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The Clarke Memorial Lecture, 5th December 2007

The Architect and The Statesman: Archibald Liversidge, Edgeworth David and the Spirit of Science in Sydney, 1874 – 1934

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This is the first Clarke Memorial Lecture to be presented by two authors, following the recent publication of their biographies of Edgeworth David (Branagan, 2005) and Archibald Liversidge (MacLeod, 2009). Both colonial scientists followed in the pioneering footsteps of the Reverend W.B. Clarke as leaders of the Royal Society of New South Wales.

Abstract: Archibald Liversidge, FRS and T.W. Edgeworth David FRS, professors in the sciences at the University of Sydney between 1872 and 1923, had a profound influence on the university, the Royal Society of New South Wales, and on the history of Australian science. They were very different: Liversidge, a shy bachelor, little known to the general public; David, a charismatic figure whose activities made him a household name. However, they worked together effectively within the university, in science and technical education, and in the application of science to economic development. Their pioneering work is still bearing fruit today.

Keywords: Liversidge, Edgeworth David, University of Sydney (Science Faculty, School of Mines), Science House, Australasian Association for the Advancement of Science

INTRODUCTION

It is customary at the Clarke Memorial Lecture to pay homage to the Reverend William Branwhite Clarke (1798–1876), a pioneer of Australian geology.[1] It is particularly fitting that the subjects chosen for this lecture were deeply indebted to him and his work. Archibald Liversidge FRS MA LLD (1846–1927), and Sir TW Edgeworth David KBE CMG DSO FRS MA DSc LLD (1858–1934), were among the most distinguished scientists in colonial New South Wales. Arriving in Sydney in 1872 and 1882 respectively, they gave shape to colonial science under the Southern Cross. In many ways their interests were complementary. Both were educated in England, both were strong Empire men, and both saw the pursuit of natural knowledge as a way of making sense of nature's contrarieties, while bringing economic benefit to mankind. In ends and means, they were united. Yet in personal terms, they differed greatly. Liversidge, a younger son of an artisan cartwright, was born in the East End of London and was bred in the rapidly expanding world of technical education and applied chemistry. David, a Welsh-born son of the manse, was a product of Oxford and heir to a tradition of gentlemanly geology. Thus came to Sydney an Englishman and a Welshman, sons of the working class and the middle class – a short chubby man with glasses and a stammer and a thin man of medium height with an aristocratic mien. Their many personal differences never threatened their friendship, nor tarnished their professional relationship. Even so, the differences that surfaced in their approaches to colonial science, university administration and public affairs remain to fascinate scholars today. Their special 'combination of talents' lent a particular character to science in Sydney and at the Royal Society of New South Wales.

[1] On this occasion, the introduction was given by Professor R.H. Vernon, Chairman of the NSW Division of the Geological Society of Australia, co-sponsor of the lecture. Brief mention of the recent discovery of previously unknown letters of the Rev. W.B. Clarke, was made by the speakers. See Branagan and Vallance (2009).

