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Creative foundations. The Royal Society of New South Wales: 1867 and 2017

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Abstract

There have been two key foundations in the history of the Royal Society of New South Wales. The first at its creation as a Royal Society in 1867, shaped significantly by the Colonial savant, geologist the Rev. W. B. Clarke, assisted by a corps of pioneering scientists concerned to develop practical scientific knowledge in the colony of N.S.W. And the second, under the guidance of President Donald Hector 2012–2016 and his counsellors, fostering a vital "renaissance" in the Society's affairs to bring the high expertise of contemporary scientific and transdisciplinary members to confront the complex socio-techno-economic problems of a challenging twenty-first century.

"This country is so dead to all that concerns the life of the mind", the scholarly newcomer the Rev. W. B. Clarke wrote to his mother in England in September 1839 shortly after his arrival in New South Wales (Moyal, 2003, p. 10). But a man with a future, he quickly took up the offer of the editor of *The Sydney Herald*, John Stokes, to contribute to the paper on science, and with John Fairfax's proprietorship of the renamed *Sydney Morning Herald* in 1841, Clarke launched a series of twenty unsigned articles entitled `Meteorology as applicable to Australia' in January 1842 and followed it in July–December 1842 with a second unsigned series,`*Notitiæ Australasianæ'*, in which he sought to bring local scientific discoveries before the public and to call upon colonists "through the habit of observation" to make useful contributions to natural science. Thereafter across the next two decades Clarke became *The Sydney Morning Herald*'s major contributor of articles, letters, scientific reports and editorials, (sometimes anonymous, or with cryptic signatures) on a span of topics that embraced geology, meteorology, climate, mineralogy, the natural sciences, earthquakes, volcanoes, comets, storms, inland and maritime exploration and its discoveries which gave singular impetus to the newspaper's role as a media pioneer in the communication of science (Organ, 1992).

With only three scientific institutions in mid-century New South Wales — the Royal Botanic Gardens, the Parramatta Observatory and the Australian Museum — the scientific community was small. The Australian Philosophical Society, formed in 1850 (as a post-event of Governor Brisbane's fleeting Philosophical Society of Australasia of 1821), was renamed the Philosophical Society of New South Wales in 1855 and gained some vigour under the presidency (1856-61) of the scientifically-minded Governor-General of the Colonies, Sir William Denison. Yet by 1866, stirred by the establishment of the new universities of Sydney (1852) and Melbourne (1855), the growth of museums and observatories, and the advent of a major geo-

logical survey in gold-rich Victoria, a view gained currency that the historical concept of a `Philosophical' society no longer reflected a community with diverse scientific interests and an expanding government commitment to science. With the assistance of the Governor, Sir John Young, the Royal Society of New South Wales gained Royal assent in 1866 and was formally established in 1867, the third society in Australia to acquire the Royal title, following the Royal Society of Van Diemen's Land in 1832 (renamed Royal Society of Tasmania in 1911), and the Royal Society of Victoria in 1859. In this forward thrust, Clarke, a long-time councillor and Vice-President of the Philosophical Society, was a prime mover.

By the end of the 'fifties William Branwhite Clarke was the most strategically placed scientist in the Colony. Arriving from Britain to take up his profession as an Anglican clergyman in Sydney in May 1839, he had received geological training with Adam Sedgwick at Cambridge University, published papers on aspects of British and Continental geology, was a Fellow of the prestigious Geological Society of London and arrived in the Colony as the first trained geologist to settle in Australia. While he earned his way as a churchman, Clarke early began his pioneering geological excursions, publishing papers in Britain and the Colonies and communicating new findings to the Sydney press. Importantly, through his service to Government on a variety of committees on artesian water and gold and, notably, through his role as Geological Surveyor appointed by government in 1851–53 to conduct surveys of the mineral wealth of New South Wales — excursions that yielded twenty detailed reports published by the Legislative Council of New South Wales and distilled through *The Sydney Morning Herald* — Clarke had emerged as a leading savant, a prominent player in negotiating science, and a household name.

He had become, in effect, what British historian of science, James Moore, defined in Britain's scientific community, as the owner of intellectual "scientific credit", one who, offering support and advancement to others, carried "symbolic capital" (Moore, 1996). As a researcher, Clarke had also developed strong connections outside the Colony as an honorary member of the New Zealand Society, a life Fellow of the Royal Geographical Society, a member of the Société Géologique de France, and, strikingly, had fostered and continued to foster a substantial correspondence with intercolonial and international scientists in the natural and physical sciences. Combining many parts, he was elected senior Vice-President of the new Royal Society of New South Wales and, at the age of 69, played a key part in the Society's formative first seven years.

