

Liversidge Research Lectures

Compiled and edited by David Collins



The Royal Society of New South Wales

INTRODUCTION

1. Archibald Liversidge 1847-1927

Archibald Liversidge, who became the second Professor of Chemistry at the University of Sydney (his Chair was actually 'Chemistry and Mineralogy'), was a very important figure in the Australian scientific community in the late 1800s and early 1900s. It was mainly through the initiative and drive of Liversidge that the Australasian Association for the Advancement of Science (AAAS) was established in 1885, and held its first Meeting in Sydney in Australia's centenary year, 1888. In 1930 the AAAS became ANZAAS, the Australian and New Zealand Association for the Advancement of Science, an organization that continued to be an important forum for the public presentation of Australian and New Zealand science into the 1980s. Liversidge raised the profile and standard of chemistry in Australia, and he became a Fellow of the Royal Society in 1882. Another indicator of his international prestige is that between 1894 and 1900, no less than ten of his papers originally published in the *Journal and Proceedings of the Royal Society of N.S.W.* were re-printed in full in *The Chemical News and Journal of Physical Science*, an interesting periodical which was established in 1859 by Sir William Crookes, and continuously edited by him until just before his death in 1918.

Four of the obituaries published in scientific journals soon after the death of Liversidge in 1927,¹⁻⁴ and several other biographical articles,⁵⁻⁸ are listed below. Several other such articles are cited in a comprehensive, detailed biography of Archibald Liversidge written recently by Professor Roy MacLeod, University of Sydney.⁹ The reader is referred to sources 2-9, but it is appropriate to quote here in full the obituary of Liversidge that was published soon after his death in the *Journal and Proceedings of the Royal Society of N.S.W.*, the vehicle through which the Lectures reproduced in this book have been preserved. It was traditional for the President of the Royal Society of N.S.W. to include in the annual Presidential Address a short biographical memoir of each of the Society's members who had died in the previous year. In his Presidential Address delivered to the Society on 2 May, 1928, Professor J. Douglas Stewart, B.V.Sc., M.R.C.V.S., summarized the scientific career of Archibald Liversidge as follows:¹

ARCHIBALD LIVERSIDGE, M.A., LL.D., F.R.S., elected member 1872, and Honorary Member 1908, died 26th September, 1927, in his 80th year. Professor Liversidge was born at Turnham Green on November 17th, 1847, and received his first instruction in science from private tutors. In 1866 he entered the Royal College of Chemistry and the Royal School of Mines, at which, in the following year, he won a Royal Exhibition and medals in Chemistry, Mineralogy, and Metallurgy. In his first year at the Royal College of Chemistry he was placed in charge of the chemical laboratory at the Royal School of Naval Architecture for one term, during the illness of the lecturer, and published his first paper on "Supersaturated Saline Solutions". Professor Frankland was his teacher at the College of Chemistry, and at the School of Mines, the associateship of which he

obtained in 1870, his teachers were Professor Tyndall in Physics, Sir Andrew Ramsay in Geology, Sir W. Warington Smyth in Mineralogy and Mining, Professors Willis and Goodeve in Mechanics, and Dr. Percy in Metallurgy. As a senior student he also did research work in Dr. Frankland's private laboratory. In 1870 Liversidge was elected to an open scholarship in Science at Christ's College, Cambridge. He was one of the first two students in the physiological laboratory just started by Professor Michael Foster, and during his first year at Cambridge he held the post of Demonstrator in Chemistry at the University Laboratory for two terms in the absence of Dr. Hicks.