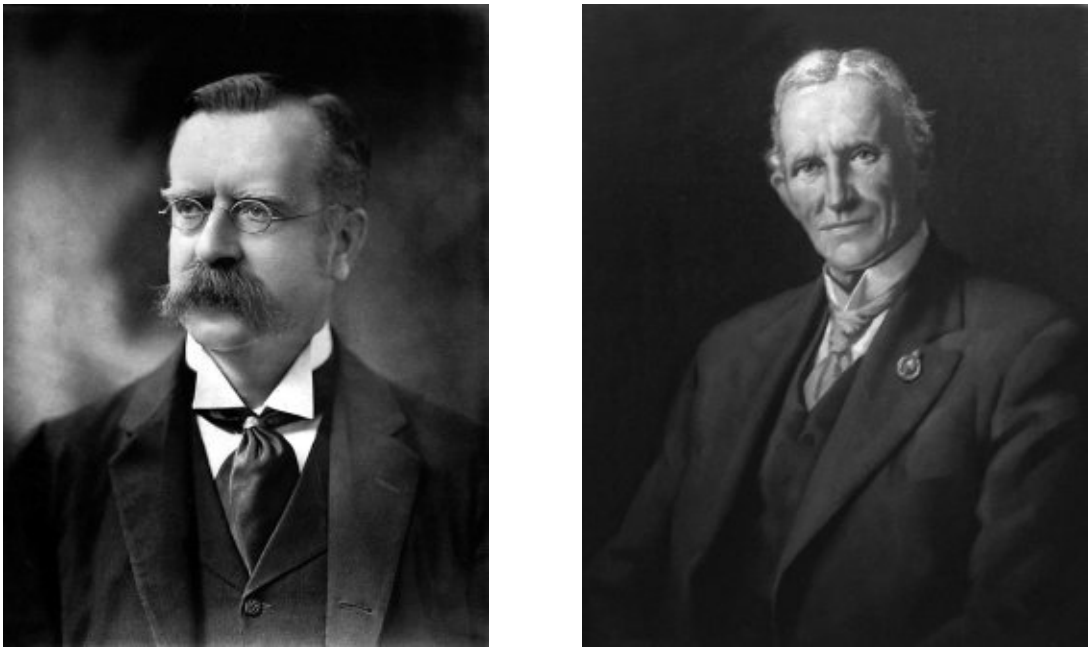

Figure 1. Archibald Liversidge and Edgeworth David.

Looking back, Liversidge and David can be cast as 'public scientists' – they were advocates and achievers, prophets and proselytisers. But the former remains best known as an architect and builder, a promoter and organiser; whilst the latter is remembered more as a statesman and inspiration – Liversidge, a careful analyst and tireless believer in inter-colonial cooperation; David, an adventurer, explorer and speaker for the nation. Together, their work helped create something uniquely 'Australian' in an otherwise distinctively British world of science. In the histories of Sydney University and the Royal Society of New south Wales their legacies were to prove both lasting and incomplete. Together, they made it possible for all the sciences in Sydney to come together and flourish; yet both were destined to leave for later generations the larger task of creating a scientific spirit among the Australian people, in a foreign land they found strange but came to know well.

Their influence spanned a generation[2]. They followed each other as Deans of Science – Liversidge from the foundation of the Faculty in 1882 to 1903 (excepting 1896), and David from 1904 to 1908, with a second period (1919–1923) after Liversidge had retired. To the Royal Society of New South Wales both contributed greatly – Liversidge as Secretary from 1874 to 1884 and 1886 to 1888, and President in 1885, 1889 and 1900 (MacLeod 2009); and David as President in 1895 and 1910, and as an almost permanent Council Member (Branagan 2005).

Liversidge and David led what historians often regard as the third generation of science in Australia – following, first, the early European explorers, culminating in the early years of settlement; and second, the gentlemen collectors and botanising parsons, epitomized by W.B. Clarke, whose traditions dominated colonial science throughout the Empire from the 1820s to the 1870s. Liversidge and David led the first generation of Australian analytical geologists and chemists for whom the field and the laboratory were professional preserves. Given the tiny community of well educated people in New South Wales - perhaps one hundred in a population that, in 1872 (when

[2] Surprisingly, no correspondence between them has survived. The reason may lie in the fact that for the many years (1891–1909) they were university colleagues, they worked in close proximity; but this explanation does not completely dispel the mystery.

Liversidge arrived), counted 138,000 in Sydney, and 550,000 in all NSW – they enjoyed a special, almost privileged status. They were prophets, like Clarke, but they were also commentators and consultants, contributing to what later generations would call 'evidence-based' policy for exploration, mining and manufacture. They came to Sydney as young men in a young man's country – thanks to the gold rushes, a male-dominated world, in which less than 10% of Sydney's population was older than fifty. In their working lives, they remained young, even as the rest grew old – and even their later photographs and portraits keep alive a sense of youth and zest we wish our generation shared. Of course Liversidge and David were also blessed in many ways – with good health, certainly, but also by a university that gave them scope to innovate and develop. In academic dress they could do pretty much as they wished – and what they did was remarkable.

LIVERSIDGE, ARCHITECT OF SCIENCE

'Not only the University of Sydney and the State of New South Wales, but the whole of the Commonwealth will be the poorer by the departure for England of Professor Archibald Liversidge, MA, FRS'. So the *Sydney Evening News* on Boxing Day, 1907 mourned the close of thirty-five years since the arrival in Australia of a man, who perhaps more than any other, embodied Britain's legacy of colonial science. In its announcement, the press was premature – the shy chemist went on to complete another two decades of research in England – but in its celebration of a man who had fought the 'battle of science and engineering' in Sydney, it paid him timely tribute.