One hundred and eight men signed the Membership List of the new Royal Society in 1867. Their collective company represented a wide community of men of differing pursuits and ages who shared a sense of buoyancy at the opportunities for fresh initiatives and knowledge in the Colony. Made up of senior civil servants from the Colonial Departments of Lands, Works, Mining, Land Titles, Telegraph, Publishing, the Colonial Secretary, the Attorney-General, the Colonial Architect, the Surveyor-General, and professional scientists from Sydney Observatory, the Botanic Gardens, the Australian Museum and the Mint, two professors from Sydney University, they also included independent astronomers, entomologists and natural scientists, an array of physi-

cians and clergymen with scientific interests, several MLC's and MLA's and two staff members from *The Sydney Morning Herald*. They hence included an association of players both involved professionally in aspects of scientific and technological progress in New South Wales, together with a corps of independent participants with research publications and overseas experience and a lively interest in the natural sciences (*Transactions*, 1867, 1, pp. xi–xiii)[1].

It was to this newly founded learned society that W. B. Clarke gave the Inaugural Address on 6 July 1867 as first Vice-President, a position he would hold until his death in 1878. Considering the concept of a "philosophical" society as no longer alone appropriate to national ends, he offered a broad and practical vision for the future:

> "Let us perform our own proper work [he said], not caring whether we ever arrive at complete knowledge of the methods by which the Universe was formed and perfected. We have before us in this Colony a vast region, much of which is still untrodden ground. We have, as it were, a new heaven for Astronomy and a new earth for Geology. We have climatical conditions of the Atmosphere, which are not to be viewed by us merely as phenomena interesting to the Meteorologist. We have facts to accumulate relating to Droughts and Floods which have a deep financial and social importance. We have a superficial area which may engage the attention of Surveyors, Agriculturalists, and Engineers for years to come. We have unrevealed magazines of mineral wealth in which Chemists and Miners may find employment for ages after we shall all have mingled with our parent earth. All that we have to trouble ourselves with, is the right interpretation and development of these physical riches, so bountifully spread around and beneath us for our investigation and use" (Clarke, 1867, p 26).

It was relevant that in the decade when *The Origin of Species* was in discussion in the Colonies and Clarke himself was in correspondence with Charles Darwin, his conclusion was open and germane. "We must strive to discern clearly, understand fully, and report faithfully; to love truth in things physical as in things moral; 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; contented if we are able to add but one grain to that enduring pyramid which is now in course of erection as the testimony of Nature to the truth of Revelation."[2]

Within the Colony's scientific activities, astronomy was in the ascendant. Ever since Governor Brisbane's establishment of the Parramatta Observatory in 1821, the resulting publication of the first major star catalogue of the southern hemisphere, *The Parramatta Catalogue of 7,385 Stars* (1838), had focused international attention on Australian astronomy and fostered its development. With the closure of the Parramatta

[1] See http://www.biodiversitylibrary.org/page/40522032

[2] Like many key scientists in the Australian Colonies and in Britain and the United States, Clarke remained a `Separate Creationist' all his days. Corresponding with Darwin in August 1861 on receipt of *The Origin*, the first page of his letter of greeting is missing from the Darwin Correspondence held in Cambridge. The full letter relates to geological findings (Moyal, 2003, vol 1. pp 551-2) with the evolutionist.

Observatory in 1848, work began in 1856 on construction of the Sydney Observatory and the Rev. William Scott, a Cambridge wrangler and lecturer in mathematics from Sydney Sussex College, Cambridge, was appointed Government Astronomer. Scott oversaw the Observatory's construction at Flagstaff Hill, began meridian observations on the position of certain stars, and with an Equatorial telescope of a 7.25-inch aperture began observations of comets (ADB, 6).

Both Scott and the brilliant locally born astronomer, John Tebbutt, Jr., were early members of the Royal Society. Exploring the southern heavens with an ordinary ship's telescope and sextant from his home at Windsor, New South Wales, 27-year-old Tebbutt had the grand experience of discovering the "great comet" of 1861 and enlarging the reputation of Australia's astronomical science. Tebbutt built his own modest observatory at Windsor, independently maintaining a remarkable series of accurate descriptions on comets, occultations on stars by the moon, eclipses, transits of Jupiter's satellites, variable stars and double stars, and the positions of minor planets, all of which were invaluable to world astronomers. He proved a prolific sharer of his scientific knowledge, reporting his cometary observations in 61 research papers and in the press, publishing *Meteorological Observations made at the Private Observatory of John Tebbutt Jnr.*, and producing some 300 papers in scientific journals. Tebbutt won the title of Australia's greatest nineteenth-century astronomer (Bhathal, 1993; Moyal, 1976, pp 133–5).