Liversidge thus seemed destined to a career of high distinction at Cambridge, but in 1872, before he was 25, he accepted the Chair of Chemistry and Mineralogy* in the University of Sydney, N.S.W. He came out in September, 1872, and from that time till his retirement with the title of Emeritus Professor, in December, 1907, his services to science in Australia were of much value. Chief among them was the founding of the Australasian Association for the Advancement of Science in 1885 as a centennial record of the progress of the colonies, and of which he was Hon. Secretary for many years and President 1888-1890. In 1874 he was made a trustee of the Australian Museum at Sydney, and during visits to Europe, America and the East brought together the greater part of its non-Australian mineral and geological collections. Of the Royal Society of New South Wales he was Hon. Secretary for 13 years, 1874-1884, and 1886-1888, and served three terms of office as President, 1885, 1889, 1900, being also for many years the editor of the Society's Journal. He originated the Faculty of Science at the Sydney University, 1879, and was Dean till 1904, and also a member of the Senate. He founded the School of Mines in that University in 1890, also the Sydney section of the Society of Chemical Industry in 1902, and was the first Chairman. He was a member of the original board of three of the Sydney Technological Museum and of the first Board of Technical Education in Sydney. Professor Liversidge made a chemical investigation of the Sydney water supply for the Government in 1876. In 1888 he published a survey of the minerals of New South Wales, and he was the author of over 100 papers and researches published by the Royal Society, the Chemical Society, and the Royal Society of New South Wales.

Professor Liversidge was elected a Fellow of the Royal Society of London as far back as 1882, and he was also also an Honorary Fellow of the Royal Society of Edinburgh, Vice-President of the Chemical Society, 1910-13, and of the Society of Chemical Industry, 1900-12, a member of the Cambridge Philosophical Society, the Physical Society of London, the Mineralogical Societies of Great Britain and France, and a member or corresponding member of various colonial and foreign scientific societies. He was Hon. LL.D. of Glasgow University. Truly a wonderful record in the cause of Science. To the Royal Society of New South Wales he was much attached, and his last service was to bequeath to it all his medals and

* This is not quite correct: Liversidge's original appointment at the University of Sydney in 1872 was as 'Reader in Geology and Assistant in the Laboratory' under Professor John Smith who was the foundation Professor of Chemistry and Experimental Philosophy. Liversidge was promoted to the newly established Chair of Geology and Mineralogy in 1874. In 1882 Smith relinquished the Chair of Chemistry, while retaining the Chair of Experimental Philosophy (Physics), and Liversidge's Chair became Chemistry and Mineralogy. Liversidge retired from his Chair at the University of Sydney in 1907, and returned to England where he remained actively involved in chemical research and scientific affairs.

diplomas, together with a sum of £500 to found a Research Lectureship in Chemistry.

In his history of the Royal Society of New South Wales, Mr. J. H. Maiden wrote: "We owe the acquisition of this House to the Council of the day, and especially to the then two honorary secretaries, Professor Liversidge and Dr. Leibius, but the principal driving power was that of Professor Liversidge, who worked whole-heartedly for the advancement of the Society from the very day he became a member of it." Mr. Maiden quotes Dr. Leibius as saying "We never got a move on till Liversidge came." (This *Journal*, Vol. L11., 1918.)

Among the many scientific publications of Liversidge is his very impressive monograph 'The Minerals of New South Wales, etc.', Trubner & Co. Ludgate Hill, London, 1888, that was published in that year to coincide with the centenary of the colony of New South Wales. This book is now relatively rare, and a collector's item.

2. The Liversidge Bequest

At the Annual Meeting of the Royal Society of New South Wales held on May 2, 1928, with the President Professor J. Douglas Stewart in the chair, the details were revealed of bequests made to the Society, and other scientific bodies in the will of Professor Archibald Liversidge. This information was reported in the 'Abstract of Proceedings'¹⁰, and is reproduced below:

An intimation has been received that the late Professor Archibald Liversidge made a bequest to this Society as set out in the following extract from the Will dated 16th, August, 1925:-

9. (A) I BEQUEATH five hundred pounds to each of the four following Institutions, namely, The University of Sydney aforesaid, The Royal Society of New South Wales, Sydney, aforesaid, The Australasian Association for the Advancement of Science, Sydney, aforesaid, and The Chemical Society of London, to found a Research Lectureship in Chemistry in connection with each of these Institutions.