Today, Liversidge is remembered as the first Dean of Science at Sydney University, and for inspiring the foundation of the Australasian Association for the Advancement of Science (AAAS), later named the Australian and New Zealand Association for the Advancement of Science (ANZAAS), and for ensuring its continuance during its first twenty years. But the current of his influence ran far wider and deeper. Espousing a colonial nationalism that drew from imperial obligation, Liversidge guided colonial science into the twentieth century. From him came a catalytic spark that gave life to proposals for technical education, for system in the use of the colony's mineral resources, and for rigour in the installation of metallurgy and applied chemistry as university subjects. Viewed from London, Liversidge was the classic 'servant of Empire', and a reflection of the Royal School of Mines in its imperial aspect. Within his field, his influence was typically careful, conservative, and custodial. Working at the same time as David Orme Masson (1858–1937) at Melbourne and Ralph Tate (1840–1901) at Adelaide, he dominated the colonial stage in the mineralogical sciences, and epitomized the virtues of 'practical idealism' *sans doctrine* that Australians deemed appropriate for its men of science (MacLeod, 2009).

Liversidge was born in suburban London in 1846, the eighth of nine children, and youngest of four surviving sons, of a well-known City carriage builder. Educated privately to the age of nineteen, in 1866 he entered the Royal College of Chemistry and the Royal College of Mines in London, where he studied with such Victorian 'giants' as Edward Frankland (1825–1899) in chemistry, Andrew Ramsay (1814–1891) in geology, Warington Smyth (1817–1890) in mineralogy and John Tyndall (1820–1893) in physics. The course at the RSM, still under the influence of Prince Albert (1819–1861) and Augustus von Hofmann (1818 - 1892), cultivated a broad spectrum of technical skills useful to trade and industry. In 1869, Liversidge took these skills, along with the Associateship of the RSM, to Cambridge, where in 1870 he matriculated as an Exhibitioner at Christ's College. Admitted to read for the Tripos in Natural Sciences, within just nine months he was demonstrating laboratory chemistry to fellow undergraduates and organising a Natural Sciences Club – a premonition and foretaste of things to come.

Liversidge's early successes in the laboratory, in a university not yet generously endowed with scientists, caught the attention of Michael (later Sir Michael) Foster (1836–1907), the brilliant physiologist of Trinity, who re-

cruited him to a small band of undergraduates. These included H. Newell Martin (1848–1893), Frank Balfour (1851–1882) and Sydney Vines (1849–1934) who would go on to transform experimental biology. A bright future awaited him. But scientific jobs were not plentiful. His teachers, Huxley (1825–1895) and Tyndall, had once looked overseas, and by some accounts, had considered the new university in Sydney. Liversidge had no special association with Australia, and whilst he had learned much about mining, had no colonial experience. Nevertheless, fate declared an interest. In 1871, Sir Roderick Murchison (1792 - 1871), doyen of British geologists and retiring Director of the RSM was approached by Richard Daintree (1832–1878), Agent-General for Queensland in London, who had been asked to find a successor to Alexander Morrison Thomson (1841- 1871), Sydney's popular professor of geology, who had arrived in 1866, but who had just died, at the age of only twenty-nine, following a field trip to the Wellington Caves. Professors were young when appointed in those days, and Murchison recommended Liversidge, by his experience groomed for a career at a young university that set store by looking like a London college. So it was in 1872, even before he could sit his Cambridge Tripos, that Liversidge accepted the University's appointment as Reader in Geology and Assistant in the chemical laboratory. He arrived in Sydney the same year.

If Liversidge's academic job was secure, his scientific future was not. He had few colleagues in Sydney, and twenty years after the University's founding, fewer than thirty students graced its fine neo-gothic sandstone building. But he rose to the occasion and launched a proposal for a new School of Science. In 1874, just two years after he arrived and at the age of twenty-eight, he was promoted to Professor of Geology and Mineralogy. Contenting with the university's dominant classical ethos, he turned to the wider colonial community, serving as a consultant to the newly established Department of Mines, joining in Transit of Venus observations and becoming a Trustee of the Australian Museum. He also looked to the Royal Society of New South Wales, finding in it both intellectual stimulus and personal friendship. Serving as its Hon. Secretary and editor from 1874 to 1884, he rationalised and rejuvenated its scientific sections, and helped find it a new home in Elizabeth Street.

During the 1880s, science 'came of age' in New South Wales, and colonial science established a firm claim upon public support. Liversidge brought a synthesis of London and Cambridge. His analytical approach to the natural world combined the analytical naturalism of Jermyn Street (the RSM and South Kensington Museum of Natural History) and the intellectual passion of Cambridge. For Sydney, he became both a Huxley and a Tyndall, mediating the agnostic naturalism of the one and the materialism of the other, in a culture that tolerated authority but resisted dogma. His text was the 'Book of Nature'. Working tirelessly, by the time he retired he had produced a major survey of minerals in New South Wales (Liversidge 1888a), invented new analytical apparatus, and published over 100 papers in chemistry, mineralogy and geology. Together, his output supplied a global demand for information about the composition of Australian and Pacific minerals. He was Australia's first geochemist, and possibly one of the first in the English-speaking world.

