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Climate, Science, and Colonization

Histories from Australia and New Zealand

Edited by

James Beattie, Emily O’Gorman, and
Matthew Henry

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To our families, for their patience and love

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Chapter 10

Imported Understandings: Calendars, Weather, and Climate in Tropical Australia, 1870s–1940s

Chris O'Brien

Introduction

Weather happens in time yet disregards calendars. However, calendrical time—especially the month—structures how modern meteorology examines and narrates atmospheric dynamics. Using almanacs and historical weather records, this chapter examines how European settlers came to be structurally blind to the variable climates of Australia's far north, how in effect cultural constructions overrode the reality of weather events and climate. It focuses on the region now defined by the city of Darwin in the period from 1869 to 1942.¹ This region is located on the coastal fringe of the Northern Territory and is part of what is now understood as Australia's monsoon belt. Taking up William Cronon's imperative to "tell stories about stories about nature,"² it unmask the "natural" as copiously cultural and reveals how dominant understandings of time have led us to misunderstand weather.

To unpack the origins of this misunderstanding we need to explore the formation of Western cultural understandings of climate and its variability. We must also grasp Western conceptualizations of time and seasons, and how these ideas shaped settler ideas about weather in northern Australia. After showing how different cultures can experience common weather yet develop vastly different ideas about climatic patterns, especially the seasons, this study examines the connections between ancient Greek and Roman conceptions of seasons and time and those of meteorologists in the Darwin region around the turn of the twentieth century. I argue that understanding these European roots is necessary to grasp the way British colonists misunderstood the weather and climate of the Darwin region because these ancient ideas, developed in a distant place, were the source of settlers' imported understandings. It is not mere genealogy but a demonstration of ideas that people not only thought, but also lived; of concepts that made sense generation after generation, in place after place, day after day, even hour after hour. It also helps elucidate a remarkable conundrum about colonial

and postcolonial tropical Australia: how an understanding in conflict with historical experience can endure for so long. Calendars have been integral to this. Understanding the contingencies behind the emergence of calendars is vital to unraveling this conundrum.

European and Aboriginal Seasons

Does anything seem as natural or straightforward as time and the seasons? Time just is, isn't it? Seasons just are, aren't they? Nothing could be farther from the truth. Take seasons: in the far north of Australia's Northern Territory (see Figure 10.1), Europeans have recognized just two annual seasons: the wet and the dry. Indeed, as then local weather observer par excellence J. A. G. Little noted, with over thirty years of supporting records and lengthy experience of the climate, these seasons changed with remarkable precision. In a widely circulated piece about the climate of the Northern Territory, first written in 1902 and later published in geographer Griffith Taylor's seminal opus, *The Australian Environment*, Little painted a vivid and engaging portrait of the region's climate. Worth quoting in detail for the ways of thinking that it reveals, Little's description tells of atmospheric fluxes even more rhythmic and reliable than those in more temperate climes, in which

the different changes of these are so uniform and regular that they may be predicted almost to a day. Signs of the approach of the wet season appear immediately after the sun has crossed the equator during the spring equinox . . . thunder clouds gather over the land, increasing in size and density day by day until they burst into terrific thunderstorms . . . [which] at first, take place every four or five days, gradually increasing in numbers until the end of November when they occur almost daily . . . During December the N.W. monsoon gradually gains the ascendancy . . . and increases in force until the latter end of January or the beginning of February, when it is blowing in full heart . . . on the approach of the autumn equinox the N.W. monsoon gradually dies away.³

Little's description encapsulated both how newcomers understood weather and climate, as well as the conceptual repertoire they used to gain this understanding. In Little's account, the North's weather progresses in a neat linear manner from absolute dry to drenching wet; then, having reached this climax, the rains steadily ease till they cease altogether, before flipping to a steady increase after passing this nadir of moisture. Ideas of an ordered, linear increase and decline structure this understanding of the seasons. The tipping points are so regular each year that they can be associated with a date on the calendar, while the progression from one extreme to another can be dependably charted by the calendar month. Weather is tied to time and, particularly, to the nonmeteorological unit of the calendar month. This intertwining of weather and the calendar, along with the notion of weather as an ordered linear phenomenon, create the dynamics of the great aerial ocean, where Australia's tropics are interpreted as a clockwork climate. Wet and dry keep time with clock and calendar.

Figure 10.1 The Northern Territory

Look at the monthly average rainfall in Darwin from 1869 to 1962 and this appears very much the case. The year begins with an average of 393.2 mm of rain in January with means of 329.7 mm in February and 257 mm in March. This falls sharply to 102.6 mm in April and then 14.3 mm in May, and a miniscule 3 mm in June. A trough of 1.3 mm average rainfall is reached in July, a slightly higher 1.6 mm in August, and then there is an apparent inexorable increase through the rest of the year: means of 12.8, 51.6, 124, and 241.8 mm in each respective month from September to December.⁴ The peak is reached in January and the decline, seemingly, begins again. The linear rises and declines are clear, and so are the turning points. At least it appears this way.

