon quantitative experiment.

In ancient Greece various theories were put forward.9 As demonstrated in Chapter 2, Anaxagoras of Clazomenae had the closest conception of the hydrological cycle. His grasp of the evaporative part of the cycle was strong and succinctly expressed:

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9 Due to his belief that water was the basis of life, Thales of Miletos is supposed to have thought that evaporation is the driving force behind the cosmos. Anaximander of Miletos subscribed to the so-called dual exhalation theory, which combined evaporation from the sea with an exhalation of vapours from the earth together to form rain. It is thought that Herakleios of Ephesos (c. 500 BC) was the principal writer on the dual exhalation theory, for Aristotle derived inspiration for his work on meteorology from him. He described an upward and downward path in the atmosphere. This strongly echoes the version of the hydrological cycle that was based on a hierarchical transmutation of the elements discussed in Chapter 2. This model involved the transformation of the elements, laying a heavy emphasis upon evaporation as the mechanism of this transformation. Dual exhalation theory included more than just the transformation of water; it included the change of seasons and night and day. All the power for this transformation derived from the sun. Brutsaert, Evaporation into the atmosphere, pp. 13–14.
What happens in the sky is caused by the heat of the sun; for when the moisture is drawn up out of the sea, the sweet part, which is distinguished by its fine texture, forms a cloud, and drips out as rain by compression like that of felt, and the winds spread it around.\(^\text{10}\)

Anaxagoras’s correct interpretation was again eclipsed by Aristotle, who subscribed to the dual exhalation theory. Dual exhalation theory confused all attempts to understand evaporation because it discounted wind, one of the controlling factors in the rate of evaporation. Instead, it privileged temperature and the role of the sun. To fully understand evaporation, equal emphasis on both is necessary.

In 1637, Descartes mounted the first serious challenge to Aristotelian views. He said that wind is air in motion and that it is the result of evaporation, not the cause. He also described evaporation in terms of the action of particles, thus reinvigorating the notion of atoms first proposed by Leukippos and Demokritos. Data from Perrault, based on an experiment conducted between 1669 and 1670, and by Halley, whose experiments ran between 1687 and 1694, confirmed Descartes’s theory.\(^\text{11}\) The results of these experiments finally debunked the ancient argument that water had to come from Tartarus (the lowest region of the underworld), because evaporation could not account for river flow.\(^\text{12}\)

Despite Dalton’s significant 1802 publication, which linked wind speed and the dryness of the air to the evaporation rate, there were still many gaps in understanding.\(^\text{13}\) Stephen Hales was an early investigator of water transpiration from plants.\(^\text{14}\) It took until 1862 for Tate to prove that the rate of evaporation is nearly proportional to the velocity of the wind. In addition, the nineteenth century was full of theory and counter theory about the nature of heat and energy, factors fundamental to understanding the processes of evaporation.\(^\text{15}\)

\(^{10}\) Brutsaert, *Evaporation into the atmosphere*, p. 13.
^{13}\) Davie, *Fundamentals of hydrology*, p. 31.
^{15}\) Brutsaert, *Evaporation into the atmosphere*, p. 33.
Evaporation is also hard to measure accurately. This uncertainty around the science is the reason why the only place where it was officially measured in the whole colony of Victoria was in Melbourne. The earliest evaporation records for Gippsland appear to date from 1957, at the Yallourn State Electricity Commission.

**Settlers’ understanding of evaporation**

So if the best scientists of Europe were bamboozled by evaporation, how would colonists grapple with it? This returns to the question of ecological perception by people who, by modern standards, were uneducated. Only a few settlers with an advanced education and an interest in science would have known about the likes of Dalton and Tate, let alone been interested in them. And yet, there they all were, living and working in a catchment that would in time display a previously unthinkable level of evaporation.

Colonial settlers had three kinds of knowledge about evaporation: embodied, cultural and formal. Formal learning was the least influential, because the majority of settlers had little formal education to a standard where precepts of hydrology would be taught. The settlers’ primary knowledge would have come from their direct, embodied experience; for example:

- thirst being a sign of internal dehydration
- seeing water evaporate in a boiling kettle or pot
- drying clothes, or
- witnessing plants and animals wither.

Personal embodied knowledge was available to all, regardless of class or gender. This physical knowledge about water’s absence and the threat to survival was augmented and framed by cultural knowledge.

Previous chapters have detailed the use of biblical imagery on shaping perceptions of the hydrological cycle, where, crudely, precipitation and flow were good and everything else was not. Chapter 4 discussed the likening of rain to the blessing of God’s love, Chapter 5 explored the importance of springs and rivers in various biblical stories that are fundamental to

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16 Men who might fit this category include Robert Thomson, a lawyer who was the first representative for Gippsland; Crown Commissioner Charles Tyers, whose almanac held hydraulic equations; Dr Alexander Arbuckle, the Sale coroner for many years; William Dawson, chief surveyor; and any of the clergy.
the faith, while Chapter 6 looked at the negative portrayal of swamps and bogs. The biblical portrayal of dry areas is similarly negative, and this negativity is displayed in much of the remaining chapter.

It should not be forgotten that the three monotheistic religions – Judaism, Christianity and Islam – originated in the deserts. ‘[Israel] is surrounded by deserts, and in their visions, the prophets saw fountains causing the deserts to bloom’ (Joel 4:18, Zech 14:8, Ezek 47:1–2). In Isaiah’s prophecies of consolation, he describes the blossoming of the desert and the wilderness as follows: ‘I will open rivers on the high hills, and fountains in the midst of the valleys’ (Isaiah 41:18). When the ways of man please God, ‘He will make the wilderness a pool of water, and the dry lands springs of water’ but sin causes Him to turn ‘rivers into a wilderness, and water-springs to a thirsty ground’ (Psalms 107:33, 35).17

Certainly, colonial settlers in Victoria as a whole used the metaphor of deserts blooming when they debated water policy, irrigation and infrastructure.18 However, descriptions of blighted landscapes common to

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17 Other desert/wilderness references from the Bible are discussed by Y Feliks, Nature and man in the Bible: Chapters in biblical ecology, Soncino Press, London, 1981. Chapter 14 of Jeremiah gives a description of drought. According to the prophet, this was punishment for the people’s sins against God. It describes shepherds trying to find water for their stock and how the wild animals stagger and suffer. In Chapter 17, Jeremiah raises several central themes in his prophecies: the sins of Judah, their persecution and mockery of him, and a call for repentance, coupled with an account of the glorious future that would follow. In his admonition, the prophet employs two parables, one from the plant world, and the other from the animal world. In his parable drawn from plant life, the righteous man is compared to a tree planted by the water, while the wicked is compared to the tamarisk in the desert (p. 35). The prophet Ezekiel makes seven prophecies about the future of Egypt, which includes punishment for the Egyptians through the drying up of the Nile (pp. 141–3). The last nine chapters of Ezekiel describe the future church revealed to Ezekiel by the angels. A key element is a fountain of fresh water, enough to ‘swim in’. This river will restore life to the Judean desert, cause an abundance of nurturing plant life for humans, and finally will flow into the Dead Sea and restore it to life as well (pp. 148–9). Armstrong notes that Jacob’s sons leave Canaan to escape a great famine and go to Egypt, where they are enslaved. K Armstrong, A history of god: From Abraham to the present, the 4000 year quest for god, Vintage, London, 1999, p. 12.

18 Argus (Melbourne), 7 April 1870, p. 5, comparing desert-like South Australia to garden-like Western Victoria; Argus, 25 April 1876, p. 6, SA correspondent describing the capacities of Mennonite settlers to turn deserts into gardens; Argus, 6 October 1880, p. 14s, describing the SA exhibit to the world fair as showing how an oasis can be made in a desert; Argus, 1 November 1882, p. 6, calling it a scandal that the Mallee should be left a desert. See also J Powell, ‘Environment and institutions: Three episodes in Australian water management, 1880–2000’, Journal of Historical Geography, vol. 28, no. 1, 2002, pp. 102–3, doi.org/10.1006/jhge.2001.0376, noting the importance of the garden rhetoric; PG Sinclair, ‘Making the deserts bloom: Attitudes towards water and nature in the Victorian irrigation debate, 1880–1890’, MA thesis, University of Melbourne, 1994. Nor was the idea confined to Australia, see for example MJ Heffeman, ‘Bringing the desert to bloom: French ambitions in the Sahara Desert during the late nineteenth century – the strange case of “La Mer Interieure”’, in D Cosgrove & G Petts (eds), Water, engineering and landscape: Water control and landscape transformation in the modern period, Belhaven Press, London, 1990.
drought-ridden northern Victoria are rarer in Gippsland’s papers, simply because of the difference in annual rainfall. But while the average rainfall was higher in Gippsland, they still experienced drought.¹⁹

Given the difficulties in measuring evaporation, the next best available measurement is temperature. However, temperatures were only recorded at Sale from 1892, starting 22 years after rainfall.²⁰ Rainfall was measured at a total of 77 stations, including Sale, Stratford, Rosedale, Omeo, Bruthen, Clydebank, Sale Mercury Office, Toongabbie, Warragul, Bairnsdale and Maffra. Dates offered by the Bureau of Meteorology for temperature records at other sites conflict, but it would appear that Omeo commenced in 1879. The next two stations were Bairnsdale Post Office, which began recording temperature in 1896, and Stratford followed suit in 1903. Four temperature stations compares poorly to 77 rainfall stations.