At the University, his presence was felt everywhere – notably on committees dealing with a broad spectrum of policies, ranging from buildings and grounds to student discipline. 'After Homeric battles with the forces of Arts', as Edgeworth David later put it (David 1930), he won approval for the establishment of a Faculty of Science, of which he was to remain Dean for the next twenty years (1883–1903). Until the early 20th century, all Sydney students were obliged to take elementary chemistry in their first year, so nearly every student had contact with the shy professor and his meticulously organised – some would say, ambitious – lecture demonstrations.

Figure 2. Lecture room set up for a Liversidge lecture-demonstration.

Outside the laboratory and classroom, Liversidge's early fascination with collecting natural and man-made objects gave him a commanding position in the 'exhibition movement' of his day. His efforts helped 'sell' New South Wales to the world at large – beginning with the Paris Exhibition of 1878, and continuing with the Sydney International Exhibition (the 'Garden Palace') in 1879 – from which grew the Industrial, Technological and Sanitary Museum, later the Museum of Applied Arts and Sciences, which we know today as the Powerhouse in Ultimo. His influence on the making of key scientific appointments - notably, at the Technical College and at the Botanic Gardens, became the stuff of legend (MacLeod, 2005b). Building an extensive correspondence, he encouraged intercolonial ties, especially with Victoria and South Australia, and encouraged scientific exchanges across the Tasman.

Many of these achievements were recognised by his peers. In 1882, he was elected a Fellow of the Royal Society of London (one of only three then living in Australia). In 1887, Cambridge awarded him an M.A. *honoris causa*, in lieu of the undergraduate degree he never took. It was entirely appropriate that, in 1888, the first great meeting of inter-colonial science, the inaugural meeting of the Australasian Association for the Advancement of Science (AAAS) – a harbinger of political federation – took place in the Great Hall of Sydney University.

In the 1890s, Liversidge continued to be a 'scientific ambassador' for NSW and by extension, for Australia in general, at major exhibitions in Europe. He also continued membership in leading British scientific societies, including the Mineralogical Society, the Chemical Society and the Geological Society of London. His studies on the origins of nuggets and gold in seawater attracted attention in Europe and the United States. In recognition of his contributions to colonial science, Glasgow University awarded him an honorary LL.D in 1896.

In 1882, following the establishment of the Faculty of Science, there was a redistribution of duties, and Liversidge translated to the Professorship of Chemistry and Mineralogy, leaving the teaching of the non-mineralogical aspects of geology to the newly-appointed Professor of Natural History and William Hilton Hovell Lecturer in Geology and Physical Geography,

William John Stephens (1829–1890), a former school headmaster and a classics scholar, doubling for a time as Professor of Classics. In 1891, following the death of Stephens, duties were again rearranged and Liversidge became Professor of Chemistry, and the newly-appointed Edgeworth David, Professor of Geology, joining Richard Threlfall (1862–1932) in Physics and William Haswell (1854–1925) in Biology, in a four-fold division of scientific interests. All Liversidge's colleagues spent years fighting for accommodation for their respective departments. In 1888 a successful end to Threlfall's struggle to get funds for a fine physics building (ironically, now named the Badham Building) was not enough to keep him in Sydney. Liversidge's turn finally came in 1890, with the building of a fine structure that was at the time one of the most highly praised chemical laboratories in the British Empire, a memorable testament to his tenacity and foresight (Fig. 3).

Figure 3. School of Mines/Geology building (right), former Engineering Building (left).

In 1907, just over a century ago, Liversidge retired and departed Sydney for the last time. He said he would return, but he never did. In England he held office in the Chemical Society and the Society for Chemical Industry. He represented New South Wales on the commission that launched the International Catalogue of Scientific Periodicals, and he nominated Australians for the 'blue ribbon' of the Fellowship of the Royal Society of London. During the Great War he advised the Royal Society and the Chemical Society and contributed to war work on minerals and light alloys, such as those used in German airships. He also helped to launch the first strategic minerals survey of the Empire, a typically far-sighted work, involving co-operation with Britain, Canada, and South Africa. For many years he held a visiting appointment at the Davy-Faraday Laboratory at the Royal Institution in London, where he continued to work on the origins and appearance of trace elements.

