

Address to the Royal Society of New South Wales
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**The Rev. W.B. Clarke and his
Scientific Correspondents**

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INTRODUCTION

It is fitting that my talk should coincide with an Ordinary General Meeting of the Society in view of the fact that W.B. Clarke was the founding father of the Society and I am sure he would be greatly cheered — future-oriented as he always was — to know that this is the 1132nd Ordinary General Meeting at which I am talking about him directly. It is a great record of continuity in the life of a Society which was so important in his life.

I speak of Clarke in this personal way for I have lived with him, on and off, for a very long time — indeed some 40 years! And the reason for this long marriage is that the Clarke Papers represent one of the most important collections in the Mitchell Library of the State Library of New South Wales and are the largest collection of correspondence of a resident scientist in nineteenth century New South Wales. In fact they are probably the largest such collection in Australia. For my part, I came to them in the 1960's with my joint appointment with the Australian Academy of Science and the History Department of the Research School of Social Sciences at the Australian National University to establish an archival centre of twentieth century scientists at the Academy's new Bassett Library and to open up research in the history of Australian science. Clarke's correspondence and diaries fertilized my early research and appeared in my books *Scientists in Colonial Australia: A Documentary History* and its illustrated and more general sequel *A Bright & Savage Land*.



In the 1990's, however, aware of the collections of correspondence of major scientists being published in other countries — Charles Darwin in multiple volumes at Cambridge University, Michael Faraday and others, Joseph Henry in the U.S.A. to name a few, and also of the international venture centred at Melbourne University to gather the outgoing correspondence of Ferdinand von Mueller, Government Botanist of Victoria, scattered around world (for his incoming correspondence has been largely destroyed), I decided to select and publish Clarke's scientific correspondence for the remarkable window it opens on Australia's nineteenth century science and its interrelationships with science overseas.

Let me give you first a brief picture of the man and why he emerges, particularly through his correspondence, as such an important figure in this country's science. William Branwhite Clarke (1798 to 1878) was one of that nineteenth century phenomenon, an Anglican clergyman who combined a knowledgeable and keen interest in geology and other natural sciences with his religious calling. Born in East Bergholt, Suffolk, he took his degree in Holy Or-

ders at Cambridge in 1817 and for a period became a curate in various English parishes. But as his prospects of preferment in the Church in England were low, after two decades, he accepted the offer of a chaplaincy in New South Wales and arrived in Sydney with his wife and two children in May 1839.

Importantly, however, Clarke had fallen under the spell at Cambridge and studied with the newly appointed Woodwardian Professor of Geology, Adam Sedgwick, who was to become one of the great figures of British geology, and across the next twenty years Clarke published papers on aspects of British and continental geology and on meteorology, and was elected a Fellow of the prestigious Geological Society of London. When, then, he arrived in Sydney in 1839 at the age of 40, he was the first trained geologist to settle in Australia.

So while Clarke also became an articulate and enlightened member of the Sydney clergy and the first pastor of St. Thomas's Church, North Sydney, from 1846 until his retirement in 1871, it was as a geologist and scientist that he made his mark and to which my volumes published as *The Web of Science. The Scientific Correspondence of the Rev. W.B. Clarke, Australia's Pioneering Geologist* (Australian Scholarly Publishing, 2003) relate.

Significantly, Clarke came to Australia at a time when British geologists were adding fundamental findings to knowledge of the geological structure and systems of Great Britain and turning their particular attention to the classification and ordering of the successive formations of the earth's crust. These were subjects of high importance and controversy in a science that was moving away from broad theory and focusing on geological fieldwork and fossil evidence as the markers of stratigraphical determination. The Geological Survey of Great Britain had begun its work 3 years before, so, that when Clarke landed at the far end of the world and set foot in what he called 'a new earth for geology', he brought with him knowledge of the evolving systems of British stratigraphy, and the skills and precepts of an experienced British geolo-

gist.

His early investigations focused on the Sydney Basin, moved by Sedgwick's recommendation that he should make the coal formations of New South Wales the first object of his research. Traveling on horseback, he explored the Illawarra region and the Hunter Valley and up to Lake Macquarie, filling his knapsacks with large collections of fossils, the best of which he sent off for identification and comparison to Sedgwick at his Woodwardian Museum. And it was to Adam Sedgwick that Clarke dashed off his long early letters that so vividly reflect the experience of the pioneering geologist in an unexplored land. They make compelling reading. Attempting to delineate the complex stratigraphy of the Sydney coal basin, he faced the formidable challenges of tracing outcrops of strata over obscure and tangled tracts of land, without the maps, canals, or rail cuttings that aided British geologists in their search.