The lack of temperature measurement is a conundrum, given the impact of dryness on an agricultural economy. Is it possible to assume that the absence of measurement meant lack of interest? There are a number of probable and complementary reasons to this apparent disinterest. The first lay in the practical costs of establishing a meteorological network. A rainfall gauge is cheaper and simpler to supply and use than a temperature gauge. The second relates to the prevalence of the popular theories about rainfall either being linked to the extent of tree cover, or to the spread of agriculture. It is possible that the strong emphasis on the measurement of rainfall reflected the ‘rain follows the plough’ debate, which reached

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¹⁹ GT, 26 January 1875, Rosedale correspondent: ‘The excessive heat which prevailed during the week was agreeably tempered by a very acceptable fall of rain on Friday evening, which both cooled the atmosphere and cleared it of the smoky pall that hung over the earth’s surface’; GT, 8 February 1876, ‘The exceedingly warm weather of the last few says has been very severely felt, and yesterday we were favoured with a genuine hot wind, which, though according to authorities is healthy, has a most enervating effect. The glass in the sun yesterday was as high at 136 and from 90 to 96 in the shade. The country presents a very dried up appearance, and bush fires will have to be guarded against should the present weather continue’; GT, 25 March 1881, ‘Last Friday was one of the most disagreeably hot days which have been experienced here during this season … The oppressiveness of the day was much intensified by a very hot wind which blew for hours’; and GT, 22 February 1886, ‘The solar heat for the past four days has been overpowering, but a welcome change in the weather occurred yesterday afternoon and rain commenced to fall in the afternoon’; MR, 22 December 1888, General News: ‘The face of nature will again, be draped in green. In town the tanks are overflowing and the dust “fiend” has disappeared’.

²⁰ Record of results of observations in meteorology and terrestrial magnetism made at the Melbourne Observatory, and at other localities in the Colony of Victoria, Australia, prepared by Pietro Barrachi, Govt Astronomer, Govt Printer, Melbourne, 1919.
its apotheosis in the nineteenth century. When settlers realised that an Australian drought meant months or even years without rain, it focused attention on rain even more. As the Rosedale correspondent said in 1886:

A south easterly wind and a very cloudy sky on Tuesday gave us the impression that we were in for a share of the good thing in the shape of rain … But alas! It turned out otherwise, a sprinkling of rain fell, the dark clouds sailed away, and the dreary dryness resumed its sway. People, in another season or so, will come to believe that brown is the normal colour of grass, and a whitey grey that of soil.

A season or so, compared to England where a drought lasted weeks. The strength of their experience of rainfall in England combined with the cultural precepts about the undesirability of deserts produced a perception filter. It acted like a filter on a camera lens, which alters the contrast in the image, but the person viewing the image is unaware that a filter has been used. Green and blue were good, brown and grey were not. Something the Rosedale correspondent wholeheartedly agreed with.

The pros of dryness

Gippsland was settled in response to drought in New South Wales, and was generally considered to be a pleasant temperate place. George Augustus Robinson described it as sheltered from hot winds and well watered. He is almost word for word with Strzelecki, author of the first epigraph. Both emphasised abundant surface water and a mild climate, suggesting knowledge of extreme conditions elsewhere on the continent at the time. Too often histories focus upon the extremes, and neglect the more subtle

21 For a succinct discussion of the tree–rainfall theory, see M Williams, Deforesting the earth, from prehistory to global crisis, University of Chicago Press, Chicago, 2003, pp. 430–2. For newspaper discussion of forest conservation issues, see GT, 9 July 1872, 2 November 1872, 23 July 1874, 20 February 1875, 3 June 1876 and 24 January 1879.
22 Contemporary definition of drought in England is 15 days with less than one-eighth of an inch of rain, www.weatheronline.co.uk.
23 GT, 16 April 1886, Rosedale correspondent.
24 For example, a K2 yellow filter increases the contrast between black and white and reduces the amount of grey. It is used in primarily in black-and-white photography. Most people are more familiar with the use of soft focus filters; however, it’s possible to see that it has been used.
middle ground. Before moving on to discuss the impacts of drought, it is worth highlighting the benefits that many settlers found in Gippsland’s generally mild, dry weather.

Dryness has a wide range of advantages, many of which were crucially important to the success of agricultural economies. Broadly, dryness was beneficial for travelling, crop ripening, some types of food preservation or processing, carrying out drainage works, some aspects of health, drying clothes, fire starting and most recreational activities. Chapters 4 and 6 have respectively covered the role of wet weather and mud in drainage and disruption of travel patterns and many social events, so it only remains to observe that dry weather encouraged Gippsland’s social and mercantile life. The optimistic report from the Trafalgar correspondent to the Moe Register in October 1888 epitomises what warm, clear weather did for settlers:

The month of October throughout has proved exceedingly fine, and very warm, and bids fair to continue. The roads are drying up allowing vehicles of all sorts to pass along them, and the farmers seem to be making good use of their time; grass is becoming plentiful, and cattle seem to be thriving, and our gardens flourishing.

The amount and seasonality of dryness was important in the growth cycle of crops. A middling amount of rain was needed to start ploughing, but only enough to moisten the soil and make germination likely. Following germination, gentle showers interspersed amongst days of warm, fine weather (so called ‘genial’ weather) provided ideal growing conditions. Damp weather encouraged fungal diseases like rust, which farmers dreaded. As the Lindenow correspondent remarked in early December 1876: ‘The steady and continuous rain which is now falling will, it is feared, prove detrimental to the crops; rust and caterpillars will be almost certain to appear if we are not shortly favoured with dry settled weather’. This was a common refrain.

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27 Morwell Advertiser, 13 April 1889, in relation to draining Moe Swamp.
28 Moe Register, 27 October 1888.
29 Moe Register, 11 August 1888. The return of dry weather enables ploughing to recommence.
30 GT, 1 December 1876, Lindenow correspondent. See also, GT, 15 August 1881, Cowwarr correspondent; GT, 10 February 1886, on rotting crops in Port Albert district; GT, 3 March 1886, Narracan correspondent.
Figure 7.1: AW Howitt’s hop kiln, Frederick Cornell, 1872. Hops were dried with the use of specially constructed hop kilns.

Source: Pictures Collection, State Library Victoria, Accession no. H8716/75.
Dry weather was essential for harvesting and processing of grain crops. In January 1853, a rain storm forced Buckley to re-dry and restack his crop. Later attempts to thresh the wheat were constantly interrupted by drizzling weather. Once a crop was in, some required further processing. This, too, was affected by levels of humidity. Warmth and damp encourages the proliferation of organisms, which attack foodstuff and other organic goods. When survival meant achieving rapid self-sufficiency, loss of food was a major problem.

The problem lay in trying to achieve the ideal conditions for the variety of foodstuffs that the settlers raised. Warm and dry conditions are ideal for drying fruits. There was a large fruit-growing industry around Bairnsdale, in which Annie Prout and the Macleods were engaged. While the bulk of product went to Melbourne as fresh fruit, most settlers would have preserved portions of their harvest for domestic consumption. Some crops had to be dried before they could be used. A few settlers grew tobacco but by far the most significant crop in this category was hops, grown around Bairnsdale. Large growers erected purpose-built drying kilns, such as in Figure 7.1, which shows AW Howitt’s kilns.

Mild and dry weather helps to process animals and animal products. There was an extensive dried fish industry operating around the Lakes prior to the introduction of refrigerated railway trucks. Tanning animal hides (discussed in Chapter 5 as an example of a flow-dependent industry) is also a preserving operation, based upon removal of moisture from the skin. Humid weather affected other preserving activities. Margaret McCann put off killing her pig because the weather was ‘muggie’, and had trouble with making butter.

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31 Diary of Patrick Coady Buckley, January 1853 and between 9 May and 27 June 1853, CGS, 2806. Also, 13 April to 9 May 1855 with his own threshing machine.
32 Agricultural Jottings by Ceres, Bairnsdale Advertiser and Omeo Chronicle, 1 May 1890, for a discussion on different methods of drying raisins. Auchterlonie sometimes bought dried fruit to sustain him when travelling, e.g. 13 February 1869.
33 GT, 4 May 1896.
35 Diary of Margaret McCann, 17 February and 7 March 1899, SLV, MS 9632, MSB 480. The Moe Register also discusses problems of hot weather and butter making. 8 September 1888.
The dairy industry presents the best evidence of how settlers tried to enhance moderate, dry conditions to maintain the quality of their product. One way was by underground storage, where temperatures are less likely to fluctuate. Buckley wrote that he ‘dug a hole in the bank for dairy at the new place’, and stored his potatoes in pits. In 1890, the *Morwell Advertiser* reported that the government was running a design competition for dairies constructed of wood, which would keep temperatures at 50°F while outside temperatures were at 120°F.

Moderate, dry weather was needed to undertake that most iconic of colonial activities, land clearing. Stephen Pyne has noted that by using fire to clear colonial settlers were imitating their ancient European forebears, but few, if any of them, would have realised this. In the heavily forested western portions of the catchment, fire was the essential step in the establishment of a farm. The importance of a ‘good burn’ crops up continuously. *The Land of the Lyre Bird*, produced in the 1920s by settlers who cleared the forests of South Gippsland, devotes two detailed chapters to the use of fire to establish grass and crops. Seriously hard and dangerous work, the book takes a valorising tone, written by a group who were looking back and finding meaning in their life’s work.