In 1902, the year in which Sydney University celebrated its Jubilee, Liversidge's hand was everywhere to be seen – a fact that David, whom he had helped appoint, clearly recognised. In

many ways, his life in Sydney must be counted a success. Yet, despite his work for the colony, memory of his achievements seemed to evaporate as soon as he sailed through Sydney Heads. Unlike David he received no public honour and even today his achievements remain unrecognised. Whilst several monuments survive him, such as the library of the Royal Society of New South Wales and the Chemistry (now Pharmacy) building at Sydney University (Fig. 4), his name is missing. There is no structure named for him in Sydney, although the planners of Australia's capital, with greater sympathy, named a street after him, appropriately next to the Australian National University and the Australian Academy of Science.

Figure 4. Chemistry Building (now Pharmacy School).

In this sense, Liversidge's life is a story of high promise, tinged by sadness, perhaps regret. He may have left London, but he remained an Englishman. A bachelor, he left no family in Australia, and willed his books and papers to Cambridge rather than to Sydney. And whilst he embraced the results of the latest research, he had little opportunity – until he retired to London – to work at the research fronts then opening for European scientists in radioactivity, X-ray crystallography and organic and physical chemistry. His empirical studies in geochemistry were not popular and did not find theoretical closure in his lifetime. Indeed, only recently have some of his early conjectures about ore genesis been widely confirmed (Butt and Hough, 2007). Other far-sighted proposals of his; the introduction of the metric system, the establishment of a federal Academy of Science, and the founding of an Australian equivalent of *Nature*, were to be many years in coming.

Still, Liversidge's record speaks for itself. When he arrived, there were over a dozen seldom-communicating scientific societies scattered throughout Australia and New Zealand, and colonial governments lacking in commitment to research and technical education. By the time he departed, there was a collective commitment to scientific cooperation on a national basis, and a commitment to science and

engineering in higher and further education (MacLeod 2009). At Sydney University his struggles produced a curriculum and laboratory equal to any in the Empire. When Liversidge arrived there were perhaps twenty-five students each year studying chemistry in an over-crowded, ill-ventilated room. When he left there were nearly 400 students whose education included chemistry, with seven lecturers, a set of laboratories and lecture rooms and a thriving community of scholars across the city. His London training found its reward in the establishment of the University's School of Mining and Metallurgy, conceived in 1892 along lines that were to rival the RSM. For years the School was to be the 'backbone' of the Faculty of Science; in 1901, 106 of the Faculty's 118 students were in engineering and most of these studied mining engineering (Fig. 5). Regrettably, with the passage of years, this – among Liversidge's greatest achievements – has been largely forgotten (MacLeod, 1995a).

We hope that Sydney University, in rewriting its history, will remember Liversidge's service to the community and to the community of science. In this lay perhaps his greatest gift to Australia – an abiding sense of *fraternity. Frater ave atque vale* (David 1930, xiv).

DAVID, THE STATESMAN

David's life in science played out in two parallel dimensions: (a) as a university figure, where he cut a leading figure in geology, in the Faculty of Science and in other academic activities; (b) and as a statesman of science, influencing both government and industry in the support of scientific endeavours (including the Funafuti expeditions, the Antarctic expeditions of Shackleton, Scott, Mawson, the Japanese and Amundsen. During the First World War, David patriotically served with former mining and civil engineering students in the Australian Tunnellers Corps on the Western Front (Branagan 1987, 2005) (Fig. 6). Near the end of his life, he helped score a signal success for science in the opening of Science House, a place that was to be a home for the Royal Society and kindred bodies, which today remains a vision still waiting to be fulfilled.

Figure 6. Edgeworth David (on left) and Professor James Pollock en route to Europe with the Australian Tunnellers.

David's background was comfortably middle class. His undergraduate days at Oxford were devoted mainly to classics and history, and geological studies were peripheral to his curriculum. However, he was greatly influenced by the eccentric John Ruskin (1819–1900), who in-

cluded material on landscape and geology in his lectures, and by Joseph Prestwich (1812–1896), a successful businessman who was appointed Professor of Geology at the age of 62, and who gave an optional course. Prestwich recognised David's interest and potential, and encouraged him to do field work around his home in Wales. Others who influenced David's future in science were his relative William Ussher (1849–1920), who worked for the British Geological Survey, and Dr Charles Vachell (1848–1914) of Cardiff. All three probably recommended that he attend courses at the Royal School of Mines in London, at which he enrolled in 1882.