Yet, in the same place, and experiencing the very same weather, the region's indigenous peoples identified six annual seasons. Irregular in duration, these indigenous seasons are identified not just by weather, but also by distinct floral and faunal changes: *Mayaltha* is the "flowering season"; *Midawarr* the "fruiting season." *Dharralharraimirri* is marked by *Burrugumirri*—the birth of sharks and stingray.⁵ Anthropologist Deborah Rose identified a similar schema among the Aboriginal people in the Victoria River district of the Northern Territory.⁶ Across the Arafura Sea, and within the same western climatic zone, the Kaluli of Highland Papua New Guinea recognize three annual seasons: *dona* after the fruit trees that flower; then *imon*, the time when trees shed leaves; and, *tau*, when the pandanus tree ripens. Indigenous people in the Amazon basin, on the other hand, discern four annual seasons in their tropical climate while, New Zealand Maori, also had their own understandings of seasons differing from those of Europeans (chapter 4).⁷

Not only are indigenous seasons different in number from each other, they are also distinguished from European seasons in being irregular in their timing, irregular in their duration and heralded by constellations of nonmeteorological events in the natural world: the blooming of particular plants, the arrival and departure of particular kinds of birds, the laying of crocodile eggs, and so on. Indigenous seasons, then, do not happen at particular times, but in specific sequences.⁸

Classical Understandings of Seasonality

Seasons do not just differ across unrelated cultures. Before 300 BCE, Greeks recognized three, not four, annual seasons. The notion of the four seasons did not gain general acceptance until the early Hellenistic Period, circa 300–150 BCE. In pre-classical Greece, three mythological figures represented the three seasons. No figure denoted winter, indicating that this period of dormancy was not considered a season. In these pastoral societies, seasons were associated with vegetation, cultivation, and agricultural husbandry.⁹ Like the Minoans of Crete, and the Egyptians, pre-Hellenic Greeks recognized a cycle of three seasons a year in concert with the heavens.

For many centuries, both before and after, this clearly cultural "natural" phenomenon was vital in reckoning time. Both the oldest surviving farmer's

almanac and a lyrical poem, Hesiod's *Works and Days*, show that people in eighth century BCE Boeotia held a sophisticated understanding of an annual procession of the seasons. Principally, the seasons were identified by celestial appearances and disappearances. One of dozens of similar instructions illustrates this: "When the Pleiads, Atlas' daughters, start to rise begin your harvest; plough when they go down."¹⁰ The skies indicated harvest time, plowing time, and so on. But, Hesiod's exhortations also related to weather and explicitly communicated a sense of regular, predictable weather in what we now know as Greece.

Long before weather was measured and enumerated, the regular processes in the heavens were linked to seasons, prevailing weather and times to perform certain culturally important tasks. Indeed, the perceived regularity of weather and the predictable movements of the stars reinforced the notion that there was an underlying order in nature. Hesiod's weather, however, was not written exclusively in the stars. His instructions included a variety of signs in terrestrial nature. The cries of the returning crane indicated "the time of chilly rains." Blooming thistles and loud cicadas heralded summer. While such signs are variable in arrival and cessation, they were positioned in a poem that implied that they were as regular and predictable as the stars. Ecology and meteorology were here invested with the certainties of astronomy. Anticipating Ecclesiastes by five centuries, Hesiod exhorts his readers to keep in mind "that all works have their proper seasons."¹¹ The cosmos is orderly and land, sea, and sky have cyclical rhythms that humans can exploit to their purposes.

While Greek thinkers disagreed about the shape of the earth, and both the fundamental basis of physical matter and the relationship of humans to nature, the notion of a regular, ordered, and hence predictable universe was largely uncontroversial, and emerged with the Ionian school of philosophy around 600 BCE. In his exhaustive study of nature in Western thought, Clarence Glacken observes that the phases of the moon, revolution of the sun, and periodicity of seasonal change were widely seen as evidence of an essential harmony in the cosmos. Seasons were a broader sign of the very regularity they were considered to possess. The word "cosmos" came to mean universal order from the fifth century BCE onward. For Glacken, this idea of unity and harmony in nature is perhaps the most important influence of the Greeks on geographical thought.¹² The same can be said for its effects on the study and telling of stories about nature. Greek natural science was based on the principle that nature is permeated by mind; mind in nature underpinned regularity and orderliness in the natural world and enabled the scientific study of nature.¹³ This mind, historian Peter Coates indicates, was that of an artisan who "wrought order out of chaos" and gave all creatures a particular purpose.¹⁴ The pervasive idea of an orderly nature has been transmitted from Greek and Roman thinkers through medieval natural philosophers to modern investigators, albeit with modifications.