A ‘good burn’ had important economic advantages for a selector. It opened up ground, provided instant fertiliser and enabled a return on all that sweat. The Narracan correspondent complained in 1886 that poorly timed rains in summer had made ‘many of the burns but indifferent’. The sooner grass could be established, the sooner one could meet repayments. This was mournfully noted by Caleb Burchett, who said in his memoirs: ‘It was my misfortune to have almost every time a “Bad Burn”. My first picking up cost me nearly 2 pounds to make the land fit for sowing the grass seed!!’

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36 Diary of Patrick Buckley, 3 August 1846 and 28 to 31 May 1852.
37 This was also reported in *GT*, 12 February 1890.
39 Diary of George Glen AUCHTERLONIE, 29 April 1869, CGS, 4060.
41 *GT*, 3 March 1886.
42 Reminiscences of Caleb Burchett, SLV, MS 8814, MSB 436, unpaginated; see also *Morwell Advertiser*, 12 February 1887 and 25 February 1888 for reports of ‘good burns’. 
Warm, dry weather made a difference to attendance rates at various events, which were often recorded in diaries. The races are one example, with the *Bairnsdale Advertiser* commenting that the prolonged dry would pull a big crowd for a race meeting at Lindenow. Agricultural shows also depended on fine dry weather for their success. One of the favoured forms of group recreation was picnicking, which relied on clear and still weather. Generally, the papers report the weather associated with these events, noting either too cold and wet or too hot and dry.

As long as dryness was moderate and agriculturally well timed, it was deemed positive. It encouraged people to socialise, building relationships and communities through a wide range of activities. Pleasant, dry weather also kept the economy ticking along, because people could travel with more ease and conduct their business. It allowed farms to grow by facilitating clearing. In contrast, higher temperatures, hot winds and high evaporation rates combined with a below average rainfall were conditions which settlers dreaded.

### Negative dryness

Fire, heatwave and drought are common experiences in Australia, and are frequently described as natural disasters. They have an extensive literature, especially with the looming threat of climate change. There have been more deaths from heatwave in Australia than from any other natural hazard. Vulnerability to heatwave is increased by a range of

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43 Mark Daniel went to the New Year’s Day picnic at the Knob Reserve in Stratford in 1885, and his lack of weather observations suggests a pleasant summer’s day. While she didn’t attend, having just given birth to her son, Margaret McCann noted that the weather for the school picnic cleared up by the afternoon. *Diary of Mark Daniel, 1 January 1885, Daniel Family Papers, SLV, MS 10222; Diary of Margaret McCann, 3 November 1898.*

44 *Bairnsdale Advertiser, 30 March 1882.*

45 *GT, 15 November 1897.* The holiday declared for the Prince of Wales’s birthday in 1897 was marred ‘by fierce hot winds’, but nevertheless got a good attendance.


factors, including access to water, the extent and type of shading available (constructed or vegetative), and economic pressures. For example, a study of economic aspects of heatwave found that people working to a quota may ignore warning signals such as fatigue, thirst, tiredness, mental confusion, poor decision-making and visual disturbances. It also identified that ‘workplaces with risks of extreme heat exposure include outdoor maintenance work, mining, shearing, farmwork, firefighting and other emergency and essential services’. All of these identified places were the normal workplaces for the majority of colonial settlers.

Settlers developed a set of expectations about when dryness formed a natural part of the cycle and how much drought was tolerable. This was because of their ongoing attempts to establish a European style of agriculture, and their cultural beliefs about dry lands. The title of this chapter sums up their perception, the water famine and the fire demon. Unlike the Kurnai before them, who knew what a vast living larder they moved through, European settlers chose to reproduce an economy based upon a few staple species. Furthermore, the ecological changes produced by European agriculture increased settlers vulnerability to drought. As Oelschlaeger notes, it is unlikely that hunter-gatherer societies starved. While there most certainly would have been lean times, it seems unlikely that all the ecosystems comprising a tribe’s whole geographical range would have collapsed in a drought. Their populations were also much smaller, placing less pressure on their range. In contrast, poverty is more common with more populous sedentary, agricultural societies, which also developed class and wealth distinctions that can render some parts of the population more vulnerable than others. With bigger populations relying on a much smaller number of food species, colonial Gippslanders were thus more vulnerable to fluctuations in the hydrological cycle than the Kurnai peoples they dispossessed.

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48 Hanna et al., ‘Climate change and rising heat’, p. 17s. Vulnerability is defined by the IPCC as the combination of risk, exposure and sensitivity. Risk refers to the actual physical conditions or prevalence, e.g. if you live in an earthquake-prone zone. Exposure refers to how exposed an individual is to the risk. A person living on the edge of state forest has a higher degree of exposure to fire risk than a person living in an inner city area. Sensitivity acknowledges that different demographic types will have different reactions. For example, people with kidney and heart disease are much more sensitive to high temperatures than a fit, healthy 20-year-old.


The myth of Tiddalik the frog, first recorded in Gippsland, indicates that drought was a feature of Indigenous life.\(^{51}\) But drought is a relative experience. Glantz noted that it could ‘be defined meteorologically, hydrologically, agriculturally, or otherwise’.\(^{52}\) Sherratt notes in *A Change in the Weather* that there are 150 definitions of drought worldwide, reflecting its social and cultural dimensions.\(^{53}\) Agricultural drought was what terrified colonial Gippslanders. Without the embodied water used to produce foods and objects common to an agriculturally founded society, daily life in the catchment could not be sustained. They were forced to simply watch, wait and hope. The Swan Reach correspondent for the *Bairnsdale Advertiser* captured this sense of powerlessness in 1882:

There is very little stirring here worth mentioning, and it seems to me that a correspondent’s duty here is merely to dilate upon the harvest prospects, the want of rain and a few matters requiring the attention of our shire councillors, or to report the proceedings of tea meetings and other social gatherings, of which we have our share.\(^{54}\)

‘To dilate’ carries overtones of passivity and helplessness. Who can be effective against the sun and wind? A knowledge of the El Niño/La Niña cycles they were experiencing might have helped, but that knowledge was 40 years away, at least.\(^{55}\)

High evaporation rates affected many aspects of colonial life. The *Morwell Advertiser* complained how evaporation affected the farming cycle. “The surface of the ground dries up so quickly now, giving out by evaporation the moisture underneath, that occasional gentle showers would be acceptable in many parts.”\(^{56}\) George Auchterlonie noted how the

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51 J Morton, ‘Tiddalik’s travels: The making and remaking of an Aboriginal flood myth’, *Advances in Ecological Research*, vol. 39, 2006, pp. 39–158. doi.org/10.1016/S0065-2504(06)39008-3. Curr recorded this myth in the Port Albert district and published it in 1887. The drought is broken when one of the animals ‘tricks’ Tiddalik into laughing, thereby releasing the waters. I can’t help but notice the similarity between this myth and the Japanese myth of Amaterseru. The difference is that Amaterseru is goddess of the sun, who turns the world to darkness when retreating into a cave. She, too, is encouraged to reverse through the use of laughter.


54 *Bairnsdale Advertiser*, 23 November 1882, Swan Reach correspondent.

55 According to Garden, the first correct formulation of the El Niño phenomenon was put forward by an Indian colonist in the 1920s. Garden, *Droughts, floods and cyclones*, p. 2.

56 *Morwell Advertiser*, 12 October 1889, emphasis added.
dry winter of 1868 made ploughing very difficult: ‘land part next lagoon kindly and somewhat moist, far end rather dry and snarly’. While he succeeded in ploughing, the resulting crop struggled. ‘The barley seem almost done through drought and heat. Oats very much in same state becoming quite withered.’

The weight of expectation of how it should be is littered through the papers. A good example comes from February 1890:

The remarkable heat and dryness of the Autumn is causing heavy loss in those parts of the colony where a fair amount of moisture is customary at this time of year, and is a necessity for crops produced in them. In North Gippsland, the maise and hops crops are pretty nigh ruined, especially the former, while the potato crops in other districts are suffering severely for want of moisture. Bushfires are commencing to be prevalent, though as yet there have been no extensive conflagrations. Altogether the autumn is reckoned as the hottest and driest experienced for many years past.

In autumns like this, death and destruction seemed far too close for comfort. The tenor of the days echoed and reinforced familiar biblical stories of desolation and thirst.

The experience of drought was different depending on what kind of agricultural enterprise each settler was involved in and where they were located. Maffra and Bairnsdale suffered more than many other areas because of their location in rainshadow areas. Michael Landy from Briagolong described it as ‘the fitful nature of rainfall. It came at the wrong time so far as hops were concerned, it came when it was no use to them’.

In contrast, areas in the west of the Latrobe valley were rarely affected. However, when drought did come to those areas, its impacts were more severe because they were unexpected. ‘At South Warragul the complete reversal of the usual order of things has quite astonished the farmers’, wrote the Moe Register in 1888.