As it happened, David was to be at the RSM for only six months. The Geological Survey of New South Wales had literally lost a member, Henry G. Lamont Young (1851–1880), who had mysteriously vanished while examining a new goldfield near Bermagui on the south coast of the colony (Branagan & Packham 2000, p. 319; Anon 1980). When the British geological establishment was asked to recommend a replacement, Professor J.W. Judd (1814–1916) and others had no hesitation in recommending the relatively untried twenty-four year-old David for the job. Although lacking experience, David had published one paper on the glacial features around Cardiff, and had two more papers in the pipeline. What's more, the young man had led a field trip for the local Naturalists' Society. David had little hesitation in accepting the offer, and knowing he had no practical knowledge of mining, raced off for a couple of weeks to examine the geology and tin mines of Cornwall. In late 1882, David was farewelled by his close family, wondering if they would ever see him return from 'the other side of creation'. He arrived in Sydney in November 1882, having met on board ship a fellow passenger, Caroline Mallett, who would later become his wife.

Although David's nine years in the Geological Survey of NSW are often underplayed, they were vitally important in many ways. His appointment to the Survey was the first of a university graduate, and his qualifications, or lack of them, did not go un-noticed. One colonial parliamentarian sniffed that the Survey did not need 'university toffs', and some officials wondered whether he had the physique to withstand the rigours of the Australian bush. Perhaps David had a hint of these feelings, but was determined to prove his mettle.

The remarkable story of his successes in the Survey can be briefly summarised. His short first job, collecting fossils around Yass and recording their stratigraphic position for display at an exhibition in Amsterdam, showed how rapidly he adapted to the new field of palaeontology, which remained an interest for the remainder of his life. Then it was off to the New England highlands of NSW, where he studied the distribution and mining of tin. Here, he proved himself not only an able geologist, but also a successful bushman, able to live with working miners and 'aristocratic' squatters. The results of his work, published in the Survey's first Monograph, enhanced the reputations of both David and the Survey (David 1887).

David's studies of coal in the Hunter Valley (David 1907), which led to a new and important coalfield, were interrupted by rushed visits to Sydney to woo and marry Miss Mallett. Soon, his work became known among both politicians and commercial men. In 1885, David's interest in glacial events was revived by R.D. Oldham (1858–1936), another RSM man from India, who visited the Hunter region with David, and who recognised evidence of glacial action that was many millions of years old, well before the great coal-forming events that David had recorded. This late Palaeozoic glacial event was to feed David's imagination, and his studies of it were to make his name in international circles (David 1896, 1906).

By 1890, David's reputation was firmly established. In addition to his Survey work he was involved in the examination of students at Sydney University and at the Sydney Technical College, which Liversidge had helped establish. A turning point in his life came in November 1890, with the sudden death of William John Stephens, the sixty-one year old Professor of Natural History (including Geology). As in the appointment of Liversidge and all other Sydney professors, the University's Senate turned natu-

rally to 'Home' for a replacement. By this time, however, the world had changed, and there was apparently enough choice, so the position was advertised internationally. David's boss, the Government Geologist, Charles Wilkinson was ailing, and although only thirty-three, David was clearly in line for this prestigious and well-paid post. However, David wanted to work on research problems that could not be solved amidst the many calls made on his time by the Survey. Accordingly, he threw his hat into the ring for the chair, which had been redesignated as Geology and Physical Geography.

The story of his appointment is well-known. From a field of twenty or more, the 'Home Committee' selected William J. Sollas (1849–1936), then at Trinity College, Dublin, and very well qualified for the position. In Sydney, however, the University's Senate demurred. David had been an examiner for the University in 1890, and had given the geology lectures in the first term of 1891. These were well received by students, and many members of Senate seemed to feel that someone well-acquainted with the local geology and colonial community might be a better bet than someone coming fresh from Britain. Consequently, the Senate 'thumbed its nose' at the 'Home' committee, and appointed David. His early success as a lecturer soon justified their decision. His name became a byword among Sydney students. His course was required for all first year students in Arts, and in later years, it became a badge of honour to have been a 'student of Professor David'.

The beauty of David's lectures was that, although linked to a printed syllabus, they embraced subjects likely to attract the interest of the young. David had the 'gift of the gab', which he combined with an ability to maintain discipline, a skill sadly lacking in Liversidge. One of David's first innovations was the introduction of field trips, which he believed were essential to an understanding of geology. This radical move quickly became an accepted part of departmental activities. Only four weeks after his first lecture, David took a group of beginning students to examine the coastal cliffs at Coal Cliff, fifty km south of Sydney. In an operation that today would draw the condemnation of Health and Safety bureaucrats, David had his students negotiate a steep, slippery path from the railway, nearly to sea-level, and, equipped with lighted candles, explore an operating coal mine. His longer field trips with senior students to the Hunter Valley sought to uncover new facts, and on more than one occasion there was opportunity to dig and determine whether the 'Prof' had got it right when he predicted a coal seam not far below the surface. Geology was not a dry science for David, or for those who studied with him.