Drawing on experience at the Royal Observatory, Cape of Good Hope, and as lecturer in mathematics at Kings College, London, George R. Smalley succeeded Scott as Government Astronomer in 1864. He shared the Vice-Presidency of the Society with Clarke and contributed several papers on astronomy to the *Transactions* before his unexpected death in 1870 (ADB, 5). The astronomers were served by the expertise of another Society member, the scientific instrument maker, Angelo Tornaghi. Born in Milan, Tornaghi came to Australia in 1858 to supervise the installation of instruments at the Flagstaff Observatory, and set up a scientific instrument, optical and clock-making business in Sydney, which became a major source of expertise supplying instruments and building and servicing telescopes for the Colony's professional and amateur astronomers.

The fields of biology and zoology were also richly represented in the Society. Dr George Bennett, a practising zoologist in the Colony since 1836, had trained as a medical doctor at the Hunterian School of Medicine, London, where he began a lifelong friendship with fellow student Richard Owen. His research centred on the kangaroo and other marsupials, and the monotremes; he published *Wanderings of a Naturalist in New South Wales, Batavia, Singapore and China* (1834) and *Gatherings of a Naturalist in Australasia* (1860). Settled in Sydney as a physician, Bennett served as Secretary of the Colonial Museum 1836–42. His long life of field research exemplified the vital link forged between science at the periphery and the metropolis in his sustained contribution of biological specimens of marsupials, monotremes, and the fossil remains of extinct marsupials to Professor Owen, the towering leader of British comparative anatomy and palaeontology (Newland, 1991; Moyal, 1976, p 896).

By contrast at the Australian Museum, the German zoologist, Johann Gerard Krefft, marked an independent-minded researcher

and author who sought local authority for his Australian work. Emigrating to the Victorian goldfields in 1857, he became Curator at the Australian Museum in 1864. A Fellow of the Linnaean Society of London and a correspondent of the Zoological Society of London, Krefft was the author of *Snakes in Australia* (1869) and *Mammals of Australia* (1871) and had the distinction of being an early and articulate Darwinian in Australia (ADB, 5; Moyal, 1976, pp 822–3). Charles Moore, trained at Kew Gardens and appointed as Colonial Botanist in New South Wales, developed a scientific herbarium at Sydney and as Director of the Botanic Gardens became an active member of the Royal Society's Council (ADB, 5).

The Society's membership in applied science evolved through staff members from the Sydney Branch of the Royal Mint. Its first Deputy Master, Captain Edward Ward, appointed in 1854, became an influential figure in Sydney, a member of the Philosophical Society of New South Wales, and a Corresponding member of the Royal Society when he moved in 1869 to establish the Melbourne Branch of the Royal Mint.[3] Legal tender was at last established in the Colonies in 1857.

Robert Hunt, Deputy Master from 1865, was a Society member, while Dr Adolph (Carl) Leibius, trained in chemistry in Germany at the University of Heidelberg and in analytical and assaying chemistry in London, joined the Mint in 1859 and, a contributor to the *Transactions* with his colleague and Fellow member Francis Miller, was later destined to play an active role as Honorary Secretary of the Royal Society. There, too, was Thomas Mort, businessman and entrepreneur, who from 1866 financed experiments and ideas in refrigeration machinery (ADB, 5).

Civil servant members of the Society exhibited a range of talents. The Colonial Architect, James Barnet, a man of striking creative achievement across his long career, 1865–90, built courthouses, police stations, post offices including Sydney's distinguished General Post Office, the Customs House, the Public Library, the Medical School of the University of Sydney, and finally Sydney's famous International Exhibition building, the Garden Palace Building, made of glass and iron, to showcase the Colony's resources and activities. His buildings, it was said, "took the public taste". Of eclectic interests, Barnet published *A Monograph of Australian Land Shells* (1868) (ADB, 3).

E. C. Cracknell, Superintendent of Telegraphs in New South Wales, brought the transformative new technology of the telegraph to the Colony. Emigrating to Australia from Britain as technical assistant to the newly appointed Astronomer of South Australia, Charles Todd, in 1855 Cracknell moved to Sydney as assistant superintendent in 1858. The Colony was soon ringed about with electric telegraph lines — that `Most Wonderful Invention' — while, as Superintendent from 1861, Cracknell built connections with the stretching intercolonial telegraph networks and in January 1876 officiated at the joining of the cable connection from Botany Bay to New Zealand to link the seven "Australasian Colonies".

The medical contingent in the Society, numbering some eight doctors including Dr Bennett and the respected Rev. Dr John

[3] His creative first Assayer, and member of the former Society, was the remarkable young William Stanley Jevons, whose rich, if reclusive, intellectual period spent in Sydney from 1854–59 led to his distinguished career as an economist (both theoretical and applied) and social theorist in England (Marks, 2016).