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57 Diary of George Auchterlonie, 23 September 1868; see also GT, 1 August 1876, Glenmaggie correspondent: ‘There will not be so much grain grown on Glenmaggie this season, as in former years, as the farmers could not get their land ploughed in time, for want of rain’.
58 Diary of George Auchterlonie, 31 October 1868.
59 Morwell Advertiser, 7 February 1890.
60 Royal Commission on Water Supply, Landy, p. 249.
61 Moe Register, 8 December 1888.
The failure of spring rains in 1888 tracked through the *Moe Register* show the variation of experience in drought. In early November, hot winds desiccated the pasture grasses. The crops were holding out better, but without a good interim fall of rain, they would not be worth harvesting. The Clydebank cheese factory was due to start operations, but its prospects hardly seemed promising under the conditions. A week later, those moister areas of Gippsland were predicting a good year if the potato crop survived because prices were being driven upwards.\(^{62}\) By mid-December, most of the crops in North Gippsland were ruined, and the cattle benefited, being turned out to graze on whatever was left.\(^{63}\) Heavy rains fell in the week before Christmas, which, although too late for many crops, had revived many orchards and home gardens. In the annual pre-Christmas yearly review, the editor noted that compared to experience in northern Victoria, the conditions had only been a partial drought, a ‘favourably dry season’ around Moe. Those who had sown early and prepared their grounds well had escaped the worst impacts.\(^{64}\)

\(^{62}\) *Moe Register*, 24 November 1888 and 22 December 1888.
\(^{63}\) *Moe Register*, 15 December 1888.
\(^{64}\) *Moe Register*, 22 December 1888.
The twin concerns for pastoralists under drought conditions were pasture growth and stock watering points. In particular, the further one had to drive stock to water the more condition they lost, and therefore the less return a grazier would make at the sale yards. On 13 February 1877, the *Gippsland Mercury* reported:

> The drought continues to increase in its intensity, and cattle in many parts of North Gippsland are dying for want of food and water. We hear that a good heavy shower fell at Morwell on Saturday afternoon, and a very slight one fell in Sale on Sunday evening; but if we are not blessed with a good heavy fall before long, the result will be most disastrous.

In very poor years, there was the extra expense of agisting stock in different districts. Many upper Maffra stock spent the summer of 1896 holidaying in Morwell and Warragul. Prolonged dryness affected viability of milk production. The quality of pasture was critical to how much milk each cow could produce. If pasture was scorched by dry winds or not enough sprouted, daily supply to the creameries and butter factories would drop, also affecting their viability.

Town dwellers were also affected. Carting water added extra expense to household budgets. In July 1882, the Maffra correspondent noted 'such a thing was never before seen viz. the carting of water for domestic purposes through the month of July'. High evaporation rates compromised both the quality and quantity of drinking water. Commenting on drought in Bairnsdale, the *Moe Register* remarked:

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65 In the *GM*, 10 February 1877, the Rosedale correspondent laments lack of rain and says that selectors will have to travel for water and feed. Previously, Sale stock agents Messrs English and Peck reported that due to the drought they did not anticipate any transactions for store cattle, *GM*, 6 February 1877. Later in March, the Flynn's Creek correspondent noted that many cattle had died or were suffering from ophthalmic disease, and it was thought locally that only a good rainfall would cure the survivors. *GM*, 22 March 1877.

66 *GT*, 27 February 1896, Upper Maffra correspondent.

67 *Gippsland Mercury*, 17 February 1877, noting impact of drought on cheese production; *GM*, 15 March 1877, the Upper Maffra factory had been forced to close; *GT*, 27 February 1896, Upper Maffra correspondent, supply of milk to the Newry creamery has decreased to 200 gallons daily; *GT*, 16 July 1896, 'There is already an increase in the milk supply at the Sale butter factory as a result of the fine rains of last month, and there is every reason to anticipate a good season'.

68 *GT*, 26 July 1882.
The last place one would expect to hear about drought is surely in Gippsland, at a spot, moreover, where you can see snow on the mountains, and what is more, feel the cold wind that blows over their bleak summits. Such, however, is the case in the neighbourhood of Bairnsdale, where residents this winter have not been able to catch sufficient rainwater from their houses for domestic purposes.69

When rains returned, it was no guarantee of an instant supply either. The Heyfield correspondent complained in mid-May 1877, after a good series of showers generally through the district, that the Thomson River was still as dry as his evaporated ink bottle.70 Rain that fell was sucked up by parched soil and plants before there could be enough runoff to raise river levels. High evaporation also affected water quality. Water levels could drop markedly, making water collected from rivers sludgy and polluted. In a classic understatement, the editor of the Gippsland Mercury said: ‘The excessively dry season has rendered water very scarce, and that obtainable has not been of the purest quality’.71

High evaporation also highlighted poor drainage practices in Gippsland’s towns. The habit of sheeting off waste to the nearest waterbody relied on water’s capacity to dilute pollutants and flush them away, but less water meant less dilution. Walhalla residents in February 1877 probably cheered when a hailstorm arrived, as they believed that incidences of low fever and scarlatina would decline after the streets had a good wash down. The small matter of employment loomed too. The Long Tunnel Company could return to work.72 The emotional impact of drought was clear in the newspapers. Words like ‘despair’, injurious’ and ‘apprehension’ were

69  Moe Register, 8 September 1888.
70  GM, 12 May 1877.
71  GM, 13 January 1877, petition to Sale Council asking for a small dam to be constructed across Flooding Creek to: 1) provide a pedestrian link and 2) raise the summer water levels to help with domestic supplies; GM, 12 April 1877, editorial: ‘There has recently been a good deal of illness in our district, and as dysentery is at the present time very prevalent, it is absolutely necessary that inspectors of nuisances be vigilant in looking after the cleanliness of localities inspected by them. We also see it as an opportune suggestion on the part of the Avon Shire health officer that all water being used for culinary and drinking purposes be filtered. The excessively dry season has rendered water very scarce, and that obtainable has not been of the purest quality’.
72  GM, 20 February 1877.
not uncommon. Further understanding of the impact of drought comes from the jubilant tones and sense of relief when rain did arrive in the nick of time.\textsuperscript{73}

As if drought conditions were not a big enough threat to survival and prosperity, things could get so much worse. As early as 1875, some recognised that the spread of settlement exacerbated the suffering caused by the fire demon.\textsuperscript{74} With the arrival of white Europeans, there were so many more opportunities for fire to take hold, like bored children playing with matches or careless travellers who failed to extinguish their campfires properly.\textsuperscript{75} Extremely hot and dry conditions are the perfect conditions for bushfires. This example from George Auchterlonie’s diary in 1868 is fairly typical:

Reaping till about 10 o’clock had to knock off with the heat which was something extraordinary – hot wind blew hotter than I’ve ever felt before. In the afternoon a bushfire came roaring down upon us threatening to sweep all before it but the wind providentially reared round to the south west which stoped its progress just as it had reached within 200 yards of the house. I was most of the aft. helping to save Warner’s hut, the fire was blazing fiercely about 20 yards from it but we succeeded in keeping it from getting any nearer. It was suffocating work.\textsuperscript{76}

\textsuperscript{73} \textit{GT}, 28 March 1862; \textit{GT}, 8 February 1866, advocating agricultural insurance as an antidote to drought induced ‘despair’; \textit{GT}, 12 April 1866, describing apprehension of drought; \textit{GT}, 6 April 1869, \textit{GT}, 19 December 1877, Rosedale correspondent, the farmers therefore are not in the best of humours; \textit{GT}, 19 April 1882, ‘the usual growl of discontent’ about the drought.

For examples of rain-related relief and happiness, see \textit{GT}, 7 March 1862, editorial, ‘whilst we are preparing for press, a fine soft rain is falling, which will be gladly welcomed by both agriculturists and squatters’; \textit{GT}, 29 May 1866, editorial: ‘It would not be easy to compute the amount of good which North Gippsland derived from the copious rainfall we had a few days ago. Previously, the country looked parched and uninteresting, and vegetation of every kind appeared to languish from the effects of the long-continued drought. Now, however, the aspect is altogether changed for the better – the grass and newly sown crops especially presenting a very refreshing greenness to the eye, after the burnt-up appearance that the country has uninterruptedly worn for so many months in succession’; \textit{GT}, 1 February 1878, Traralgon storm initially welcomed as a drought breaker; \textit{GT}, 8 March 1882, blessed with a day’s rain.

\textsuperscript{74} \textit{GT}, 28 January 1875.

\textsuperscript{75} \textit{GT}, 29 February 1884. In another appalling incident of playing with matches, there was the death of a little girl, caused by her brother playing with matches in dry grass. Being hot and windy, the girl’s clothes caught alight and she was burned to death. \textit{Morwell Advertiser}, 3 March 1888.

\textsuperscript{76} Diary of George Auchterlonie, 24 December 1868.
Clearing by fire was a double-edged sword. Selectors were acutely tuned to the degree of dryness. Burns were usually in January and February, and they preferred the hottest and windiest day. This had the greatest effect on the area to be burned, but could also lead to serious repercussions. Some people lost everything because a neighbour’s burn went out of control, for example Mr Hall of Leongatha lost his entire dairy herd. One man even burned to death in his own clearing fire. Good neighbours gave sufficient notice of their intention to burn, and had enough people to watch and help. Catherine and John Currie nailed up notices when they intended to burn on 25 January 1881. An entry in her diary for the following month shows just how easily a fire might turn into a disaster:

John lit an old tree … the flames Leaped High and catched the bark and was to the top of the tree in no time. We were very frightened as it was so near the Barn and Stock. The wind was blowing the spark right over this way it catched on other two or three and John chopped them down but the worst were such big ones.