This romantic view of science was reinforced for the general Australian public when David and several students (W.G. Woolnough (1876–1958) and W. Poole (1868–1928) sailed to Funafuti to test Darwin's theory of coral atoll formation. (MacLeod, 1998a; Branagan, 2005). From this work came election as an FRS in 1900. His profile was further enhanced when, without University permission, he remained with Shackleton's expedition (1907–1909) after reaching Antarctica, and led several expeditions, one life-threatening, which became an Antarctic legend. David topped this by becoming the innovator of the Australian Tunnellers Corps in 1915, and taking a leading role in British geology on the Western Front. Not even his former student, Douglas Mawson, famous for his pre-war Antarctic exploits, managed to have his scientific skills harnessed so successfully for war service (MacLeod, 1988c.).

Although David spent much time away from the University in these years, he still managed to exert significant influence on academic affairs. He was a strong supporter of Liversidge's educational ambitions, and offered his continuing support for intercolonial science through his very long association with the Australasian Association for the Advancement of Science (AAAS). While still merely a Geologist for the New South Wales Geological Survey, as yet relatively little known, his name appears in the records of the Association's first meeting, which took place in 1888 in Sydney, where he presented three papers and helped lead a four-day excursion to the Jenolan Caves. Liversidge presented only one paper – concerning the 'Proposed Chemical Laboratory at Sydney

University' – which he accompanied with twelve detailed plates (Liversidge 1888b).

In 1904, David delivered his first Presidential Address to the AAAS ('The Aims and Ideals of Australasian Science'), and was a member of many Research Committees (David 1904). His address was a successor to a lecture on 'University Science Teaching' that he had delivered at Sydney University on 3 October 1902 (David, 1902), and moved from the experience of one university to a broader vision of science in the new nation as a whole (David 1904, p.4).

A 'FINAL' HOME FOR SCIENCE

David had a way with politicians and administrators, learnt early during his time in the NSW Department of Mines. However, it was Liversidge – the arch-organiser and administrator – who scored greater goals with the political leadership of New South Wales (MacLeod, 2001, 2009). For our purposes, it will suffice to remind the reader that Liversidge played a large part in re-establishing the Royal Society of New South Wales, and in finding a suitable building for its library and meetings in Elizabeth Street, Sydney. But Liversidge had greater ambitions, and sought to bring about a single home for all the sciences, and for the members of all the colony's scientific societies.

In his 1890 Presidential Address to the Royal Society of NSW, Liversidge expressed his hope of seeing in Sydney a 'modest edition of Burlington House, Piccadilly, which had been built by the Imperial government to lodge learned societies' (Liversidge 1890). In 1895, Liversidge and David acquired land adjacent to the Society's building in Elizabeth St, and made further acquisitions in 1905. The Engineering Association of New South Wales and the Institute of Architects rented rooms, as did the Institution of Surveyors and the Dental Association of New South Wales. Liversidge's return to England in 1908, and the coming of the First World War interrupted plans for a new site. However, in 1922, when the Society's premises were again enlarged and other scientific societies became tenants, the Governor of NSW, Sir Walter Davidson (1859–1923), a former school classmate of David, pushed for the construction of a 'Science House' – perhaps as close as Sydney could come to a version of 'Solomon's House' in Francis Bacon's utopian *New Atlantis*.

David played almost no part in the practicalities of the project, as he was overseas during the mid-1920s when negotiations took place between the three societies (the Royal, the Linnean, and the Institution of Engineers) and the NSW State government. On his return to Australia, his attention was interrupted by a search for Precambrian fossils in South Australia, and poor health diminished his interest. However, as a Council member of the Royal Society of NSW, he was always supportive, and spoke at several early Science House meetings. In his obituary of Liversidge for the Royal Society of London, David (1930) recalled his colleague's foresight in acquiring the Elizabeth St. site:

'*This building has quite recently been sold and the Royal Society of New South Wales, the Linnean Society of New South Wales and the Institute [sic] of Engineers, Australia, are sharing equally between them the cost of the erection of a building to be called Science House. The housing under one roof of the libraries of the Royal and Linnean Societies of New South Wales [the Engineers' library was forgotten!] will be a great boon to scientific workers in that State [and so it proved for some fifty years]. This creation of a sort of Burlington House, on a small scale, for Sydney was one of Liversidge's ideals, to the realisation of which his foresight contributed not a little.*'