Dunmore Lang, held other engaged participants. Dr James Cox FRCS, pastoralist and merino breeder (an editor of *The Stud Book of New South Wales*), founded the local Linnean Society, was elected a Fellow of the Linnean Society of London, and was a dedicated conchologist, publishing several editions of that popular colonial topic, *Monograph on Australian Land Shells* (1858) (ADB, 3). Dr John Le Gay Brereton, poet and prose writer, was also numbered among the members while Charles Nathan, trained at Westminster Hospital School of Medicine, founded the New South Wales Branch of the British Medical Association, was a member of the N.S.W. Medical Board, a founding member of the University Senate, and was the doctor called upon when the Duke of Edinburgh was wounded in an assassination attempt in March 1868 (ADB, 5). Edward Bedford FRCS, surgeon, politician and public servant during an eminent medical career in Hobart, emigrated to Sydney in 1863 where he was appointed medical adviser to the New South Wales government. He joined the Society in 1864 and contributed several papers to the *Transactions* while also serving from 1867–74 as Honorary Treasurer. (ADB, 3, obituary; Clarke, 1876, p 11).

Most important to the character of the new Society, however, was the influence of the University. From the beginning, Sydney University took its cue from London University, with its strong emphasis on scientific chairs, planning four in mathematics; anatomy, physiology and medicine; chemistry and experimental physics; and natural history. To the vocal disappointment of T. H. Huxley, an eager candidate for the proposed but discarded natural history chair (Moyal, 1976, pp. 98–100). John Smith M.D., lecturer in chemistry from Aberdeen University, was the first academic science appointment as Professor of Chemistry and Experimental Physics at Sydney in 1852, together with the first Professor of Mathematics, Morris Birkbeck Pell, 1852–76. Smith's research interests were in water analysis and educational policy and he served on many commissions. Pell's teaching in Mathematics underwrote its teaching as a compulsory subject in the Bachelor of Arts degree, and its impact proved crucial. Henry Chamberlain Russell, born and educated in Maitland, New South Wales, graduated in physics and chemistry with a BA degree in 1858 and was at once appointed "computer" at the Sydney Observatory, rising to Acting Director 1862–4, and Government Astronomer on Smalley's death in 1870. As such, he was the first graduate from Sydney University to rise to eminence and influence in Colonial science. Russell's work in astronomy, meteorology and geophysical science was far-reaching. Equipping a huge number of meteorological stations in New South Wales with his privately designed self-recording instruments, he based his pioneering papers on Australian weather and the cyclic behaviour of climate on this accumulated mass of evidence. He also published the first Australian Weather Map in *The Sydney Morning Herald*, 3 February 1877[4]. In astronomy, Russell gained international prominence in organizing Australia's observations of the transit of Venus in December 1874 and in his pioneering stellar and lunar photography of the Milky Way and Magellanic Clouds and large stars. A formidable contributor to the Royal Society, (he published some 69 papers in its *Journal* and numerous works elsewhere), he followed Clarke's steps in becoming a three-time Vice-President of the Society. He was elected a

[4] See http://trove.nla.gov.au/newspaper/article/13389140/1438919

Fellow of the Royal Society of London in 1881 (ADB, 6; Bhathal, 1991; Moyal, 1976, pp 832–3).

In December 1866, Dr A. M. Thomson, one of London University's first doctors of science, with experience at the Royal School of Mines, arrived at Sydney University as Reader in Geology, marking an important extension in science. Working also as assistant in chemistry to Professor Smith, he published a number of pioneering geological papers and a *Guide to mineral explorers in distinguishing minerals, ores and gems* (1869) and was posted as the first Professor of Geology at the University in 1870 where he taught "very up-to-date- courses", gave popular public lectures and opened science teaching to senior students at Sydney Grammar School. Thomson was rapidly recruited to the Royal Society where he became a member of Council in 1870 and a key contributor. His brilliant young life, however, was cut short as an outcome of his work with Gerard Krefft in the excavation and examination of fossils of extinct marsupials in 1869 in the damp Wellington Caves (Moyal, 1976, pp. 206–211). He died in 1871, a significant loss to the Colony, the Society, and to Clarke, for whom, through their close geological collaboration, he had become a "scientific son."

Such, in sum, was the diverse company of the Royal Society when it gathered its members together to begin a new creative epoch in its affairs.