In *Forests of Ash*, Tom Griffiths notes that there are three fires in Victorian history that stand out for their ferocity and destruction. All of them took place in Gippsland and two of them took place within the study period. The first, Black Thursday, happened on 6 February 1851. The second was between 10 and 12 January 1898, although fires were active before and after those dates. The next major conflagration was the 1939 fires, by which all fire indexes were calibrated until recently. Since *Forests of Ash* was written, the fires of 2009 have eclipsed them all: 172 people in Victoria died as a direct result, and many more died in the preceding heatwave. In between the cataclysmic events of 1851 and 1898, there were other significant years of fires. Part of Angus McMillan’s financial ruin was caused by fires sweeping through Bushy Park in 1861. More suffered the following year, with most of the country between the Mitchell and Avon rivers alight, and in 1870 Bairnsdale found itself encircled by flame.
Because bushfires were of extreme importance, local newspapers covered their extent and impact closely. The following quote from the *Morwell Advertiser* in 1888 illustrates both the extent of bushfires and conveys something of the fear and drama associated with them:

> The drought stricken condition of the country, and the long continuance of excessively hot weather rendered the occurrence of bush fires on a large scale inevitable. Fires are reported at Lakes Entrance, Toongabbie, Briagolong, Cowwar, Lindenow, Walhalla, Moondarra and different places south of the Sale Railway Line. During the past week a heavy pall of smoke has enshrouded the whole of north Gippsland, contributing not a little to intensify the discomfort caused by the excessive heat, while every evening the sun set like a globe of fire, and the sky was lurid with the glow of bushfires.82

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82 *Morwell Advertiser*, 1 December 1888. Other examples of fear/anxiety comments in the papers include Dutson correspondent, *GT*, 8 April 1891, *Bairnsdale Liberal News*, 20 September 1879. The correspondents from Dargo, Carrajung, Stradbroke and Woodside in *GT*, 22 August 1886, all mention the welcome onset of rain and how it means a good season for crops.
Diary evidence supports an interpretation of fear and anxiety. Owing to the thin smattering of population in 1851, few accounts of that massive fire’s spread through Gippsland exist. Patrick Buckley, usually a terse, even taciturn, diarist, actually showed emotion. He said how afraid he was, especially of losing the whole farm, and wished himself and the staff safely on the beach.\(^{83}\) George Auchterlonie felt ‘suffocated’ by them. Catherine Currie, a woman of anxious disposition, was frightened by the fires.\(^{84}\)

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83 Diary of Patrick Buckley, 6 February 1851. He expressed surprise that he lost no buildings and noted that native dogs and kangaroos had been lamed. D Parry-Okeden, ‘The Parry Okeden family at Rosedale’, \textit{Gippsland Heritage Journal}, vol. 10, 1991, p. 51, for his remembrance of the Black Thursday fire. For the 1898 fires, see Diary of Charles Alfred Broome, 5 and 6 December 1898, SLV, MS 10774, Box 1542; Diary of Margaret McCann, 20 January and 31 December 1898.

For her, the fire season could not pass soon enough, gratefully recording on 9 March 1881: ‘No fear of fire now for this year. Some very heavy hail storms’. Even solid water was welcome after a taxing fire season.

The 1898 fires were not unexpected, but their scale and ferocity shocked everyone. In the spring of 1897, George Auchterlonie noted what ‘an exceptionally dry spring it was’.85 On 20 December 1897, the *Gippsland Times* Maffra correspondent wrote:

> The intense heat of Thursday and yesterday is causing land owners considerable anxiety as to the outbreak of bushfires. It is generally expected that fires will be more numerous this season unless more than ordinary precautions are taken in consequence of an abundance of grass. Already several narrow escapes have been experienced; the outbreaks being discovered before any good progress was made and at Ravenswood on Thursday about 100 acres was destroyed before the fire was mastered.

Mr J Gorman of Childers wrote to his sister: ‘We are experiencing a phenomenally hot, dry season, usually we count on plenty of rain till about the middle of January, with occasional hot days; but we have no rain worth speaking of for two months’.86 In such desiccated landscapes, ownership of a spring was literally a lifesaver. Copeland tells of a man and child who survived the fire by huddling under bags, which he periodically wetted in the nearby spring.87 While his father and older siblings were out helping the neighbours save their property, Frank Savige, his mother and his younger siblings were able to save their own home because they could draw water from a spring.88

The combination of drought, heatwave and fire made everyone’s worst nightmares come true, like the summer of 1881/82 where days of extreme heat, fire and dust storms prevailed. Because of the lack of official temperature measurement, it is not possible to determine how long and severe the heatwaves were, but newspaper descriptions suggest a summer best spent in deep shade by a river. In the same week the thermometer had reached 106°F in the shade, the Sale Council received a petition from 144 residents, including their own health officer and various doctors in town,

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87 Copeland, *Path of progress*, p. 419.
begging that the bathing sheds be renovated.89 The ‘fearfully oppressive’ weather included hot winds, a substantial dust storm and threatening fires.90 Fears were expressed that should a westerly wind come, the fires that had been contained to the ranges above Toongabbie would escape to the flats. Between the smoke and dust, Maffra residents could ‘scarcely see the opposite side of the street’ in the week of 23 February. Around Tinamba the pastures were ‘very much parched and burned up’.91 At the beginning of March, the *Maffra Spectator* wrote: ‘To give our readers an idea of the exceptionally dry season we are experiencing, and the great want of rain that exists, hereby is subjoined a return of the rainfall at Maffra for the month of February during the last three years:– 1882 0.6 inches, 1881 1.12 inches, 1880 4.49 inches’.

The difficult weather continued unabated. In the week before 20 February, there were fires at Merriman’s Creek, Briagolong, Kilmany Park, Tanjil, Dutson and other localities. In a thunderstorm, lightning struck a swamp gum on Mr Cameron’s property near Maffra, which spread flaming shards of timber through the tinder-like stubble. In mid-March, the heat was so fierce that animals at the various stock saleyards were dropping dead.92

In recent years, there has been research carried out on the psychological impacts of prolonged drought. Findings show a variety impacts, especially depression. Under conditions of climate change, which are likely to aggravate drought and fire weather, the Australian Psychological Association expects mental health impacts to increase.93 Because colonial Gippslanders were pursuing the same farming enterprises, and shared common frames of reference about the desirability of agriculture, there are valid grounds to expect settlers to feel much the same as their modern counterparts. The newspaper and diary evidence shows that there is no doubt that colonial Gippslanders were threatened on most levels by the absence of water. Most obvious is the economic threat it posed: poor or nonexistent harvests, stock in poor condition or dying from thirst and starvation. Drought and depression were linked, while fire was linked to fear and anxiety. Their economic survival and their mental health were at stake.

89 *GT*, 20 January 1882.
90 ‘The description ‘fearfully oppressive’ comes from the *Maffra Spectator*, 23 February 1882.
92 *Maffra Spectator*, 16 March 1882.
Dealing with extremes

As the animals in Gippsland’s stockyards found to their detriment in the appalling summer of 1881/82, dryness and heat is fatal. The water famine and the fire demon brought times of great emotional and financial distress for the settlers of Gippsland. They remained a constant threat, disrupting settlers’ cherished notions of order, progress and prosperity, and put at risk the ideology of the yeoman farmer. They also put at risk the mythology of the abundant biblical garden, which they were trying to reproduce in the antipodes. These were the ‘the two dominant social and economic philosophies of the time: the creation of a class of yeoman farmers and the attempt to make the deserts bloom’.94 A number of writers have pointed out the religious imagery employed in the debate on irrigation in Victoria, which is perhaps best expressed in the cartoon of Deakin as Moses. Irrigation appeared as the most rational and logical solution to nature’s threat to their achievement.95

Some of the most powerful metaphorical language was employed by the Royal Commission on Water in their descriptions of aridity. Deakin’s report on the waterless American landscapes he saw was full of evocative imagery. He described the lands west of Kansas with terms like ‘glaring barreness’ and ‘illimitable desert’, which had ‘gaping gulchures and fissures of unappeasable thirst’. In contrast, irrigation channels and ditches were places ‘where one beholds industry and intelligence transmuting barren surfaces into orchards and fields of waving grain … It is here veritably the water of life’.96 Francis Myers (Telemachus of the Argus) used equally strong language in the pamphlet he wrote for the Chaffey Brothers, architects of the irrigation scheme at Mildura, calling them apostles.97

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96 A Deakin, Irrigation in western America, So far as it has relation to the circumstances of Victoria: A memorandum for the members of the Royal Commission on Water Supply, Government Printer, Melbourne, 1885, p. 9.
97 F Myers, Irrigation or the new Australia, Chaffey Bros Ltd, Mildura Victoria, 1893, p. 2. Other biblical analogies included: ‘They would dig, plant and water it; they would settle on it a population; they would transform a wilderness to a garden …’, p. 5 and ‘They saw sterility on either bank, and the river of life flowing between them’, p. 6.
With this language, Deakin tapped into an enduring set of biblical metaphors about making deserts bloom. Locally, Gippsland residents bought into this imagery with their persistent portrayal of the catchment as ‘the garden of Victoria’. At a public dinner in 1881, John King said:

He came to Gippsland from the neighbourhood of the Goulbourn, after a period of terrible and prolonged drought, and when his eye first lighted on our fresh green grassy plains, with the rich juicy herbage reaching up to our saddle girths, his astonishment and delight could scarcely be described. It was like coming to a veritable paradise, and he could assure them he should never forget the days when Gippsland was without a fence, and (sotto voce) without a selector.98

Other gardenesque comparisons were used, for example JJ English, Sale’s mayor, dubbed Gippsland as the Lombardy of Australia.99

Figure 7.5: Cowarr Butter Factory.
Source: Author.