Within this world view, the three seasons of the same place and the same climate became four. How this happened is yet to be fully explained,

but people along the Mediterranean littoral recognized the equinoxes and solstices by the third century BCE. These apparent movements of the sun divided the year into four roughly equal periods. While this idea of the seasons seems to reflect straightforward astronomical dynamics, we should also consider the significance of the number four in the Greek natural order. In Hellenistic Greece, four fundamental elements were recognized, four humors accounted for health, there were four cardinal directions, and, in Aristotle's pervasive doctrine, phenomena had four causes. This template suggests deeply cultural influences infusing the concept of four seasons.

Time and Its Marking in the West

We cannot say exactly when humans began to mark time and construct calendars. Certainly Egyptians, Babylonians, and Greeks were doing so millennia ago and Chinese have for even longer. Long before the spread of Judeo-Christian faith and belief in unique events such as the Crucifixion inaugurated linear time in Western thinking, these societies saw time in cycles. Cycles were marked by the apparent movement of the sun, other stars, and, indeed, the seasons.

These societies came to require time reckoning on smaller scales than the three months between an equinox and a solstice. Among a panoply of calendars, the Egyptians had devised the oldest known one to comprise a 365-day year by the late third century BCE.¹⁵ According to mathematician and historian of science Otto Neugebauer, it was derived from averaging the long-term observations of the successive arrivals and phases of Nile River flooding at Heliopolis.¹⁶ While other scholars have disputed this as too variable a phenomenon, W. M. O'Neill has shown that in the periods 1382–1522 and 1693–1862 most intervals between the arrival of successive floods clustered around 365 days.¹⁷ Variations were too small to influence time reckoning on a scale of less than a century. However, neither the Egyptians nor the Romans, who also adopted a 365-day year, could quite solve the problem of reckoning a year on a planet that takes 365 days, 5 hours, 48 minutes, and 45-point-something seconds to do a full loop around the sun. By the time of Julius Caesar, the calendar was out of kilter with the seasons. The seasons, as Virgil (70–19 BCE) tells us in his graceful poem cum almanac *Georgics*, were fixed and regular, as he declared that it was: "Well for us that we watch the rise and fall of the sky-signs / And the four seasons that divide the year equally."¹⁸

Two measures were taken to synchronize the calendar with the seasons. A new calendar, introducing a leap year, every four years, and comprising twelve months, was inaugurated. In order to synchronize the new calendar with the seasons, 46 BCE was 445 days long. In the West, the seasons and the calendar did not get seriously out of synch for about 1,500 years. Even then, the calendar decreed by Pope Gregory XIII in 1582 (still in use globally, known as the Gregorian Calendar) included only a minor variation on the calendar of Caesar. These contingencies were largely forgotten. For

example, few today are aware of that in 153 BCE the Roman civil calendar moved New Year to January 1 to coincide with the then new practice of consuls taking office from January 1.¹⁹ Where the New Year had for so long, in so many societies, been tied to natural events such as the vernal equinox, summer solstice, valley inundations, and even new moons, it became a purely legal and governmental construct disconnected from nature. Yet, with the forgetting of this unhitching of the calendar from nature, the many changes before 1582 and its stasis since, this cultural construct has come to be seen as profoundly natural.

The calendar was never merely an idea. It has been something that organized societies; it has been something that people lived, a cognition that people repeatedly enacted. Calendars identified religious festivals and other major social, political, and economic events. Calendars enabled the determinations of movable feasts and important days of religious observance, even for the illiterate multitudes. In doing so, they brought an order to both life and time. Calendars were often embodied in the actions of people and the timing and order of these actions. Not just a concept, the calendar has been a very stable intellectual technology in the West. A cultural production, predicated on a long-forgotten certitude about the absolute regularity of the seasons, it now has a natural aura. Remarkably, physical processes such as weather have long been expected to conform to calendrical timing in the West. The ontological status of "modern" time as absolute also buttresses this sense that weather and climate are timely phenomena, at least in the West.

Time is deeply cultural. But like the calendars that mark it, it is regarded as purely natural. One powerful reason for this is that this is how time is experienced—it seems to exist independent of other aspects of reality, while everything else is completely encapsulated within time. Between the thirteenth and seventeenth centuries, a number of inventions and discoveries gave this sense of time a conceptual potency. The invention of the clock in the late thirteenth century ushered in a new way of imagining the universe. The cosmos was reimagined, by some, as a clock, mechanically ticking away, the theologian Nicole Oresme, nature was a clock, mechanically ticking away, regularly and predictably, a process observed through the movements of the planets. During the sixteenth century, the painstaking work of Nicolaus Copernicus, Galileo Galilei, and Tycho Brahe showed just how regular and predictable observable celestial movements were. Demonstrating that any pendulum of a given length swings at a constant frequency, regardless of amplitude, Galileo bequeathed the same sense of physical and temporal harmony on *terra firma*, as well as finding a reliable way to measure small units of time. Time seemed regular, constant, and orderly, as revealed by "Kepler's laws" of planetary motion. Demolishing the long-standing dogma that planetary motion was both uniform and perfectly circular, Kepler's laws also revealed temporal regularity in the physical universe and accounted for much of what people witnessed in the sky.