It fell to George Smalley, the second Vice-President, to indicate the progress made in the Society in its first year in his Opening Address to members on 3 June 1868. With the new name, he declared "we are exhibiting signs of fresh vitality". Smalley pressed the value of "meeting in a social manner" and judged that in the long history of establishing societies for the advancement of science, art and literature, "In a young community, a society such as this is the only one likely to be appreciated in promoting the advancement of art and science with an energy adequate to meet the requirement". "Great things", he predicted "grow out of small beginnings", and he hoped that women, whom he considered "neither uninterested nor unappreciative of science" and "not incapable of understanding it", would not only "grace with their presence at the Conversationes of this society, but sometimes attend the ordinary meetings" (Smalley, 1868, p. 8). It was a view that took root in the establishment of the periodic social public assemblies that were held by the Society from 1873 and greatly enlarged its audiences.

Volume 1 of the of Society's *Transactions* of their first year of meetings was published in 1868[5]. With papers from Clarke, Smalley, Krefft, and Pell, it covered topics as wide as 'On the Auriferous and other Metalliferous Districts of Northern Queensland', 'The Mutual Influence of Clock Pendulums', 'The Vertebrates of Tasmania, recent specimens and fossils', and 'On the Rates and Expectation of Life in New South Wales compared with England and other Countries'. Volumes 2 and 3 of the *Transactions*, presenting papers of 1868-9, extended the range[6]. There was Dr Alfred Roberts `On the Hospital Requirements of Sydney', Clarke `On the Causes and Phenomena of Earthquakes, especially in relation to the shocks felt in New South Wales, and in other provinces of

[5] See https://royalsoc.org.au/council-members-section/73-jprocrsnsw-vol-1

[6] See https://royalsoc.org.au/council-members-section/74-jprocrsnsw-vol-2 and https://royalsoc.org.au/council-members-section/75-jprocrsnsw-vol-3

Australasia', Smalley's `On the value of Earth Temperatures', Russell's `Tables for Calculating the Humidity of the Air', Smith `On the Water Supply of Sydney' and 'On the results of the Chemical Examination of Waters for the Sydney Water Commission', Dunmore Lang 'On the Origin and Migration of the Polynesian Nation', Edward Cracknell on the Electric Telegraph, mathematician Martin Gardiner's contributions on 'New Theorems in the Geometry of Three Dimensions' and 'Improving Solutions of Problems in Trigonometrical Surveying', F. B. Miller 'On Refining Gold by Means of Chlorine Gas', A. Leibius 'On a New Apparatus for Reducing Chlorine of Silver' and Alexander Thomson's 'Notes on the Geology of the country around Goulburn'. Investigative advances had been made and serious scientific information transferred. By 1869 forty new members had joined the Society.

W. B. Clarke's part in the expansion of the Society's new mode drew strongly on his reputation and continuing scholarly work. Touching 70, his nets never dried; he remained the senior geologist in the country. Retiring from his large parish of St. Thomas's Church, North Sydney in 1870, he became deeply engaged in bringing his long researches and collections on the stratigraphy of the country to fruitful conclusion in a lengthy correspondence with the distinguished Belgian palaeontologist Laurent de Koninck, Professor of Palaeontology and Chemistry at Liége University, conducted entirely in French.[7]

In addition to his own work, Clarke used his "scientific credit" to influence the Queensland Government to appoint two geological surveyors, dropped from the disbanded Geological Survey under Alfred Selwyn in Victoria, to new survey posts in Queensland — Christopher Aplin in Southern Queensland and Richard Daintree in the North — where their pointers to gold proved invaluable in stimulating the gold rushes in that Colony. Their geological findings along with that of scattered others found their way as major contributions to knowledge through the Anniversary Addresses which Clarke, as Vice-President, delivered to the Society and in the many papers he wrote for the *Transactions*. Drawing on a substantial survey of new information on diamonds and other minerals, he reported in his Vice-Presidential Address of 22 May 1872, "We have now evidence that Eastern Australia is what I have often stated, one vast field of mineral wealth. From north to south, and from the coast to the 41st meridian, the western boundary of New South Wales, we know that coal, gold, copper, tin, and, in many places, lead, and other minerals of less local importance, are found in abundance" (Clarke, 1872, p 38).

Clarke was also a great encourager of younger members in other disciplines. H. C. Russell wrote to him calling on his expertise on weather, climate, floods, storms, tides and coastal elevation and the varying appearance and disappearance of Lake George. Informing letters also came to him from Gerard Krefft, to whom he gave strong support during the 1870's, while the warm collegiate correspondence and exchange

[7] From 1864-77 de Koninck undertook the classification of Clarke's Devonian, Silurian and Carboniferous specimens, lists of which Clarke published as an Appendix to the 4th edition of his *Remarks on the Sedimentary Formations of New South Wales*, 1878. De Koninck's *Recherches sur les fossiles palaéozoic de la Nouvelle-Galles du Sud (Australie*) 1876-77 describing some 266 of Clarke's fossil specimen was finally published in English by T. W. E. David, Mrs David and W. S. Dun in 1898 (Moyal, 1976, p 668).