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98 Report of proceedings of a dinner held in the Duke of Manchester’s honour, GT, 29 November 1880.
99 Discussion of English’s article on artesian irrigation, GT, 4 March 1881. Other examples include GT, 3 April 1863, 16 July 1867, 5 April 1870 and 31 October 1874.
The emphasis on the productive, garden-like nature of the catchment was tied to an economic goal. When Gippslanders collaborated to send loads of produce to England in newly refrigerated containers in the 1890s, they were exporting the catchment’s water in the guise of apples or butter. Chapter 6 illustrated how vital the concept of flow was to colonial Gippslanders. They wanted the products of their labour to flow out to the empire, and worked tirelessly to reshape Gippsland’s hydrology in support of that vision. The water famine and the fire demon threatened their ability to participate in the imperial economy.

Yet, it is the nature of the hydrological cycle to periodically flux from wet to dry. The length of these periods of flux is highly variable across the globe, with Australia gaining the reputation for the most variable climate.100 As Tuan and others have pointed out, European culture and science has always been disparaging about, if not actively hostile to, arid lands.101 Falkenmark describes a blue water bias, which only values surface water and ignores water in other pathways of the hydrological cycle.102 How might the history of hydrological science have been different if it had reflected the Australian context, where there is more water stored in soils than there has ever been in surface waters?103 Perhaps soil moisture measurements might have been the first order of measurement, not rainfall. The apparent refusal to consider other meteorological measurements besides rainfall confirms the blue water bias held by European migrants. Had they been able to see beyond this, perhaps other ways of seeing the colonial landscape would have emerged over time.

100 Aplin, Australians and their environment, p. 49; Hanna et al., ‘Climate change and rising heat’, p. 15s.
103 Aplin, Australians and their environment, p. 422.
What options did settlers have to limit the effects of the water famine and the fire demon? They had most capability to ameliorate drought, and this is where most turned their attention. Settlers had four options, the first of which was the spiritual option of praying for rain.

In doing so, Gippslanders were not departing from any cultural norm. Historians of natural disasters have shown that in Europe prayer was a popular recourse, based upon a conception of the universe where God would punish the wicked for their sins through natural disasters. They were also following Biblical instruction because, as the *Gippsland Times* noted:

> In Joel, chapter first, we are told that ‘the seed is rotten under the clods, the harvest is perished. The herds of cattle are perplexed because they have no pasture; yea, the flocks of sheep are made desolate.’ Under these circumstances, the people are directed to ‘sanctify a feast, call a solemn assembly, gather the elders and all the inhabitants of the land into the house of God, and cry unto the Lord.’

The earliest reference found in the *Gippsland Times* to the practice was in January 1866 and continues. Examples include reporting in the *Gippsland Mercury* on 1 May 1877, after a harsh summer with major stock deaths and disease. Usually, the intercession sought was rain, but there is also one instance of praying in relation to wind patterns. In 1882, the *Maffra Spectator* records settlers in Toongabbie praying for the wind not to change, because otherwise the fire would move down onto the flats.

In the report from May, readers were told that the government had set aside the previous day ‘for humiliation and prayer for rain owing to the severe drought experienced in most parts of the colony’. Individually, even

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106 *GT*, 3 January 1866.
107 *GT*, 3 January 1866. Also *GT*, 10 January 1865 and 30 March 1869; *GT*, 6 April 1869, noted that Roman Catholics had been performing a daily prayer for rain for the whole of the previous month; *GM*, 1 May 1877; *Morwell Advertiser*, 8 December 1888.
108 Advising readers of the times and locations of the services, *GT*, 3 May 1897 and 22 November 1897.
though surviving diaries rarely recorded such personal spiritual matters, there is indication of praying for rain, usually in reference to controlling fire. Catherine Currie’s diary displays her anxiety openly, and she often prays for rain in February to protect her home and her family. During the 1898 fires, people beseeched God for divine intervention, and some were converted when it came.

However, praying for rain was a contested practice. In the summer of 1881/82, Bishop Moorhouse of Melbourne had been asked to authorise prayers for rain in services. He refused, saying that pleading for intervention in natural cycles was wrong, and further suggested that if the population had not conserved the water that it received, asking for intervention was downright insulting to God. This message was repeated on 8 December 1888, when the *Morwell Advertiser* ran a lengthy article on the arguments for and against the practice of praying for rain, indicating a level of practice that was sufficiently widespread to warrant comment. The *Advertiser*’s journalist opposed the practice. ‘Some clergymen’, he wrote, ‘are uttering a half hearted protest against praying for rain while facilities for irrigation surround us on every hand, facilities which no man attempts to make use of.’ Why ask God to intervene when we are capable of doing it ourselves?

In his view, praying for rain demonstrated how few accepted or understood the fruits of scientific enquiry. He asserted that the world was governed by ‘rigid unvarying’ natural laws and, given this, no halfway intelligent ecclesiast could ‘subscribe to the doctrine that the laws which govern meteorology are capable of being altered or modified in order to square with the little temporary exigencies of particular localities’. The writer’s firm belief in a set of fixed laws meant that no amount of prayer could alter the course of natural events, which included drought. Belief in the efficacy of prayer meant that rain could be organised like the railway timetable, ‘providing for the periodical recurrence, at convenient season, of the amount of rain or sunshine which the condition of any given district might seem to necessitate’, which clearly was illogical.

Despite the jesting tone, the *Morwell Advertiser*’s journalist precisely summed up the desire to escape the variability of the hydrological cycle. If prayer worked, then it meant that men like Michael Landy didn’t have

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110 Diary of Catherine Currie, 19 February 1879 and 13–17 February 1895.
111 *Morwell Advertiser*, 4 February 1898.
112 *GT*, 1 March 1882, editorial discussing Bishop Moorhouse’s refusal to pray for rain.
to testify to the royal commission that the rain didn’t come till after the crops were ruined. Praying therefore was a good option and, more to the point, it was infinitely cheaper than all the others.

A second option to minimise exposure to drought was to chose one’s location wisely. Gippsland was initially colonised as a response to the 1838 drought in New South Wales. John King’s impressions have already been cited, and Angus McMillan was equally impressed with Gippsland’s abundance. The selection era opened many of the squatting estates up to small agriculturalists. Most selections took place in the comparatively wetter early 1870s. Settlers could not have known that this was not the norm. Many would therefore have chosen an area whose appearance at the time of selection was uncharacteristic. However, because they selected in a wetter period, this established the benchmark for normal by which later years would be judged.

George Auchterlonie left the rainshadow area around Maffra and moved to Wilderness Creek south of Narracan, precisely because he wanted a more reliable rainfall. Gormandale was settled because it remained green during a drought, and so the farmers of Merriman’s Creek decided to move there en masse.113 While some settlers moved, the more common experience across the colonies was to demand assistance from the government. The fixed nature of farming drove the irrigation push, because they could not move to water as pastoralists could.114

The oft-told story of Goyder’s line and the failure of farms beyond it is illustrative. The timing of selections in Gippsland, in those crucially wet early 1870s, is a mini version of the experience in South Australia. Connell reads the Goyder story as being a struggle between ‘biophysical realities and human ambition’.115 Colonial Gipplanders displayed a similar misperception, thinking that how it was when they first arrived was how the catchment was always going to be. The difference between arrival in Gippsland and perceptions of the climate is amply demonstrated in the evidence given to the Royal Commission on Water by William Palmer. ‘Then your memory does not go back to the old times?’ asked the commissioners. ‘Not the old, moist times’, said Palmer.116

116 Royal Commission on Water Supply, p. 250.
Once a preferred location had been secured, the next option was property management and development. Settlers could augment supply, and lower evaporation rates by excavating dams and sinking wells, planting windbreaks, and in the home garden and orchard, using mulch. It is expected that trial-and-error testing of different species for their robustness also occurred, but that subject has not been investigated here.

Sinking wells presupposes the knowledge of groundwater, but wells were common in Europe and this was no great departure. In 1877, Samuel Lacey, an engineer with a prosperous business in Sale and future joint venturer with August Niemann in artesian boring, exhibited his pumping windmill at the local agricultural show. In later years, Lacey took to advertising their pumping windmills with this direct reference to lack of rainfall:

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118 *GM*, 21 April 1877, report on the agricultural show. Mr Lacey’s windmill is described as ‘one of simple construction and which has been testified to by several cattle breeders as a most effective apparatus’.
As Egypt does not on the clouds rely,  
But to the Nile owes more than the sky;  
So, what the Heaven’s this thirsty land desires.  
Our tireless FRIEND, THE SAFETY MILL supplies.\textsuperscript{119}

Windbreaks alleviated the desiccating effects of drying summer winds. It is striking to note, driving through Gippsland now, how many remnants of conifer windbreaks have survived. Howitt was adamant on the need for windbreaks in hops cultivation, for he found that the ‘winds have a most injurious action in bruising the vines’.\textsuperscript{120} For example, a report on an experiment in windbreaks was included in the \textit{Gippsland Times} in 1897. Next to irrigation, windbreaks were praised as the most important thing a farmer could do to protect crops. A controlled experiment was performed, and the performance of the orchard inside the windbreak far outstripped the unprotected one.\textsuperscript{121}

Almanacs and more specialist publications also give some insight into the ways in which settlers could attempt to manage hot and dry conditions. Much of this related to the home vegetable garden and orchard, which could be more intensively managed. Moreover, this information was known from as early as 1841 in \textit{Kerr’s Melbourne Almanac}. The January entry for the ‘Farmer’s Calendar’ reads, ‘in this colony from the sudden effects of the hot winds, no care can guard the farmer from occasional heavy losses by the falling off of the heads of the various cereal grasses, more particularly barley’. In early spring the advice was that ‘the hot winds occur in the latter end of November, or beginning to end of December; if the wheat is not out of blossom before these winds come on, it is sure to be more or less blighted’.\textsuperscript{122} To prevent evaporation from the soil surface, \textit{Castner’s Rural Australian} gave detailed instructions on how to mulch in November 1875.\textsuperscript{123} In January 1875, it noted that with shading and mulching, gladioli made a brave addition to the summer flower garden.