Within a century, time took on a life of its own. With the publication of Isaac Newton's *Principia Mathematica* in 1687, the mechanics of observable

and observed motion were completely explained. They were testable and when tested and retested, proved reliable.²⁰ Accordingly, they spoke powerfully of the harmonious nature of the cosmos. But they were explicitly based on a particular view of time, one which was heavily influenced by the culture of order in which it arose and the uses Newton had for it. Newton began his momentous treatise by declaring that time was "absolute, true and mathematical time, [which] of itself, and from its own nature, flows equably without relation to anything external."²¹ No matter that, as R. G. Collingwood remarked, something cannot be said to flow except relative to another thing that is stationary, nor can "it be said to flow at a uniform rate unless its flow is measured by movement."²² This notion of time was the basis for proven theories, physical laws that made the cultural assume an aura of the law-like. More potently, this idea of universal, absolute, and independent time accorded with everyday experience. Physicist Paul Davies observes that Newton's time became the time underpinning scientific investigation and remained so into the twentieth century and, moreover, is still the time of everyday experience. Infusing the repeatedly proven laws of mechanics it "encapsulated the rule of cause and effect," "epitomised the very rationality of the cosmos," and came "to play a fundamental role in our description of the physical world."²³

Following Newton, time assumed the nature of an absolute, unvarying, linear, and independent dimension of reality. It was the bedrock upon which physical phenomena were studied: projectile motion, acceleration, chemical change, weather, and more. Time was absolute. Time determined the regularities and orderliness of the physical realm. It can be and has been used to generate expectations and make predictions. Although deeply cultural at heart, time became profoundly ontological and "natural" in Europe after Newton. This became the understanding imported into its colonies elsewhere. Its instruments—the calendar and the clock—so closely associated with this idea, have assumed this same, absolute, and fundamentally natural sense. Like the time they mark, they have come to be the measure of weather, its normality or otherwise, and they shape our sense of what to expect, even though they force a regularity on both weather and climate that characterizes neither.

Northern Australian Almanacs

This notion of time was thus yet another of modern colonialism's exports from Europe. Shaping how both colonizers and the colonized lived, the calendar and the almanac transmitted and reinforced this idea of absolute time, helping to discipline people into living it day after day, even hour after hour. Through almanacs, weather has long been entwined with the calendar. Of course, calendars could have been used just to mark events: when they occurred, how long they lasted, even to assess whether certain events tended to recur at particular times of year. In examining almanacs from England, the Northern Territory, and South Australia (which included the region that

is now the Northern Territory from 1863 to 1911), it is clear that something else happened. Weather—a chaotic yet broadly recurring phenomenon, oblivious to human temporal boundaries—had been hewn into the shape of fitted Western temporality, particularly the calendar month.

The earliest almanacs were carved on wood or bone, but we do not know exactly how long ago. From one of the few comprehensive studies of almanacs, Maureen Perkins' *Visions of the Future* (1996), we do learn that the common factor to all almanacs has been the use of time reckoning by calendar. Both Perkins' opus and Bernard Capp's *English Almanacs, 1500–1800* (1977) demonstrate the enormous variety among almanacs: different towns and regions had their own almanacs; following the English Civil War and restoration almanacs, Whig, Tory, and Royalist almanacs appeared. In 1448, an almanac was the first item to come off the Guttenberg press. An almanac was the second publication off the presses in colonial New England and colonial New South Wales. According to Perkins, one in every three families in seventeenth-century England purchased a copy each year. In 1801, 605,000 authorized almanacs were printed in Britain; by 1839 this had increased to 649,000. During the eighteenth and nineteenth centuries, countless unauthorized almanacs were in circulation. British people in the nineteenth century, as Perkins states, "thought with their almanac."²⁴ Predictions of both the natural and supernatural featured prominently before the nineteenth century. Weather forecasts were among the most prominent of predictions.

Before newspapers, almanacs were where people publicly grappled with the weather. Forecasts were often issued for significant days. However, as historian Bernard Capp notes, recognizing the difficulties of forecasting and the peculiarities of particular locations, some almanacs published rules for forecasting as early as the late seventeenth century.²⁵ Almanacs also transmitted weather lore. Nevertheless, English almanacs also conveyed and reinforced the calendrical template of time, the sense of weather's regularity and linked weather to calendrical time. From around 1600, it was standard for almanacs to discuss weather prognostications according to the four seasons of the year, which themselves were explicitly defined by exact dates in the civic calendar. Sometimes forecasts were issued for calendar months. Even weather lore, which often captured something of weather's complexity and variability, was commonly structured by the calendar. Well into the eighteenth century, weather was popularly thought of and spoken about as belonging to calendar months in England, Scotland, and Ireland. Historian Jan Golinski illustrates this at work when he tells of the widespread eighteenth-century belief that when "March days" occurred in April, and any untimely weather, judged by the calendar, happened, they were considered "borrowed days" and occasioned a variety of superstitions.²⁶ By 1700, but also probably earlier, people tied weather to the calendar; ideas of normality and expectations were based on timing, frequently linked to the calendar month. Even in a climate of limited variability this imposed an artificial order. Charming, eloquent works such as David Bogue's *Book of the Months and the Circle of Seasons* of 1844 and Robert Mudie's four volumes on the seasons—one for each—appearing

in 1837 amplified this as almanacs moved away from prediction and published monthly tables of weather records.