Clarke enjoyed with Alexander Thomson underscored his role as mentor, savant and collaborative forward thinker. Clarke was a polymath in mid- to late-nineteenth century Australian science and his careful retention of a vast colonial, intercolonial and international correspondence conducted from 1840 to 1876 illuminated his unique part.[8]

For the first seven years of the Royal Society, Clarke emerged as the thread on which many matters hung. As his sometime fellow Vice-President, Professor John Smith, saw it, "he was a centre around which all facts and discoveries were sure to group themselves" (Moyal, 1976, p. 57). Challenges were abundant; membership fees proved tardy; there was the need over several years for a permanent home for the Society and for a growing Library. There was also need for a wider than local emphasis, and Clarke, as an Honorary member himself of several overseas societies, early advocated extending reciprocity to other societies and offering Honorary Fellowships to reputed scientists in the Colonies and overseas. Centrally, a government stipend was urgently required to support and enhance the publications of a society which, in Clarke's words, "was performing a very important service to the community" (Clarke, 1876, pp 3-4).

In one arena, the press, the early Royal Society was singularly well supported. Proprietor John Fairfax was a member of the Society from its foundation and the practice of *The Sydney Morning Herald* in giving prominent place in its front pages to the Annual Addresses and extracts of papers from the Society's meetings the following day, in addition to its sustained scientific journalism, offered a strong and continuing image of public science. As Clarke early told Richard Owen, the newspaper "was the scientific journal of the Colony" (Moyal, 1976, p 10). Overall there was Societal growth: 116 members were reported in 1873–4, 155 in 1875, and 170 in 1876 (Clarke, 1875, p 6). As membership grew, other proposals envisaged a division into Subsections that would encourage greater concourse among specialists in different disciplinary arena. "When these separate parts are brought together," said Clarke, "all of them assist towards completion of the whole object" (Clarke, 1876, p 7). Enunciated by Clarke, these ideas were swiftly taken up and acted upon by the young Archibald Liversidge, who arrived as Reader in Geology and Assistant in the Laboratory at the University in 1872 in succession to Thomson, and joined the Society's Council in 1873. As Liversidge's biographer recounts, "Clarke had set the Society on its course of reconstruction in July 1867, he had inspired Russell and Liversidge to action in May 1875; now it was Clarke who carried the tablets from the mountain" (MacLeod, p 162). Acting in concert as Honorary Secretaries, Liversidge and Russell shouldered the Society's practical needs of finally securing some government funding to create a permanent premise, editing and adding scientific illustration to the *Transactions* and *Journal,* encouraging public science through well attended `conversationes', and steering the formation of Sections.

Clarke gave his final Anniversary Address to the Society on 1 May 1876. As the Society's shaper, he had stood essentially on the cusp between amateur and independent engagement with science and its increasing professionalization. With gathering pleasure, he saw that there had been consider-

[8] W. B. Clarke was one of the few scientists in the Colony who preserved his personal correspondence for posterity.

able progress in the Society and that the first two elected Honorary Fellows, James Hector from New Zealand and Professor de Koninck from Belgium, would recognise that they had become members of a society that was both "active and vigorous". It was a society "which had already contributed much useful information". It was not Promethean science. His central theme remained a constant. "Our true position", he reminded his audience, "is that of pioneers, sowers, foundation layers; and in that respect we have assuredly an honourable occupation… As such I have aspired to take a part … sometimes scattering a seed for thought here and there — and sometimes adding a pebble to what hereafter will, I hope, see itself surmounted by a superstructure of enduring reputation, when you and I will have long passed beyond the heats of controversy... Let us do what we can to serve honestly our day and generation" (Clarke, 1876, pp 32-3).

The Council viewed his contribution in larger terms and in 1875 commissioned Giulio Anivitti, an Italian artist recently appointed instructor in painting and drawing at the new Art Training School in Sydney, to paint Clarke's portrait. Decked in a cassock with a foreground of a globe and a substantial book, Clarke hoped that his portrait "might look down upon a flourishing Association of men". A greater recognition, however, was to come. On 1 June 1786 the Rev. W. B. Clarke, after a long and fertile scientific life, was elected Fellow of the Royal Society of London, his nomination proposed by four notable Fellows, Charles Darwin, William Stanley Jevons, Robert Lowe (former N.S.W. lawyer and politician and from 1868-73 Gladstone's Chancellor of the Exchequer), and James Hector. "The Council," wrote the Society's Secretary enthusiastically, "fully acknowledges your claims, and both Hooker and Huxley were warm in your favour, so that you came in, it may be said, triumphantly" (Moyal, 1976, pp 56, 65). Jevons, well known to Clarke when serving as assayer at the Mint, sent words to praise him. "You have founded the geology of a new continent," he graciously wrote early in November 1876, "and I might also say founded a Royal Society of your own" (Moyal, 1976, p 1147).