In June 1841, he wrote to Sedgwick:

'Since I wrote to you, I have had some further opportunities of examining extensive districts in this part of the Colony; and the result of my labours, it is my intention to bring before [Geological] Society in a connected Memoir . . . But the difficulties are so great in this country to the Geologist, that after all the most industrious & extensive researches can only lead to any approximation of the whole truth. Owing to the peculiar construction of the country, its deep and impassible ravines, its enormous forests, its want of crossroads, and good sections, it is only by most painful plodding, that one can make out anything satisfactory, but hope, with such slender means as I possess. I shall, nevertheless, be the first who has ever laid before the public a connected series of geological observations on a wide extent of Australian land.'

Through the 1840's, snatching time from a huge parish that ran from North Sydney through bushland country as far as Manly, Clarke managed to publish a number of papers on Australian geology in major geological Journals overseas. In 1842 he discovered the Palaeo-

zoic fossil Trilobites in a tributary of the Hunter River which confirmed that Australia was a continent of great geological antiquity and opened the way for the extended classification of Devonian and Silurian rocks in Australia, correlations with British and European stratigraphy that were of first interest to his colleagues in the northern hemisphere.

Clarke was also quickly and keenly involved in meteorological research setting up instruments at his rectory, linking in correspondence and friendship with that other keen meteorological investigator, Admiral P.P. King and with scattered settlers, and writing on the subject and on other scientific topics in the Sydney Morning Herald. It was, in fact, very soon after his arrival in Sydney that he made arrangements with the Herald to communicate articles and editorials on scientific topics, that made Clarke an early and major pioneer of the public communication of science in Australia.

In 1842, however, a significant event occurred which was to transform Clarke's personal and scientific life. His wife Maria Clarke detested the Colony. She hated the convict settlement and the convict servants, and the summer winds that fanned her husband's interests in meteorology, left her exhausted and dispirited. So in January 1842 she plucked up their now three children and sailed for England. She did not return for 15 years when a generous donation from Clarke's parishioners brought her and their now adult children back to Sydney. Her departure, it must be said, was a blessing to Australian science. Left in a solitary state, Clarke accelerated his diverse scientific activities and eager to overcome the tyranny of distance and retain and extend links with his networks 'at home' he became a prolific correspondent reaching out to key figures in Britain and Europe, the United States, India, New Zealand and to participant naturalists throughout the Australian Colonies.

Much of Clarke's public reputation rested on his work in connection with gold. He himself found gold particles in 1841 and again in 1844 when he took them to show Governor Gipps at Government House in Parramatta when Gipps

exhorted him famously in a convict colony, 'Put them away Mr Clarke or we shall all have our throats cut'! Clarke put them away but he wrote increasingly in the Herald on the constants to be looked for in the location of gold and, with the promotion of a gold rush by Edward Hargraves in 1851 Clarke was at once appointed by Government to conduct a Geological Survey on horseback, with a cart and two assigned servants, across New South Wales from Omeo in the south through the Alps, traversing to Ipswich in the north, a distance of some 60,000 square miles, reporting as he went on gold and other metalliferous deposits and the structure of the country in 29 reports to Government.

His Southern and Northern Geological Surveys conducted from 1851–53 for the first time offered him unbroken fieldwork over continuous tracts of country and he pinpointed many areas that were later found productive in gold and identified minerals, notably in New England of copper, lead, tin, iron and precious metals that underlay the economic exploitation of these materials in later years. It is not widely known that Clarke was one of the 200 people named at the Bicentenary for their contribution to the development of Australia and this stemmed from his opening up of mineral wealth. His Reports, published in Colonial and British Parliamentary Papers and extracted in the Sydney Morning Herald, were widely read and served as a guide to diggers, focused Clarke as an authoritative 'public scientist', and made him a household name. They also brought him invitations from neighbouring Colonies and from New Zealand to conduct geological surveys in their regions, all of which in the interests of his church calling, he declined. He also received hundreds of letters across his career from diggers and prospectors which he conscientiously answered, one or two of which I have included in the book.

