

Leaping forward through the past

How historical documents can help scientists understand climate change

Joëlle Gergis

An untapped goldmine

Australia has one of the most spectacularly erratic climates in the world: dramatic weather variability influences every aspect of our lives. Right now, most of our capital cities and rural areas are facing a major water crisis. Bone-dry conditions have persisted for 12 years across much of southern and eastern Australia. In 2007 the Murray-Darling Basin, the nation's food bowl, experienced its hottest year and lowest water inflows on observational record. Mighty rivers like the Murray have shrivelled to brown trickles snaking through cracked land. With paddocks reduced to dust bowls, farmers have been forced to sell stock for a pittance or buy feed to keep emaciated stock alive. In the latest year of a seemingly endless drought, still no relief is in sight.

People often want to know if the long dry is just part of a natural climate cycle or if the menacing overlay of global warming is already with us. How much do scientists really know about our pre-20th century climate history? How can we figure out what the climate was like before modern day weather stations were around?

The lion's share of our description of Australia's climate relies on records kept over the past 100 years. Few people realise that an amazing

amount of information about our climatic past lies recorded in the logbooks of the first European explorers, governors' correspondence, diaries of Australia's early settlers, budding newspapers and the seminal works of our 18th and 19th century scholars—written decades before modern meteorological observations began.¹ Unlike Europe and the Americas, Australia's documentary archives remain virtually unexplored for climate information.

To patch this hole in our understanding of pre-20th century climate variability, researchers from the School of Earth Sciences are now using historical documents to compile a climate history of south-eastern Australia since 1788.² This will allow climate scientists to examine a broader range of Australia's natural climate variability needed for global warming studies, while shedding light on a culturally significant period of Australian history.

H.C. Russell: A founding father of Australian meteorology

Henry Chamberlain (H.C.) Russell is recognised as one of the founding fathers of Australian meteorology.³ He was the first Australian-born government astronomer to work in the colony of New South Wales.

During his dynamic career at the Sydney Observatory, Russell initiated a rapid expansion of the observing networks throughout the state. Under his guidance, the number of weather stations increased from just 12 in 1870 to 1,800 stations throughout New South Wales by the time of his retirement in 1905.⁴

During his life Russell made many enduring contributions to the field of meteorology. In 1879 he convened the first of the inter-colonial meteorological conferences aimed at achieving uniformity in weather data collection (eventually resulting in the establishment of the national Bureau of Meteorology in 1908). He wrote extensively on scientific matters and was the first to describe the migratory behaviour of southern hemisphere anticyclones (high pressure systems). In fact, many of his meteorological papers show a far-sighted description of the important elements of Australian climate. Wanting to help farmers predict rain, he compiled the first weather chart ever published in an Australian newspaper, the *Sydney Morning Herald*, on 3 February 1877.⁵ It ushered in the beginning of daily weather maps, replacing the table of weather conditions printed in the paper.

Aside from his meteorological



H.C. Russell, the Government Astronomer at Sydney Observatory from 1870 to 1905, photographed January 1898 by J. Hubert Newman, photographic (possibly platinum) print on paper. Powerhouse Museum Collection, Sydney, 95/239/24.

Below: H.C. Russell's annotations on pp. 44–45 of his personal copy of his book, Henry Chamberlain Russell, *Climate of New South Wales: Descriptive, historical, and tabular*, Sydney: Charles Potter, Acting Government Printer, 1877. Vallance Collection, Special Collections, Baillieu Library, University of Melbourne.

talents, H.C. Russell was also a very accomplished astronomer. He invented and made many instruments including telescope mountings and self-recording meteorological devices.⁶ He took some of the first astronomical photographs in the world and involved Sydney in one of the greatest international astronomy projects ever undertaken, known as the *Astrographic catalogue*.⁷ The project was the world's first completed atlas of the sky: the Sydney section alone took 80 years and 53 volumes to compile.⁸

Along with his diverse scientific endeavours, Russell held many advisory roles including President of the Australasian Association for the Advancement of Science (now Australian and New Zealand Association for the Advancement of Science), Vice-Chancellor of the University of Sydney, President of the Royal Society of New South Wales and a Fellow of the Royal Astronomical Society.⁹ It is fair to say that H.C. Russell was one of the leading minds of 19th century Australia.

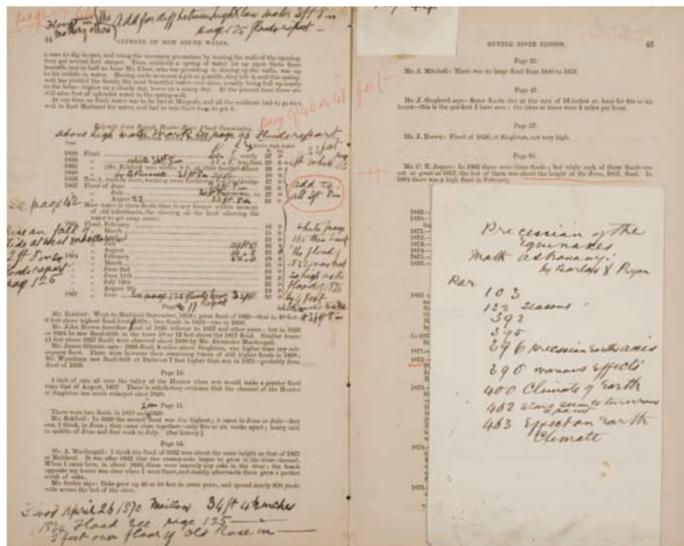
Unearthing a scientific gem

In January 2008 I stumbled across an extraordinary item held by Special Collections in the Baillieu Library: a seminal publication on the *Climate of New South Wales*, written by H.C.