It fell to H. C. Russell as a new Vice-President in May 1877 to sum up the progress achieved by the Society since its foundation. "Allow me to congratulate you upon our flourishing condition," he declared. "With 132 members added to our number during the year, seven working sections, 1000 books added to our library, and friendly relations established with no less than 107 kindred societies scattered over all parts of the world" and "a fair prospect of help from a liberal government to carry out our purposes … we have good reason to congratulate ourselves" (Russell, 1877, pp 1–2).

Clarke, still actively engaged with his geological affairs, died on 16 June 1878. The Clarke Medal awarded for meritorious contributions to the natural sciences, (defined subsequently in geology, biology and zoology presented in alternate years) was dated from 1878. It marked the first scientific Medal awarded in Australia. An enduring legacy from the Society's foundation, a hundred and thirty-eight Clarke Medals have been awarded to date to distinguished leaders in their fields.[9]

[9] Attuned to his 'Association of men', Clarke would doubtless be surprised, yet perhaps gladly, that four Clarke Medals have been won by women in geology, and six in the botanical and biological sciences.

2017

One hundred and fifty years have elapsed since the founding of the Royal Society of New South Wales, which recent president, Dr Donald Hector, has claimed as "the leading learned institution of its type in Australia and in the Southern Hemisphere." For well over a century [he suggests], it was the leading learned institution in N.S.W. and, arguably, in Australia." (Hector, 2014, p 1). Functioning across decades Societies such as this have all experienced varied epochs of progress, zenith, and change (Branagan, 1972). Currently, however, Dr Hector as President from 2012–16, has become the torch bearer in a movement to effect a "renaissance" in the Royal Society to meet a new and increasingly complex environment for science and its community and "to re-establish the Society as a leader in the intellectual life of N.S.W. and of the country" (Hector, 2016, p 5).

Hector's motive, and that of his Council, springs from the perception that the Society's intellectual contribution has suffered a dilution of influence over recent decades arising from factors that include the advent of the four learned academies, increasing specialization in the scientific disciplines and in their publications, and a diminishment of communication across the disciplines. Moreover, while in its founding days, the Society of 1867 had before it "a new heaven for Astronomy and a new earth for geology", in the 21st century it has come to face a force of complex socio-techno-economic problems that are transdisciplinary, national and global in their crucial challenge.

Is there an answer? Focusing on mankind's "remarkable capacity for intellectualizing problems and solving them in the abstract" (Hector, 2016, p 6), Hector early put the case that the Society could play a special role in bringing much greater insights into previously unassailable problems. The Royal Society, he argued, "is uniquely placed to provide leadership in this type of complex analysis". At a first level, the Society can provide "a forum where like-minded people can gather and understand what is happening in other disciplines" (Hector, 2014, pp 1–2). He also underlined, that the "wisdom of the founders in defining such a broad remit of human knowledge — science, art, literature and philosophy — was truly prescient". But the current environment called for major change. Solutions, he advised, will not be found in science and technology alone. For impact, "we need more writers, architects, sociologists, musicians and historians" (Hector, 2016, p 15). Only then will we be able to engage with the community: "we can harness both intuitive and rational thought to bring great creativity", he said. It marked a clarion call.

By 2012 the Council had already stirred a sense of outreach and collective action. The Society was engaged in a range of awards and special named lectures (the Dirac Lecture in the physical sciences is one). In February 2013 the Society held its first annual Four Societies Forum with the Nuclear Engineering Panel of the Sydney Branch of the Institution of Engineers, Australia, and the Australian Institute of Energy. In a key Council initiative, several highly eminent members of the science community already linked to the Society were elevated as `Distinguished Fellows': Nobel Laureates, Professors Peter Doherty and Brian Schmidt, Sydney-born, former UK Chief Scientist, Lord May, Emeritus Professors Jill Trewhella and Eugenie Lumbers, Professor Michael Archer, and the Hon. Barry Jones, unique as an elected Fellow of all four learned Societies

(Hector, 2014, p 2). In December 2013, a further Council decision was taken to extend the knowledge base of the Society through the election as special members of a number of highly accomplished leaders across fields of knowledge drawn from the professoriate of the universities in the State of New South Wales. The Awards Advisory Panel, composed of the Deans of Science and the Deans of Engineering, chaired by Professor Mary O'Kane, Chief Scientist and Engineer of New South Wales, selected some twenty-one new members — the "FRSN" — for formal election in May 2014.