(C) AND I DECLARE that the bequests made by this Claim are not intended to supplement the emoluments or add to the duties of any member of the ordinary or permanent teaching staff of any institution (including the said College) mentioned in this Clause.

10. I make the above bequests for the encouragement of research in Chemistry not in ignorance of the fact that there are already in existence other Lectureships in Chemistry but because there are none such as I contemplate, namely, for the express encouragement of research and for the purpose of drawing attention to the research work which should be undertaken and because having regard to the vastness of the subject I wish the subject to be elucidated by as many workers as possible and feel

that the friendly emulation of the lecturers holding the various lectureships above-mentioned may be of benefit.

11. I DIRECT that the lectures to be given by the persons holding the said Lectureships respectively shall not be such as are termed popular lectures dealing with generalities and giving mere reviews on their subjects nor such as are intended for the ordinary class or lecture room instructions of undergraduates but shall be such as will primarily encourage research and stimulate the Lecturer and the public to think and acquire new knowledge by research instead of merely giving instruction in what is already known AND I DIRECT that the Lecturers appointed shall be the most suitable and eminent men procurable in their respective branches of knowledge.
12. I HEREBY lay down the following rules in connection with the said Lectureships, not with the intention of imposing any legal and binding restrictions or obligation in regard thereto, but merely as an indication of my wishes --
 - (a) NO lecturer shall hold office for more than one year but after intervals of two or more years during which time he shall not have held any of the Lectureships founded under this my Will in any of the said Institutions he may be re-appointed from time to time if then still considered by the Institution the most suitable person obtainable.
 - (b) The remuneration paid to each Lecturer shall not be less than Ten pounds nor more than Twenty-five pounds for each lecture delivered by him and if the annual income of the Lectureship is insufficient the lectures can be given in alternate years.
 - (c) The number of lectures in each course shall ordinarily be one or more but not more than three.
 - (d) If possible the Lectures shall be delivered in the evening at the Institution receiving the legacy to found the lectureship and if that Institution does not itself possess a sufficiently large room then in some other suitable and conveniently situated building.
 - (e) The lecture hall (under suitable regulations) be open to the public free or at a nominal fee to cover incidental expenses such as the hire of the hall.
 - (f) If possible the lecture shall be published in a cheap form so as to disseminate the information for the benefit of such of the public as are unable to attend and the Lecturer shall in every case be required to present to the Institution concerned a correct and complete copy of his lectures for the above purpose.
 - (g) The Lectures shall be upon recent researches and discoveries and the most important part of the Lecturer's duty shall be to point out in

which directions further researches are necessary and how he thinks they can best be carried out.

- (h) If for any reason the whole of the interest on any of the above bequests cannot be utilised as above prescribed in any year or years the unexpended part thereof shall be invested and added to the sum originally bequeathed.
- (i) Christ's College, Cambridge, may in their discretion arrange for their lectures to be delivered during the meetings of the Summer School for Teachers in the long vacation.
- (j) The said Institutions may appoint delegates to form committees or confer by correspondence to carry out all or any of the above objects with a view to preventing overlapping and generally carrying out my intentions in regard to the said lectures.

13. I DECLARE as follows:-

- (i) In the case of any infant legatee under this my Will or any Codicil hereto my Trustees in their absolute discretion may pay his or her legacy to any parent, guardian or guardians of his or hers and the receipt of any such parent, guardian or guardians shall be a completed discharge to my Trustees for the legacy.
- (ii) In the case of any Institution, College, Society or, body (whether or not incorporated) to which or to whom any legacy or property is bequeathed or given by this my Will or any Codicil hereto the receipt of the Secretary, Treasurer, Bursar or any other officer for the time being of such Institution, College, Society or body shall be a complete discharge to my Trustees for the said legacy or property and shall free them from all further concern with the trusts or application thereof.
- (iii) THE foregoing legacies and annuities shall rank and be satisfied in the following order of priority that is to say **FIRST** the said specific legacies and annuities bequeathed by Clauses 3, 4, and 6 hereof with the death duties in respect thereof; **SECONDLY** the pecuniary legacies bequeathed by Clauses 5 hereof with the death duties in respect thereof (all ranking *pari passu inter se*), and **THIRDLY** the pecuniary legacies bequeathed by Clauses 7, 8, and 9 hereof with the death duties in respect thereof (all ranking *pari passu inter se*).