From 1667, the month became a fundamental unit of institutional weather recording as well as of popular *mentalité*. Robert Hooke set out the format for empirical weather observation in his "Method for Making a History of the Weather," published in Thomas Sprat's *History of the Royal Society*. This gave detailed instructions for compiling daily observations and measurements, where possible, of wind, atmospheric pressure, humidity, temperature, clouds, thunder and lightning, the tides, and incidents of illness. All information was to be tabled in a standardized format to allow comparisons from time to time and from place to place. Most significantly for the study of weather, each table was to be arranged so that a whole month's observations would be on one sheet. This soon became the scientific practice of weather observation in ships' logs, journals, and parish records, long before the establishment of official national bureaux of meteorology, and remains the format of official weather records, even electronic records, to this day. Thus the month became the fundamental structural unit of British weather reports and analyses.

However much elite, technical, and scientific approaches to the weather differed from those of more grassroots weather lore, both shared the same temporal structure and both identified kinds of weather with particular calendar months. Indeed, linking weather with calendar months and dates was deeply entrenched in European thought before colonialism invaded continental Australia. Thus the month also came to structure how people thought about, tried to understand, and told stories about weather in the far more variable climates of colonial South Australia and Northern Territory.

The region now known as the Northern Territory was initially colonized by the British through the colony of New South Wales. Territory, trade, and putative security concerns motivated these efforts, but following three failed attempts by New South Wales to settle Australia's north coast between 1824 and 1849, the colony of South Australia petitioned Britain for control over the Northern Territory. In 1863 South Australia took control of this massive landmass running 1700 km from its northern borders to the far north coast of Australia. After one failed attempt to establish a settlement along the coast (Escape Cliffs 1866–67), Darwin, the region's capital, was founded in 1869.

Migrants imported a fully formed concept of the climate of Australia's northern littoral imbued with the notion that weather is so regular as to run to clock and able to be expressed in calendars.²⁷ Colonists also imbued climate with having an important impact on health, and even racial development (chapter 11). In terms of seasonality, based on limited experience of the region, they came up with the concept of the wet/dry dichotomy. Edmond Halley first developed this concept after analysis of data collected by trade ships during the seventeenth century. Subsequent nautical guides—almanacs for the sea in format, content, and intent—transmitted this idea with up-to-date weather observations through to the late nineteenth century.²⁸

They imposed a climate on the region and also conveyed the notion of an orderly link between weather and time.

Given the role of both NSW and South Australia in shaping understandings of the climate of northern Australia, it is important to examine almanacs from both of these colonies, but especially South Australia.²⁹ Almanacs in colonial Australia were not mere facsimiles of those in Britain. Certainly they transferred English ideas about nature and imposed it on foreign environments. But, according to the Whig press in Britain, Australian almanacs exemplified statistical almanacs "unalloyed by superstition and ignorance," in contrast to so many in England.³⁰ In the early nineteenth century, the *NSW Pocket Almanac and Colonial Remembrancer*, as well as its successors, modified the four seasons paradigm so that rather than starting on either an equinox or solstice, spring was declared to start on September 1, summer on December 1, autumn on March 1, and winter on June 1.³¹ This, however, was not commonplace in South Australian almanacs until the late nineteenth century. Such defining of seasons did not occur in any of the South Australian almanacs examined later in this chapter. Moreover, Boothby's Almanac explicitly defined the seasons astronomically as late as 1880.³² Common to both definitions though is the sense of four annual seasons, of equal duration changing on the same dates each year.

South Australian almanacs reveal just how ordered its settlers believed nature and weather to be, and how integral calendars were to this. Some explicitly discussed weather; those that did not addressed weather obliquely in issuing instructions about what to plant when. Produced scarcely two years after the founding of the colony, the *Royal South Australian Almanack for 1839* illustrates this sense of nature running to time. Beginning with a table of feasts, including forgotten and almost exotic sounding occasions such as Septuagesima Sunday and Rogation Sunday, it then gives a page to each calendar month. At the top appear precise times for the phases of the moon, to the minute. Exact times for sunrise and sunset appear for each day and important calendar dates are noted and named. Underneath is the "Gardener and Farmer's [sic] Calendar." January's entry begins: "Sow cauliflowers and broccoli as early in the month as possible. Swedish turnips and cabbage for an early crop may also begin. Sow celery and seakale seed." It ends with the imperative to, "[b]reak up ground for wheat or barley."³³ March's "Gardener and Farmer's [sic] Calendar" commands people to:

Prepare ground for onions and leeks; plant out strawberries, sweet herbs, cauliflower, broccoli and cabbage; snow peas, beans, leeks, onions, spinach, carrots, cress, radish, parsley, lettuce, endive, sorrel, for early crops...³⁴

Practically all South Australian almanacs conveyed this implied sense of orderly weather changing from month to month. Some, such as Andrew Murray's *South Australian Almanack for 1850*, also included a meteorological register, which effectively reinforced the notion that each month has its own weather. The *Almanack for 1862* featured a piece beneath each calendar

month, headed "The Weather and the Garden." Succinct abstractions of each month's weather came before brisk instructions on what to do in the garden. February's entry gives a feel for content and tone:

The weather is still very hot, in fact this may be considered the hottest month in the year; frequent lightning [*sic*] and occasional thunder after sun-set.

Plant cress, radish, lettuce, turnips, broad beans and peas, transplant cauliflower, and cabbage plants, sow annuals, plant bulbs....³⁵

Other entries give an even more misleading sense of harmony in the weather. For example, in March, "the atmosphere is still dry and hot during the early part of this month, but a change generally sets in about the 15th."³⁶ Not only was the month thought to be a coherent meteorological unit, but the weather was also understood as precisely timed and linear in the sense that late March was cooler than early March and warmer than April when, according to "The Weather and the Garden," "summer has now entirely left us."³⁷ However, in Adelaide, it is not uncommon for periods of several days or more in April, and occasionally May, to be warmer than similar periods in March.³⁸

Although the British colonial settlement of Darwin was established in 1869, it did not produce its own, local almanac until 1885. V. B. Solomon's *Northern Territory Times Almanac and Directory* featured detailed rainfall figures at Port Darwin Telegraph Station for each year from 1872 and monthly totals for the two years prior to each edition. Weather was discussed in a sketch of the history and geography of the Northern Territory in each edition. Little's narrative on the Northern Territory's weather, as noted earlier, imposed a clockwork climate on the region, declaring that "the wet season extends from October to April and the dry one from May to September," dependably and without variation.³⁹ This is not as exact as Little's report to his then master, the South Australian colonial government, when he stated that the Territory's two annual seasons were the "wet season from October 1st until March 31st and the dry season from April 1st till September 30th."⁴⁰ But, like the detailed piece from Little quoted earlier, it does demonstrate how calendrical time was imposed on the weather and climate of the "Top End" of Australia.

Circulation figures for the *NT Times Almanac and Directory* are not available. However, the frequency of advertising from many different areas in the local press suggests it probably had a wide circulation among the Top End's newcomers. The most prominent Top End newspapers of the period—the *NT Times* (1873–1932) and *The Northern Standard* (from 1932)—also discussed weather in terms of calendrical imported understanding. Weather, especially rain, was routinely reported in terms of seasonality. Seasonality and hence the (ab)normality of the weather was defined according to the dating of Wet and Dry. This occurred throughout the period of study, from the 1870s through to the 1940s. Furthermore, weather reports were rare in these papers during the Dry, suggesting that the very pattern of press reporting perpetuated the

imported understanding.⁴¹ The wet/dry dyad spread far beyond officialdom to the broader community of newcomers. Both the mariners who came from the north and the landlubbers who colonized from the south brought established ideas of a clockwork climate. The local press and, no doubt, word of mouth transmitted it widely. However, this was blind to an essential element of the Top End's climate: its variability from one year to another.

Measuring Variability

Reliable weather statistics date from the earliest weeks of the settlement at Darwin. These have long yielded important information about the region's weather and climate at odds with conceptualizations of regularity. On some level, the dichotomy of wet and dry linked to calendar months resonated with people's experience and memory. The idea of time that underlay it accorded with human experience and perception. Scientific observation and analysis of these very statistics seemed to verify the received wet/dry dyad. A more historical study of weather, however, illustrates that the problems with this notion go beyond the unintelligibility of making chaotic weather conform to a social construct such as the calendar month and extrapolating from monthly means.

Averages do reflect what has happened, but only to an extent. Specifically, they indicate an aspect of what has happened. Historically, climate records reveal that January and February in Darwin are always wetter than July and August. However, the widespread use of means, without standard deviations, in historical data conceals variation as well as variability. Using the template of the calendar month, a history of January rainfall in Darwin reveals differences between the averages and the received understanding. According to received understandings of weather, January should fall in the period of the wet. Yet in Darwin, during the seventy-two years of available records from 1870 to 1942, January rainfall totals ranged from 68 mm, in 1906, to 708 mm, in 1896. Furthermore, between 1870 and 1916, January rainfall exceeded 500 mm twenty-one times, 600 mm eight times; and failed to reach 250 mm fourteen times and 200 mm nine times. Even at the peak of the so-called wet season there is variation in volumes, which suggests inherent variability, as Figure 10.2 illustrates.