Russell in 1877.¹⁰ His intention was to compile a state-of-the-art summary of all the weather and climate information held by the colony of New South Wales into a 'convenient reference'.¹¹ It covers a vast range of topics including lists of floods, droughts, insect plagues, 'hot winds', theoretical discussions on natural cycles and a comprehensive appendix containing valuable 19th century weather observations. There are riveting accounts of 'fearfully dry' conditions when it was 'frightful to go into the garden', followed by periods of torrential rain when 'the quantity of cattle and other farming stock lost was prodigious'.

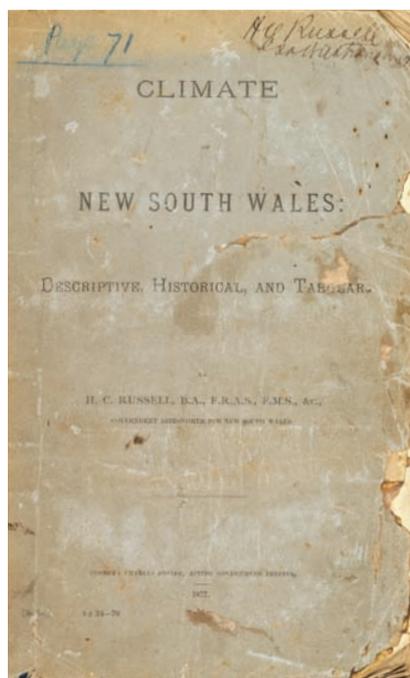
I was surprised to find that, according to the University of Melbourne's catalogue, Special Collections held: 'author's copy with holograph corrections and additions'. Judging by the notes and dates of the newspaper clippings pinned to some pages, it seems Russell annotated the work some time after February 1902. The hand-written notes bear the hallmark of a gifted mind late in life (Russell suffered a severe illness in 1903 and died at the observatory on 22 February 1907).¹²

We know Russell wrote these notes because on page 125 there is a signed statement that reads: 'Early this year [1834] my father



Hon B Russell went to Maitland with the intention of settling there and got there in the time of the great flood [1834], went to the Old Rose Inn and sat on the counter with his feet in the flood water'.¹³ Curiously, there are some dates added to the list under 'meteorological periodicity' that post-date Russell's death in 1907. Perhaps another person added these entries sometime between 1907 and 1913. But given that the handwriting is consistent with the style found in other parts of the book, perhaps it is more likely that these years are predictions based on the meteorological cycle discussed in a paper originally presented to the Royal Society in Sydney on 11 October 1876.¹⁴

Discovering such an important piece of Australia's meteorological history in a university library collection is undoubtedly a rare treat. H.C. Russell's *Climate of New South Wales* provides us with rich accounts and thought-provoking theories on past drought and floods while offering us a fascinating glimpse into what life 'behind the numbers' may have been like. This book will go a long way in helping researchers piece together the jigsaw of our climatic past with the aim of planning for life in a hotter and drier Australia. The



excitement I feel retracing the final thoughts of a pioneer in the twilight of an exceptional career assures me that the fires of scientific curiosity burn on. It reminds me that even in this age of dazzling technology, sometimes the best way forward is back through the past.

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Notes

- 1 For example: David Collins, *An account of the English colony in New South Wales ...*, London: Printed for T. Cadell Jun. and W. Davies, 1798. Special Collections in the Baillieu Library holds two copies of this book. John Hunter, *An historical journal of the transactions at Port Jackson and Norfolk Island ...*, London: Printed for John Stockdale, 1793. The copy in Special Collections is from the Ian Francis McLaren Collection.
- 2 Joëlle Gergis, 'Documentary accounts of the impacts of past climate variability on the early colony of New South Wales, 1788–1791: A preliminary analysis', *Bulletin of the Australian Meteorological & Oceanographic Society*, vol. 21, no. 5, 2008, pp. 103–107.
- 3 David Day, *The weather watchers: 100 years of the Bureau of Meteorology*, Carlton: Melbourne University Publishing, 2007.
- 4 G.P. Walsh, 'Russell, Henry Chamberlain (1836–1907)', *Australian dictionary of biography*, vol. 6, 1976, pp. 74–75.
- 5 Day, *The weather watchers*.
- 6 Walsh, 'Russell, Henry Chamberlain'.
- 7 'History of Sydney Observatory', website of the Sydney Observatory, Powerhouse Museum, www.sydneyobservatory.com.au/exhibitions/history.asp.
- 8 'History of Sydney Observatory'.
- 9 Walsh, 'Russell, Henry Chamberlain'.
- 10 Henry Chamberlain Russell, *Climate of New South Wales: Descriptive, historical, and tabular*, Sydney: Charles Potter, Acting Government Printer, 1877. Vallance Collection, Special Collections, Baillieu Library, University of Melbourne.
- 11 Russell, *Climate of New South Wales*, p. 1.
- 12 Walsh, 'Russell, Henry Chamberlain'.
- 13 Russell, *Climate of NSW*, p. 125.
- 14 Russell, *Climate of NSW*, p. 168.