Other ventures flourished. The first Forum of the Society with the four learned Academies was held at Government House, Sydney, in September 2015 on 'The Future of Work'[10]. Introduced by the Governor, General David Hurley, it brought a broad range of academics and business leaders to bear on one of the big national and social issues, "a futuristic look at the technological, social and cultural change expected over the next 30 years" (RSNSW Annual Report 2014) expressing in the Governor's words "the Royal Society's defining purpose of rigour in challenging received opinion and dominant authority through its motto, *omnia quærite*, question everything". A second Joint Forum of the Society and the four Academies, held at Government House in 2016, titled 'Society as a Complex System: Implications for Science, Practice and Policy', spanned a wide scientific and political spectrum and brought diverse minds to bear. The papers from both Forums are published in the Society's *Journal & Proceedings*. This in-house resource has also been reinvigorated to include key invited lectures and articles solicited for special issues, and others based on personal historical background. Extending new membership has brought needed finances to the Society while its core goal of "renaissance" is expressed in its wide intellectual interaction, consultation, multidisciplinary narratives, and in the stimulus of personal interconnections. Embracing community, the Society's Annual Dinners gather participants in a linked reflection of the 'conversationes'.

Special invited lectures throw critical light on key often "wicked" problems. Speaking at the Awards Dinner on 7 May 2014, savant and one-time politician, Barry Jones contended that "the quality of public debate on scientific issues had been trivialised, even infantilised". "Despite Australia's large number of graduates (more than 4 million)," he said, "our 38 universities and intellectual class generally have very limited political leverage and appear reluctant to offend government or business by telling them what they do not want to hear… In a democratic society such as Australia, evidence is challenged by opinion and by vested and self-interest. Australia has no dedicated Minster for Science with direct ownership/involvement in promoting scientific disciplines." In an era of super-specialisation, he suggests "many scientists are reluctant to engage in debate, even where their discipline has significant intersectoral connections" (Jones, 2014).

A widely disseminated lecture by Distinguished Fellow, Professor Brian Schmidt, on 'Evidence and Expertise in a post-truth world,' invites us to inspect the tenuousness of our human future. He sees "a post-truth world" itself as a threat to our survival and one that, unless dealt with quickly, threatens us severely. Our planet, he reminds us, emerged 3.7 billion years ago "a small grain of sand" in the universe, but a grain we need to

[10] See https://royalsoc.org.au/council-members-section/240-jprocrsnsw-vol-148-2

preserve. There are 7.4 billion people now on Planet Earth, and an increase of one hundred million every year. Using energy, water, land and pollution we have a difficult challenge on our hands: that "we, humanity, have to fit on Earth," as Schmidt says. In this, "evidence and expertise" are critical. Numerate, deeply expert in the history of the universe, Schmidt contends that "we will be a bunch of rabbits around a waterhole" if we take wrong or inconsequential action. "It is only by being human," he maintains, and, by using decisions to share Planet Earth in learning to reduce our collective population and distribute the planet's finite resources, "that we will have a path that will enable us to save ourselves". (Schmidt, 2017). Or as Bill Bryson (2010) writes more simply in *Seeing Further: The Story of Science and the Royal Society*, "If we have an earth worth living on a hundred years from now, the Royal Society [of London] will be one of the organizations our grandchildren will wish to thank" (p 13).

On a smaller canvas in its transformative processes, the Royal Society of New South Wales has much to share with, and learn from, this ancient Society. With its seven journals, its endless stream of papers, its communication through lectures, its transdisciplinary principles, its manifold committees, its many awards and prizes, its contribution to changing legislation, it exemplifies many concepts and trends that the N.S.W. Society endorses. Articulate for many years in the climate change debate, work-shopping and despatching a steady flow of communications on policy to government and the media, it also provides public information to the lay reader on energy policy and global warming. By repute, the Royal Society of London provides "a vibrant showcase of science". It also acts as "the conscience of a nation" (Bryson, p. 13).

In a richly engaged period for the Royal Society of New South Wales, large and unpredictable questions lie ahead. Martin Rees (2010, p. 485) offers a fitting frame for us all in his 'Conclusion: Looking Fifty Years Ahead' in Bryson's *Seeing Further*. "Wise choices will require the idealistic and effective efforts of natural scientists, environmentalists, social scientists and humanists — aided by the insights that twenty-first century science will surely bring."

From 1867 to 2017 such recommendations have the ring of truth.

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