Historically, threshold months such as April and October have been both wet and dry, as Figure 10.2 indicates: That is to say, that in some years they are wet, in others they are dry, and in some years they are both and in others neither. July is the most consistent month for rainfall in Darwin, a month in which rain seldom falls. Yet 65 mm fell in July 1900.⁴²

Variability has a second dimension: timing. To study this we must eschew the template of statistics based on calendar months and look at when rain has fallen and the intervals between. Examining when rain has fallen between 1870 and 1942 confirms an enormous variability between years in the timing of rain. This variability is at odds with the presentation in almanacs of a regular and predictable climate. Twice rain fell each calendar month. On another

Figure 10.2 January, April and October Rainfall, Darwin, 1870–1920

six occasions, it fell during eleven calendar months of its respective year.⁴³ Yet, in 1896, no rain was recorded falling from April 24 until November 16; 1925 likewise saw one of the only other six-month periods without rain. In 1925 rain was light, occasional, and sporadic until December. The year 1926 seems to have experienced two “dries,” one from May 10 till 10 September, the other from late September till early November. Investigation of prevailing winds, humidity levels, diurnal temperature profiles, and cloud observations could well indicate that these were in fact two different kinds of “dry” season, undermining the simple notion of “the dry” and indicating that this was not simply one season interrupted by atmospheric chaos. We know from the work of Neville Nicholls, John McBride, and Robin Ormerod that the onset of “the wet” is irregular.⁴⁴ However, historically, the onset of the wet is often not followed by an orderly increase in either the frequency of rain or its intensity. In no fewer than eighteen years between 1870 and 1942, there were very similar patterns across October and November. Indeed, in 1874, 1899, and 1914, rain was more frequent and dry spells shorter in October than November. Periods without rain between soaking weeks, deep into the wet are not uncommon and the timing has varied remarkably. Indicating how variable the timing of rain is, in 1911 rain fell on four days in March accumulating to 20.5 mm, and in April 263.5 mm fell on fifteen days. Similar patterns were recorded in 1870, 1874, 1887, and 1891. Missing this variability, the idea of dyadic wet/dry seasons is inadequate for tropical Australia. So, too, is the imported understanding of rain increasing and decreasing in an orderly, linear fashion according to the month of the calendar year.

Conclusion

Arguably, the imported understanding of the relationship between the calendar and the Australian climate has endured. One explanation is that it

accords with people’s broad experience of the region: each year comprises long wet periods and long dry periods. Clearly, too, with a focus on monthly means, this is how science and government understood the region’s weather between the 1870s and the 1940s. This idea shaped local press reporting of weather during the period.

Europeans have long regarded weather and climate as working to time and the stability of modern calendars enabled all, even the illiterate, to impose order where it did not exist. Even as ideas about weather and climate have changed, this tick-tock temporality has been the kernel of Western endeavors to understand the atmosphere for well over 2,000 years. The equally enduring praxis of severing nature and culture from one another rendered people blind to the possibility that human perception and cognition could influence how people understood the physical world. The imported understanding made sense experientially, theoretically, and ontologically. A history of Australia’s weather, however, reveals that this “understanding” presented a poor conceptual fit to what newcomers experienced, observed, and measured.

To access important dimensions such as climatic variability and to capture weather’s chaos, we need stories and histories unfettered by the blinkers of Western calendrical time and uncumbered by processes that keep those blinkers in place. We have forgotten the manifold contingencies inherent in our understandings of seasons, time, and calendars. Accordingly, these richly cultural constructions are mistaken as natural and their application to weather and climate is scarcely examined. Through the ravages and endeavors of modern European colonialism, these erroneous understandings have been transplanted to vastly different climates from those in which they arose, and for which Australian Aborigines’ concepts of seasonality more accurately encapsulated. Here the gulf between concept and historical reality indicates how imported concepts can distance people from precisely what they labor to understand.

Notes

1. This chapter draws on research that was undertaken for a larger study of weather before meteorology became primarily mathematical: 7 (PhD dissertation: Australian National University, 2012).
2. William Cronon, “A Place for Stories: Nature, History and Narrative,” *Journal of American History* 78 (1992): 1375.
3. J. A. G. Little, quoted in Griffith Taylor, *The Australian Environment (Especially as Controlled by Rainfall)* (Melbourne: Government Printer, 1918), 70.
4. Bureau of Meteorology (Australia), “Climate Data Online,” *Monthly Climate Statistics, Darwin Post Office*, www.bom.gov.au/climate/averages/tables/cw_014016.shtml
5. Stephen Davis, *Hunter for All Seasons* (Millingimbi: School Literature Production Centre, 1984), vii.
6. Deborah Bird Rose, *Dingo Makes Us Human* (Cambridge: Cambridge University Press, 1992), 97–99.