Throughout the 1850's and 60's Clarke developed his personal communication network which, as in the book's title, I call 'The Web of Science'. In Britain this drew in, in addition to Sedgwick, a lovable but unreliable friend,

such scientific luminaries as the imperious Sir Robebrick Murchison, the palaeontologist Sir Richard Owen, to whom he sent the bones of giant marsupial species, and the younger geologist J.B. Jukes, a personal friend of Clarke's now head of the Irish Geological Survey who had visited Australia in the 1840's as naturalist to the British survey ship H.M.S. *Fly*. From North America it also included that other one-time visitor, the noted mineralogist, James Dwight Dana, who had met and geologised with Clarke in the Illawarra in December 1839 when Dana visited Sydney as naturalist to the United States Exploring Expedition and who, as Professor of Natural History at Yale, continued to communicate with Clarke on geological questions for over 30 years. In July 1872, Dana wrote his old friend warmly: 'The few weeks of intercourse which I had with you in Australia were among the happiest days of my life and I shall never forget your kindness & the scenes we enjoyed together'.

Other participants in the 'web' included the directors of the Geological Survey of India and the New Zealand geologists Julius Haast, James Hector and others, a number of eminent French geologists, and a good scattering of metropolitan and provincial palaeontologists in Britain.

The letters that flow to Clarke from these correspondents — and these are *incoming*, letters which form the greatest part of these volumes — are full of news of recent discoveries, classificatory discourse, the warmth of friendship, discussion of health (so important in the nineteenth century), gossip about colleagues, and the aspirations, achievements, and frustrations that make up the life and sociology of science. Clarke's scientific findings in Australia were grist to his correspondent's scientific mills; his exchange with Murchison over scientific priority in the discovery of Australian gold, was particularly fiery and lively, 'For a clergyman' Murchison at last exclaimed, 'you appear to be very bellicose'! And over all, the myriad people who cross these 896 letters and appear in the many footnotes touch and engage an enormous spectrum of nineteenth century science.

In Australia, Clarke's opportunities for scientific exchange and communication grew with gold. Conspicuously, he was a man who offered great encouragement and friendship to younger scientists, initiating contact, furnishing them with copies of his books and foundation papers and forging strong collegiate bonds. Central among them were the young geologists trained and handpicked in Britain who arrived to man the Geological Surveys set up in Victoria and Tasmania in the 1850's and early 1860's and later, through Clarke's pressure, in Queensland: Christopher Aplin, George Ulrich, Richard Daintree, Norman Taylor in Victoria; Charles Gould in Tasmania. Their letters to Clarke reflect the high importance of this communication flow though in the bustle of colonial fieldwork none of his letters to them have survived. As young Charles Gould moved about Tasmania — dropping the names of famous scientists Darwin, Huxley, and Jukes on the mountains of the west coast — wrote Clarke: 'I have so few opportunities now of communicating ideas that any break in correspondence with yourself amounts to a very positive misfortune'.

The correspondence from these men throws fresh and illuminating light on the nature of Australia's early surveys, the mapping and the mineralogical search, and highlight the constraints and restrictions in a country where geological investigation — as opposed to gold search — was judged a luxury by government. 'Oh for a forty parson power', Daintree, his frequent correspondent once exclaimed in a letter to Clarke, 'to rouse the inert masses of slumbering politicians in Australia'. A later recruit to the geological community, Charles Wilkinson, who traversed much of Clarke's earlier surveys of New England as Geological Surveyor in New South Wales in the 1870's, wrote the old geologist from his camp in 1876, 'I wish I had the pleasure of your company on my travels'. And it was Wilkinson who brought out Clarke's great Geological Sketch Map of New South Wales four years after his death.

Clarke's one failure in his scientific networking and an important one, lay in his relationship

with the Irish paleontologist appointed in 1856 as the first Professor of Natural History at Melbourne University, Frederick McCoy. McCoy, who had first examined some of Clarke fossils at the Woodwardian Museum, fought him persistently and publicly over the age of the coal measures of New South Wales and, as the one palaeontologist in the Australian Colonies for many years, was a source of great frustration and delay to Clarke although he was eventually proved to be wrong. Yet the few but very cold and unceremonious letters from McCoy to Clarke in the collection supply a clear example of the rivalry, dislike and conflict that sometimes animated the life of science.

It was however, Clarke's capacity to engage young scientists which greatly assisted him in his period as the major founding father and first Vice-President of this Royal Society.

Clarke had served as an influential Council member and one time Vice-President of the Philosophical Society of New South Wales established in 1850 before he became a key mover in the restructuring in 1867 of its successor, the Royal Society of New South Wales. As its first Vice-President, he would make this office a key position in the advancement and life of science in the Colony for the nine long years of his reelection. In his Inaugural address in July 1867 he set down his open-minded view of science which he espoused as a creed for the Society. In brief, he said:

'We must strive to discern clearly, understand fully, and report faithfully; ... to adjure hasty theories and unsupported conjectures; where we are in doubt, not to be positive; to give our brother observer the same measure of credit we take to ourselves; not striving for mastery, but leaving time for the formation of the judgment which will inevitably be given, whether for or against us, by those who come after.'