\textsuperscript{119} \textit{GT}, 18 November 1897, emphasis in original.  
\textsuperscript{120} \textit{GT}, 23 October 1882.  
\textsuperscript{121} \textit{GT}, 13 December 1897. See O Archibold, ‘Living in a garden in a valley’, \textit{Australian Garden History}, vol. 11, no. 3, 1999, pp. 10–14, reference to planting pines as windbreaks in the Latrobe catchment. Also, for the Macalister catchment, see \textit{GT}, 12 March 1883; \textit{GT}, 23 November 1887, design of the Yarram Episcopalian church takes account of needing to break the east wind; \textit{GT}, 16 June 1890, Michael Landy’s farm on Freestone Creek ‘occupies a well sheltered position, being protected on the north and west sides by the foothills which form an effective break for the hot winds of summer or the westerly gales of winter’; \textit{GT}, 6 February 1891 and 10 February 1892, on the use of ti-tree as a windbreak at Prospect.  
\textsuperscript{122} \textit{Kerr’s Melbourne Almanac}, 1841, pp. 208 and 213. See also \textit{Port Phillip Patriot Almanac and Directory} for 1847, Levy Brothers and Co. \textit{Victorian Almanac} for 1872, S Mullen’s \textit{Victorian Almanac} for 1882 all of which offer similar advice as to the problems of cultivation in January and February.  
\textsuperscript{123} \textit{Castner’s Rural Australian}, November 1875. Also \textit{Glass’s Almanac}, 1862, February entry.
In February, the principal advice was to install water tanks. The advice from Glass’s Almanac was to protect young trees from winds in February. The almanacs clearly show that the difficulties of the Australian summer were well understood from an early stage, and that there was plenty of pragmatic advice that individuals could act upon to prevent moisture loss from their crop, orchard, vegetable or ornamental garden.

Finally, the last option was irrigation. Colonial Victoria was the epicentre of irrigation development in Australia.124 The scholarly attention given to the large, centralised schemes has obscured the many individual efforts made to practise irrigation at the domestic or farm scale. A report from 1869 suggests basic irrigation practices at the Aboriginal mission at Ramahyuck, while, in 1876, Blythe and Howitt were irrigating their large hops plantations on the Mitchell River.125 The success of the artesian well at Sale prompted William Pearson to start boring at Kilmany Park to facilitate irrigation.126 The Royal Commission on Water Supply visited Palmer’s Charlcote estate at Clydebank and William Craig’s Craigelee near Stratford, both of whom were practising irrigation on relatively large scales.127 Other references have been found to individual farmers irrigating parts of their property.128 And, as

125 GT, 10 August 1869 and 29 December 1876.
126 GT, 3 March 1881.
127 Royal Commission on Water Supply, Evidence from 26 June 1885.
128 Examples include GT, 21 January 1884; Park House, 28 February 1882, ‘The machinery consists of a Wood’s string reaper and binder, threshing machine, reaper, mower, double and single furrow ploughs, chaff cutter &c., all by the best makers, and a McComas water lift. Although the latter may be a very suitable pump for drawing water within a few feet of the surface, I do not think it adapted for lifting from 15 to 20 feet below the surface, the power required being too great, and also the speed at which it is necessary to drive it, are drawbacks to its more common use. One thing in its favour, its non-liability to get out of repair’. Hales, Gippsland estates, p. 7; ‘From the early 1880s onwards trials were carried out on irrigation methods. In 1884, a Californian pump was imported that used one horse in a horse works. That horse, walking around in a circle, pumped the water up from the creek or river to irrigate the flats. Later, on the river flat, Tom Kendal and Henry Drew purchased a stationary steam engine to drive a pump that was shared between the two farms. In the same area, John Higgins used a steam pump in conjunction with a giant flume to carry water to a series of irrigation ditches he had dug across the paddocks.’ L Barraclough & M Higgins, A valley of glens: The people and places of the Upper Macalister River, Kapana Press, Bairnsdale 1986, p. 40; ‘The water race has been used to irrigate the river flats were he grew crops of oats, peas and potatoes which he sold to the nearby farming community’: ‘Return to Swinger’s Flat’, Coach News, vol. 14, no. 4, June 1987, p. 15; Extracts from report of an excursion to Gormandale: Cr Hiam of Rosedale Shire (after who Hiamvale was named) at his property in the 1880s (by then a pine forest) had built an irrigation system from a spring some distance away. Traralgon DHS Bi Monthly Bulletin, vol. 12, no. 2, May 1981, p. 10; Notes of a talk given by Jean Galbraith: ‘Pipes were made from cylindrical bark taken from young saplings to water the plants’. Traralgon DHS Bi Monthly Bulletin, vol. 3, no. 3, July 1972, p. 4; Bushy Park: ‘The benefits of irrigation however attracted attention, and Mr Mackintosh is now seriously considering the advisability of erecting a large pumping plant and going in extensively in irrigation. The house is pleasantly situated on the banks of the Avon and is surrounded by a fine old orchard containing a great variety of trees … Water is raised from the river by means of a Tangye engine and pump, and laid onto the house and garden’. GT, 29 April 1887.
Blackburn notes, the role and importance of Chinese market gardeners and their irrigation and land management practices in making irrigation seem feasible should not be understated. Blythe, as mentioned above, is noted as using Chinese labour to construct his irrigation system.\(^{129}\)

The experience of drought had already made the presence or absence of water a significant issue by the time irrigation’s most celebrated promoter, Alfred Deakin, became a minister. At the end of 1884, he was appointed chair of a royal commission to investigate the applicability of irrigation to Victoria. He travelled in California between December 1884 and May 1895, and his report recommending irrigation was presented in June 1885. The Irrigation Act was introduced into parliament in June 1886.\(^{130}\) As Powell demonstrates in *Watering the Garden State*, most of the emphasis in this era was in northern Victoria, especially areas abutting the Murray River. The comparative dryness of the climate in the inland north makes the fervour for irrigation more understandable. In the GLC, the interest was less pronounced, but the drier eastern sections of the GLC followed the broad trend of interest in irrigation. There was widespread support for irrigation as a concept, and most in Gippsland believed in its progressiveness.\(^{131}\)

One of the strongest public advocates of irrigation was the Bishop of Melbourne. In December 1883, he arrived in Sale to preside at the foundation stone ceremony of St Paul’s Church. His address used irrigation as his metaphor. He considered irrigation to be an alignment of humans with the forces of nature, in much the same way that dedication to Christ was aligning oneself with the true nature of prosperity.\(^{132}\) The bishop told of the experiences of settlers on the northern Victorian plains, who he described as belonging to ‘a grand, an imperial race – one that never knows when it is beaten, that cannot say die’. He described their ruin when rains ‘failed’, and then pointed out that he, the wise man of God, had advocated for irrigation five years previously. Using catchment imagery and language, there was rain on the mountains, and rivers that

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131 GT, 5 September 1884, is a good example. Councillor Davis of Maffra Shire gives a public lecture exhorting the young men of the district to take up the cause of irrigation because ‘it would increase the wealth of the district to a great extent, and in that they were all interested’.
132 GT, 19 December 1883.
would transport the rain past them, if only they would go to the trouble and expense of getting it. This, in the bishop’s view, was ‘humouring Nature’, or ‘bringing their energies into line with the natural energies around them’. In this view, irrigation seems less like an intervention in the hydrological cycle than an accommodation with it.

Bairnsdale established the first irrigation trust in 1891, but there had been concerted lobbying in the decade prior, especially by Michael Landy who was a significant farmer in Briagolong. He was a consistent advocate for irrigation from as early as 1879 when he gave evidence to the inquiry into land selection.

The increase in newspaper reporting about irrigation from approximately 1884 is the combination of the establishment of the Royal Commission on Water Supply, and the cumulative experience of desiccating winds, variable rainfall, crop failures and a run of bad fires. The slowly worsening dryness prompted collective action by several of the shires in 1885. They extended an invitation to the royal commission to inspect the region. Hoping to gain grants for schemes of irrigation, the visit was intended to establish in the minds of the commissioners an image of Gippsland as a place of hydrological deficiency. An extension of their previous *modus operandi*, Gippslanders were very experienced at lobbying government for support for capital works. Between the railway, de-snagging the rivers and the creation of the entrance, they had already appropriated millions of pounds of colonial revenue in the endeavour to overcome Gippsland’s hydrological barriers to progress.

The commission visited in June 1885, inspected parts of the Thomson, the Macalister and the Mitchell rivers and took evidence from 11 men. Charles Geoghan, Secretary of the Borough of Sale; Jan August Niemann, water borer; Thomas Lloyd Flegge, farm manager; Michael Landy and William Palmer, graziers; and George Jones, the engineer at Maffra Shire, were examined in Sale. In Bairnsdale, the commission examined Peter Bredt, Bairnsdale Shire Secretary; Joseph Taylor, hops and seeds grower; William Ross and Andrew Macarthur, both shire councillors; and James Bankin, a mixed farmer.