7. Ben Orlove, "How People Name Seasons," in *Weather, Climate, Culture*, ed. Sarah Strauss and Orlove (Oxford: Berg, 2003), 133.
8. For more on Indigenous Seasons in the Top End, see Stephen Davis, *Hunter for All Seasons*, (Milingimbi: School Literature Production Centre, 1984) and Deborah Bird Rose, *Dingo Makes Us Human* (Cambridge: Cambridge University Press, 1992), 97–99.
9. Michael Kammen, *A Time to Every Purpose: The Four Seasons in American Culture* (Chapel Hill: University of North Carolina Press, 2004), 39.
10. Hesiod, *Works and Days*, trans. Dorothea Walker (London: Penguin, 1973), 71.
11. Hesiod, op. cit., 73–79 (first quote, 73), (second quote, 79).
12. Clarence Glacken, *Traces on the Rhodian Shore* (Berkeley: University of California Press, 1967), 15, 17.
13. R. G. Collingwood, *Idea of Nature* (Oxford: Clarendon Press, 1945), 3.
14. Peter Coates, *Nature: Western Attitudes since Ancient Times* (Cambridge: Polity Press, 1998), 27.
15. Otto Neugebauer, cited in G. J. Whitrow, *Time in History* (Oxford: Oxford University Press, 1988), 26.
16. Cited in Whitrow, *Time in History*, 26.
17. W. M. O'Neill, *Time and the Calendars* (Sydney, University of Sydney Press, 1975), 73–74.
18. Virgil, "Georgics," in *The Eclogues, The Georgics*, trans. C. Day Lewis, intro. and notes R. Lyne (Oxford: Oxford University Press, 1999), 59.
19. Whitrow, op. cit., 67.
20. Word limits prohibit discussion of the historical dimension of knowledge production, including of the modern scientific method and production of facts. On which, please see Steven Shapin and Simon Schaffer, *Leviathan and the Air Pump* (Princeton: Princeton University Press, 1985).
21. Isaac Newton, *The Mathematical Principles of Natural Philosophy*, trans. A. Motte (Berkeley: University of California Press, 1962), 7.
22. Collingwood, *Idea of Nature*, 3.
23. Paul Davies, *About Time* (London: Penguin, 1995), 31.
24. Maureen Perkins, *Visions of the Future, Almanacs, Time and Cultural Change, 1775–1870* (Oxford: Clarendon Press, 1996), 3–17 (statistics, 14), (quote, 3).
25. Bernard Capp, *English Almanacs, 1500–1800* (Ithaca, NY: Cornell University Press, 1979), 62.
26. Jan Golinski, *British Weather and the Climate of Enlightenment* (Chicago: University of Chicago Press, 2007), 93.
27. This is detailed, with a lengthy history, in Chapter 2 of my Ph.D. thesis. I also explore this in a 2011 essay, *A Brief History of the Monsoon*, currently under review for publication.
28. Ibid.
29. Alan Powell, *Far Country: a Short History of the Northern Territory*, 4th ed. (Melbourne: Melbourne University Press, 2000).
30. Perkins, op. cit., 76.
31. Ibid., 164–65.
32. Josiah Boothby, *Adelaide Almanac and Directory for South Australia, 1880* (Adelaide: J Williams 1880), vii.
33. *Royal South Australian Almanack (sic) for 1839* (Adelaide: Robert Thomas and Co., 1838), 7.
34. Ibid., 9.
35. Andrew Murray, *Almanack for 1862* (Adelaide: Andrew Murray, 1861), 10.
36. Ibid., 11.
37. Ibid., 12.
38. Daily Temperature for Adelaide at Bureau of Meteorology, "Climate Data Online," <http://www.bom.gov.au/climate/data>.
39. Little, "Climate and Temperature of the Northern Territory," in *Northern Territory Times Almanac and Directory, 1893* (Palmerston: NT Times and Gazette Office, 1892), 3.
40. Little, "Climate of the Northern Territory," in J. Langdon Parsons, "Quarterly Report on the Northern Territory, March 31st, 1885," *Parliamentary Papers, South Australia*, No. 54, 1885 (Adelaide: Government Printer, 1886), 8–10.
41. This is true of both newspapers, including the period from 1921–1932 when both circulated. A sample of editions of both from "wet dates" and "dry dates" between 1873 and 1942 demonstrates that both content and timing of reporting explicitly and implicitly communicate the idea of the wet/dry seasonal dichotomy of the region.
42. All statistics are calculated from: Bureau of Meteorology, "Climate Data Online," *Monthly Rainfall, Darwin Post Office*, <http://www.bom.gov.au/climate/data>.
43. Adelaide Observatory and Commonwealth Bureau of Meteorology, *Daily Rainfall, Darwin Post Office, 1869–1942*. Unless otherwise cited, all data in this paragraph comes from this source.
44. N. Nicholls, J. McBride, and R. J. Ormerod, "On Predicting the Onset of the Australian Wet Seasons at Darwin," *Monthly Weather Review* 110 (1982): 15.