The Royal Society of New South Wales began with a membership of 163. They were an eclectic group made up of scientists, and administrators, from the University of Sydney, a medley of civil servants from the Colonial De-

partments of Works, Lands, Mining, Surveyor-Generals, and interestingly enough, from the Telegraph Office, and the Sydney Mint, along with a growing corps of professional scientists from the Sydney Observatory, the Botanic Gardens and the Australian Museum. There were also the one-time 'amateurs and gentlemen' — the independent zoologists, entomologists, botanists, and astronomers (most notably here the internationally renowned astronomer at Windsor, John Tebbutt, who gave many papers to the Society), and a large number of physicians, clergymen, members of Parliament and the Stock Exchange, and businessmen and a few schoolmasters and scattered settlers.

It was a major cultural assemblage, and an intellectual force within the Colonial society. And it was in the context of this key scientific community that Clarke's Inaugural message had special significance. He himself had read the *Origin of Species* as soon as a copy arrived in the Colony and at once wrote off to Darwin sending him pertinent geological information which Darwin would include in a later edition. Unfortunately it not possible to know what Clarke actually said about *The Origin* itself in this first letter of August 1861 as the top page in the Darwin Correspondence at Cambridge is missing. But Darwin's response was telling, 'Thank you cordially', he replied in October that year, 'for your very kind expressions towards me & for your letter which has deeply interested me'. 'I am very glad to hear of your new discovery of secondary fossils in N.S.Wales. I have for some time thought that the geology of distant countries would help in the progress of Science more than anything else'. Clarke, for his part, answered Darwin's queries on the glacial period in Australia, sent him a photograph of the Blue Mountains where young Darwin had ridden out in 1836, and was ready to assist the dangerous evolutionist with a botanical experiment relating to bees. By contrast Australia's leading botanist, Ferdinand von Mueller, a man who believed firmly in the fixity of species, declined.

Australian scientists such as Mueller ad-

mired Darwin for his *Journal of Researches into the Geology and natural History of the various countries visited by H.M.S. Beagle*, but, with the notable exception of Gerard Krefft at the Australian Museum, the great majority deplored his theory of evolution by natural selection. Clarke, for his part, was a uniformitarian and an evolutionist in geology who recognized the appearance and extinction of species over infinitely changing eras of geological time, but, like so many major scientists of the period in Britain, he remained a ‘Separate Creationist’ to the end. ‘I believe’, he put his view in a letter to the Sydney Morning Herald in 1869, ‘that species as such were made by the Creator, and that they are not the result of accidental conditions, but however related are independent of their predecessors’ Nonetheless in a scientific community deeply antipathetic to Darwin’s view, Clarke was an exceptional public advocate for an unbiased examination of contemporary scientific ideas.

The two men’s friendship grew, anchored largely on geological themes. Darwin linked Clarke with a reputed palaeontologist in Bath — Charles Moore — to classify some of his thousands of fossils (for the problems of the investigator at a remote outpost and without comparative suites of specimens were very real) and, importantly became one of Clarke’s sponsors for his election to the Royal Society of London in 1876.

At the Royal Society of New South Wales, Clarke’s leadership launched two important initiatives. Firstly, his idea of a ‘new earth for geology’ was to colour the life of the Society across its first seven years. As the resident authority, scientific adviser to government, and public science communicator, he had long acted as a receiver and synthesing agent for new discoveries and information coming in from geologists and surveyors around the Colonies, and to an extent for the other sciences. Now he brought this rich review of information together in his substantial Annual Addresses. Daintree, appointed to head the Geological Survey of Northern Queensland offered data on Queens-

land’s expanding gold and other mineral discoveries and his unique photographs and information flowed in from surveyors and scientists around the country. These Addresses became important annual overviews of advancing knowledge in Australian science. They were reprinted in the Sydney Morning Herald — those were the days for serious science communication! and Clarke disseminated them tirelessly to colleagues and institutions at home and overseas.