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133 *GT*, 19 December 1883.
The evidence proffered is striking in a number of ways. Only two of the 11, Niemann and Flegge, depart from the script of enthusiasm and boosterism. Niemann was more interested in protecting his water-boring business, so his evidence must be read in this light. ‘I wish to say that bringing water to Sale from the River is like bringing coals to Newcastle.’ He argued for an artesian supply, which would be more reliable that dam water distributed through irrigation channels. Flegge described his experience of irrigating from an artesian bore drilled by Niemann. While agreeing that irrigation could be good, he found it too expensive and ill suited to his very flat lands. He pointed out that very expensive infrastructure would be needed to retain the constant flow of the ground water, along with distribution channels and thought the expense not worthy of the result. He also pointed out the porosity of the soil as a problem.

The commissioners probed both the costs of works installed by individual farmers and the anticipated costs of the grand schemes presented for their consideration. They also tried to gain an understanding of the expected increase in production as a result of irrigation, by understanding the losses from drought. Only Landy, Palmer, Taylor and Bankin could give even approximate figures of the costs of their works and returns. Palmer said that his carrying capacity went from one sheep to 10. Landy based his calculations on the difference between wet and dry years and estimated his losses from drought over the past three years at £20 an acre. Most reckoned that pastures could hold three head to an acre under irrigation, compared to one, dry.

What is most striking is the near complete lack of reliable figures from anyone, compared to their ability to make sweeping claims for the desirability and utility of irrigation. Landy claimed that dams in the Alps could water ‘the whole of Victoria’. George Jones presented a plan to dam the Macallister and irrigate as far south as Rosedale without having made an estimate of the average flow rate. The slightly less bold Peter Bredt told the commissioners that ‘unlimited supply’ of water in the Mitchell River catchment could supply ‘half of Victoria’, because of the vastness of the Mitchell’s catchment and the snow which fed it. He could not answer questions about how the water might be brought from the Alps, but suggested that ‘it is a mere matter of engineering to bring the water

135 Royal Commission on Water Supply, Niemann, p. 244.
136 Royal Commission on Water Supply, Flegge, p. 247.
137 Royal Commission on Water Supply, account of site visit on 26 June 1885.
from a higher level to lower’. Bredt at least had an estimate of flow rates, a 6 mile an hour current, although he did not disclose his method of calculation to the commission.138 By this stage, the commissioners were finding such boosterism tedious. They grilled Bredt, who appeared foolish when forced to admit that he did not know of any catchment that could supply water to catchments beyond it. The Bairnsdale Advertiser did not report this aspect of proceedings.

The best data the witnesses had to give the commissioners was rainfall data, and even then, they fudged. Bredt submitted returns saying: ‘Formerly our rainfall went as high as 5 and 6 ft per annum. Last year we had 21.17 inches, the year prior to that 25.85’. However, he had to admit that that his rubbery estimate of rainfall in feet was in a flood year, and before rain gauges were installed.139

Only Bairnsdale farmer Joseph Taylor explicitly identified evaporation as a problem. He told the commission that much of the water he applied in summer evaporated before it could do any good. He preferred winter irrigation because it would ensure enough soil moisture would be present during the growing season. He also thought that irrigation was better for non-alluvial lands, believing that evaporation from the river condensed on alluvial lands and gave it an advantage that non-alluvial lands didn’t have.140

There was no one who thought irrigation an inherently bad thing, even if their experience of it had not been trouble free. They had all suffered in the recent drought, or when rain came at the ‘wrong’ times. They all had a clear conception of irrigation’s benefits, which Landy summarised for all. ‘We all have the idea that, if this colony is to go on progressing, there must be some general scheme of irrigation, to supplement natural rainfall and equalise the seasons, and to give some certainty to production.”141 In this single sentence, Landy stated the argument of this research. Colonial Gippslanders believed in growth as much as they believed in God, and both were good. The greatest amount of growth would occur with reliable and predictable water supply. Permanently flowing rivers were the most desirable, but Gippslanders were also showing themselves to be willing experimenters with ground water. They were less fussy about where the

139 Royal Commission on Water Supply, Bredt, p. 254.
140 Royal Commission on Water Supply, Taylor, p. 255.
141 Royal Commission on Water Supply, Landy, p. 249.
water came from, as long as it was there and was fit for the intended purpose. Irrigation was seen as a technical and rational solution to even out the vagaries of nature, just as the efforts to open the permanent entrance were seen.

Interest in irrigation continued, even in the wetter parts of the GLC. In September 1887, the *Morwell Advertiser* remarked that the waters from approximately 20 feet below the Macallister floodplain were suitable for irrigation because they did not injure plant life. Further calls for a widespread scheme of irrigation came from the editor of the *Morwell Advertiser*, writing in December 1888:

> the voice of the country should be unanimous in demanding that the government of Victoria should see to it that steps should at once be taken with a view to the mitigation of the horrors of future drought, if indeed it is not possible to prevent the occurrence of droughts, or at least of an insufficient supply altogether, by means of a system of irrigation on a grand and comprehensive national scale.143

Irrigation was given a further encouraging push when Alfred Deakin was invited by the Sale Commercial Association to lecture in Sale in January 1890. However, the Bairnsdale Council had already announced its intention to form an irrigation trust. Michael Landy's previous attempts to encourage irrigation had failed due to fears of the cost, not because of any objection to the idea of irrigation. Bairnsdale district residents were about to enact the same debate.

Deakin's lecture was extensively reported by the *Gippsland Times*. He emphasised the predictability and permanency of water:

> In a country such as this, it was impossible to farm on scientific lines without a regular and adequate supply of moisture. It was unjustifiable that a man prepare his land and put in expensive crops, with a certainty staring him in the face that unless the clouds sent sufficient rain his labour would be useless. Farming on these lines meant ‘betting on the clouds’, but give the farmer the certainty of moisture and he has the keystone of success.145

142 *Morwell Advertiser*, 17 September 1887. This could be taken to indicate an implicit understanding of the impact of salt on plants, and possibly the presence of a saline aquifer already present within the catchment. Salinity has become a problem in the flatter and lower drained portions of the GLC in the late twentieth century requiring management plans.

143 *Morwell Advertiser*, 3 December 1888.

144 *GT*, 17 January 1890, Maffra correspondent.

145 *GT*, 27 January 1890.
Immediately after Deakin’s speech, a group of interested landowners got together to discuss opportunities for extending irrigation in Gippsland. The men included Michael Landy and George Jones. Jones produced a map of the County of Tanjil, in which he had marked out places suitable for damming and the likely places that could be developed as irrigation areas. Dam sites included Alick’s Downfall, on the Avon River and Freestone Creek, which would irrigate the areas around Maffra, Sale and the Heart, Boisdale to Marlay Point, and Briagolong to Stratford incorporating Bushy Park. They agreed to organise a series of public meetings, through the respective local governments, to gauge support for a scheme. History was repeating itself, as George Jones had not varied the plan he presented to the royal commission in 1885.
After the lecture in Sale, Deakin proceeded to Bairnsdale, where he attended a dinner given in honour of local members Allan McLean and Henry Foster. The dinner was also the public announcement of the ‘new and great enterprise’: the irrigation trust. In his speech, Deakin linked concepts of flow and irrigation. He encouraged Bairnsdale residents to take irrigation seriously, because the amount of irrigated produce would be greater and the railways would derive more revenue. This would lend further weight to any claims from Bairnsdale for new lines, stock or infrastructure when it came to debating the proposed new Bill. Deakin thus linked very explicitly the flow of water with the flow of goods and revenue.

The Bairnsdale farmers accepted the encouragement. The trust revived a plan originally floated in 1885 to construct a weir at Glenaladale. It received a loan of £106,662 to carry out the works, which is where the trouble started. The royal commission evidence showed that very few settlers had a good grasp of economics or of hydraulics. These twin failings would eventually destroy the Bairnsdale Trust. The loan proved to be woefully inadequate for the job and, as the works proceeded, more and more money was required. A faction of farmers formed against the trust, protesting the escalating costs. Throughout the fighting, construction work on the weir at Glenaladale continued. However, the collapse of the trust in the face of the opposition, combined with a flood that damaged the wall, sank the hopes of the irrigationists. The available flow of money could not support the wish for flowing water out of season. The expansion of irrigation in the Maffra district would have to wait for another two decades.

The failure of the first irrigation scheme in Gippsland shows that there were nuances in the devotion to permanent flowing water. The divisions were predicated upon the need of some farmers to avoid increasing their personal level of debt. A water rate would be enduring and, no doubt, escalating, and a farmer could quite reasonably decide that the proposed

146 GT, 27 January 1890.
147 Bairnsdale Advertiser, 5 May 1885.
149 Adams, *Path among the years*, pp. 116–18.
150 This has been told by Meredith Fletcher in both *The small farm ideal* and *Avon to the Alps*. I have not included it here because the time lag is too great.
water rates might be more productively spent elsewhere on the farm. Had the personal costs to farmers been more reasonable, there is no doubt that the trust would have succeeded.

Had the irrigationists been as scientific and rational as they proclaimed, and based the trust’s figures on well-thought-out planning and financing, there would have been no need for opposition. The irrigationists fell because of their own boosterism, not because anyone objected to irrigation itself. The ideology of the yeoman farmer and the garden mythology permeated the social fabric so strongly that anyone opposing irrigation could not be taken seriously.151 Irrigation was progressive, and as both Michael Landy and Alfred Deakin proclaimed, it provided certainty in an uncertain world. Cloud betting was not the way forward for a brave, pioneering white race.

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