In 1925, when David was preparing to travel to England to 'complete and publish' his *Geology of the Commonwealth*, the project at last took off. The Royal Society of NSW invited the Linnean Society and the Institution of Engineers Australia to join an Executive Committee, which made a formal approach to the State Government for assistance 'in the shape of a site for the erection of Science House' (Vonwiller 1931, p. 3). On 28 July 1927, the Premier, J.T. Lang, authorised a grant of land on the corner of Essex and Gloucester Streets. The next State Government endorsed his action, and the 'Science House (Grant) Act' was passed on 16 June 1928. In the expectation of quick construction the Royal Society's house at 5 Elizabeth Street was sold in October 1927. A

design competition was won by the firm of Peddle, Thorp & Walker in 1928; tenders were received in December 1929; and construction began on 7 March 1930. The foundation stone was laid on 24 June 1930. Once building began, the Institution of Engineers plotted its progress (Anon. 1930a,b; 1931 a, b, c). In 1932. the new building won a well-deserved Sulman Award for Architecture (Fig. 7).

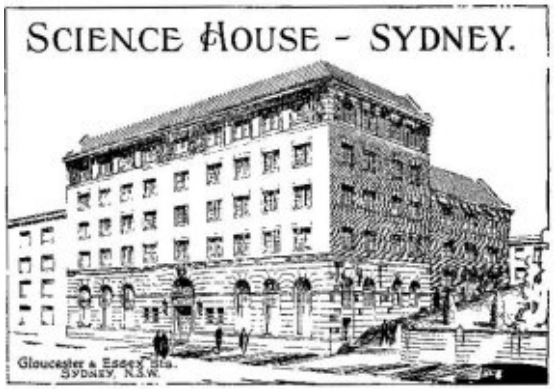

Figure 7. Sketch of Science House, Sydney.

The Royal Society's Annual General Meeting of 6 May 1931 – the day preceding the official opening of Science House – was the first held there by the Society. Co-incidentally, it was also the Society's 500th General Meeting, and marked the beginning of the Society's 75th year. In his Presidential Address, O.U. Vonwiller picked up on what David had written about Liversidge, and recounted the history of the long move to Science House, so that both the 'Architect' and the 'Statesman' were suitably remembered. They were soon to be remembered anew by the establishment of lectures (and medals) in their names. The bachelor Liversidge had not forgotten Australia at his death, and left a number of legacies: to the Royal Society, to the University of Sydney and to the AAAS, (which became ANZAAS). The first Royal Society 'Liversidge Lecture' was given in Science House on 24 September 1931 by Harry Hey, of the Electrolytic Zinc Co, Tasmania (Hey, 1931). The first ANZAAS Liversidge lecture was given on June 1930 by the West Australian chemist, Professor N.T. Wilsmore, the topic being 'Chemistry in its Relation to the State'. The first of the University of Sydney Liversidge Research Lectures – entitled 'Research in its relation to the University', and 'Some Problems in Carbohydrate Research' – were delivered in 1931 by Prof A. Killen Macbeth, an organic chemist from Adelaide University. The same year also saw the appointment of the first two Liversidge Research Scholars. The first David Lecture, sponsored by the Australian National Research Council (ANRC), and continued by ANZAAS, was given in Science House in November 1933 by E.W. Skeats (Skeats 1934), David being present.

But it is time to leave the story. By 1933, the 'Architect' had long departed, and the 'Statesman' would be nationally mourned less than a year later. In the midst of the Great Depression, the Royal Society of NSW faced many challenges – as Vonwiller put it: '*in common with the rest of the country, . . . difficulties of an abnormal kind.*' In August 1930, the State Government's subsidy, essentially for the *Journal*, was cut from £č400 to č200, [it was never restored to its former level].

With great foresight, Vonwiller saw:
'*. . . the time has come when we must review our position in view of altered conditions, and, if necessary, make changes, perhaps radical changes, in our methods, if we are to maintain our position and extend our influences and usefulness.*' (Vonwiller, 1931).

Vonwiller's message would reverberate through the Royal Society's meetings for the next eighty years. But in 1932, there were signs of hope. The opening of Science House coincided with the completion of the Sydney Harbour Bridge, designed by one of David's great friends, John Job Crew Bradfield (1867–1943), engineer and long-time member of the Royal Society of New South Wales. Today, the Bridge stands as an icon of Sydney, and of Australia, and as an emblem of the power of science and engineering. And today there are fresh signs that Science House – after thirty years of alternative use – may soon be restored to science. This is certainly a consummation devoutly to be wished. Should current discussions now succeed, a revived Science House will become for future generations a fitting, and, we hope, lasting tribute to Archibald Liversidge and Edgeworth David –

architect and statesman – and to their vision for the future of science and the scientific community in New South Wales.

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