Simultaneously, on a second front, Clarke was reaching out to the two new highly qualified British appointees in Geology and Chemistry at Sydney University, the delicate young Dr Alexander Thomson, Reader in Geology from 1866–72, and Archibald Liversidge who succeeded Thomson on his early death to become Professor of Geology and Mineralogy in 1874 and later influential Professor of Chemistry. Clarke bound the two young men to him, recruiting them to the Council of the Society, geologizing and sharing geological discoveries with Thomson, and drawing on their interest and skills in assaying the many mineral specimens that flowed to his desk. Their letters shed light on the Society’s affairs. In particular Clarke’s many letters to Liversidge who become Secretary of the Society for a decade from 1874, and a scientific maker and shaker himself, reveal the Society’s internal functioning, the search for funding from Government and for their own building, the formation of sub-committees, the choice of honorary members, Clarke’s famous portrait by Aniviti in 1875, and pieces of the trivia and gossip that figure in the life of all societies.

‘Will you — would you’ writes the 76 year-old Clarke to young Liversidge all of 28 from his home on the North Shore in 1874, addressing him carefully now as ‘Professor’, ‘let me have the pleasure of a conversation with you here as soon as you can conveniently come over. I am unable to stir out being under treatment for a violent attack in the eyes which has kept me a prisoner since we met on the *Challenger*.’ (p1037).

The language and cordiality of the communication of scientists in these long lost days, refreshes and adds pleasure to the reading.

The letters of Clarke to Liversidge (retrieved after Clarke's death) focus his close paternal role in the Society's affairs. At the time of his departure as Vice-President in 1876, membership numbers had risen from the initial 163 to 348 and, so wide had the scope and compass become of scientific interests that flourished in the Society and flowed into its *Transactions*, that by 1877 some seven different working sections had been formed.

Significantly Clarke stood on the cusp of change as science moved from the domain of the independent scientist to an increasing professionalization and institutionalization, a movement he was able to foster and advance. His own work gathered substance from the first publication of his *Remark on the Sedimentary Formations of New South Wales* in 1867 through to its fourth and final edition in 1878 which encompassed much of the classifications of his fossil collection. Yet, in the event, it was not the scientists at the Imperial centre with whom he had long correspondence who assisted him in this but Professor Laurent de Koninck, distinguished palaeontologist at the University of Liege in Belgium, to whom he had been recommended and who carried out the classification of Clarke's Palaeozoic and Carboniferous fossils in a collaboration and correspondence across the world conducted entirely in French. In these volumes, de Koninck's letters full of warmth and friendship, appear translated into English by the distinguished linguist the late Dymphna Clark.

In 1877 the Geological Society of London honoured Clarke with the award of the Murchison Medal and a purse of gold 'in recognition of his remarkable services in the investigation of the older rocks of New South Wales'. The previous year he had been elected at last to the Royal Society of London. With Darwin and the philosopher U. S. Jevons as his sponsors. His election was not in doubt. As the Society's Secretary wrote him: 'both Hooker and Huxley

were warm in your favour, so that you came in, it may be said, triumphantly'.

When I first began exploring W.B. Clarke's work and Papers, the view was generally held by contemporary geologists in Australia that Clarke was just one of a small group of the early pioneers. His correspondence tells a different story. Through his extensive networking as well as his tireless independent scientific investigations, his position as a prominent public scientist with strategic relations with governors and governments, and his leadership role in building a scientific community, Clarke emerges as both the Colony's key scientific savant of his period, and a polymath. Moreover, (unlike other nineteenth century scientists in Australia who variously conducted correspondence in their fields) Clarke had the good Judgment and the foresight to perceive the value of this correspondence and to preserve it for posterity. He thus became the custodian of the historical record and gave us a ticket of entry to our scientific past.

Clarke, of course, was not perfect. He was highly ambitious in his geological researches, concerned for recognition and priority, and often outspoken and controversial in some of his anonymous (though clearly identifiable) writings in the Sydney press. Yet, alongside my historical evaluation, it is interesting to read this perceptive contemporary comment in 1878 at his death. 'When geology was yet unknown' wrote an unknown obituarist, 'who could estimate the immense gain to our young Colony to have a man like Clarke at our disposal. He excited an interest in the subject; he never ceased to bring the prime interest of his life before the public. He was a centre around which all facts and discoveries were sure to group themselves'.

For their part, the Royal Society of New South Wales, also showed contemporary judgment and foresight when at Clarke's death they struck Australia's first scientific medal in his name.

'We have buried the Rev.W. Clarke', wrote the New Zealand geologist, Thomas Hacket, stationed in Australia to his compatriot, James Hector in July 1878. 'There were some 200 gen-

tlemen present at his funeral on the north shore including some 20 clergymen, and a great number of the Royal Society and many notabilities and friends'. His bones have been scattered in the old cemetery at St Leonards now a pleasing park, but Clarke's name has continued to focus the contribution of Australian scientists to the

natural sciences across the past 127 years.

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