References

1. Stewart, J.D., Presidential Address to the Royal Society of N.S.W., biographical memoir of Archibald Liversidge, M.A.,LL.D., F.R.S., *J. Proc. Roy. Soc. N.S.W*, 1928, **62**, 8-10.

2. David, T.W.E., 'Archibald Liversidge - 1847-1927', *Proc. Roy. Soc. (London), Series A*, 1930, **126**, xii-xiv.
3. David, T.W.E., 'Archibald Liversidge: Born November 17th, 1846; Died September 26th, 1927', *J. Chem. Soc. (London)*, 1931, 1039-1042.
4. David, T.W.E., 'Prof. A. Liversidge, F.R.S', *Nature*, 1927, **120**, 625-6.
5. Mellor, D.P., 'Founders of Australian chemistry: Archibald Liversidge', *Proc. Roy. Aust. Chem. Inst.*, 1957, **24**, 415-421.
6. Le Fèvre, R.J.W., 'The Establishment of chemistry within Australian Science', in *A Century of Scientific Progress: The centenary volume of the Royal Society of New South Wales*, published by the Society, Sydney (n.d., 1968), pp. 332-378.
7. Mellor, D.P., 'Liversidge, Archibald (1846-1927)', *Australian Dictionary of Biography*, 1974, **5**, 93-94.
8. Branagan, D. and Holland, G., 'Ever Reaping Something New: A Science Centenary', University of Sydney Science Centenary Committee, 1985, pp. 34-47.
9. Macleod, R., 'Imperial Science under the Southern Cross: Archibald Liversidge, FRS and the Culture of Anglo-Australian Science', unpublished manuscript (as at July, 2000), personal communication.
10. 'Abstract of Proceedings', *J. Proc. Roy.Soc. N.S.W.*, 1928, **62**, pp. x-xiii.

THE FIVE SERIES OF LIVERSIDGE LECTURES

Since 1928 the Liversidge bequests have funded three series of Liversidge Lectures in Australia and two series in the United Kingdom.

1. The Three Australian Series

The three Australian institutional beneficiaries of the Liversidge Will were the Royal Society of New South Wales, the University of Sydney, and the Australasian Association for the Advancement of Science (AAAS) that in 1930 became the Australian and New Zealand Association for the Advancement of Science (ANZAAS). To coordinate the establishment of the three Australian Lectureships the three organizations appointed a Joint Committee which agreed that the University of Sydney and the Royal Society of New South Wales 'should each appoint Liversidge Research Lecturers in alternate years, and that the Australasian Association for the Advancement of Science should appoint a lecturer for each of its meetings.'¹

The University of Sydney (Department of Chemistry) series began in 1930 with a lecture by Professor Alexander Killen Macbeth who only two years earlier had arrived in Australia to take up his appointment as the second Angas Professor of Chemistry at the University of Adelaide.² The first ANZAAS Liversidge Research Lecturer (1930) was Professor Norman Thomas Mortimer Wilsmore who had been appointed in 1913 as the Foundation Professor of Chemistry in the University of Western Australia.³ The honour of presenting the first Liversidge Research Lecture in the Royal Society of New South Wales series was not awarded to an academic, but to an industrial chemist, Mr. Harry Hey. At the time of his lecture in 1931 Hey was Chief Metallurgist at Electrolytic Zinc Co. Australasia Ltd.; he later became Managing Director (1947), and then Chairman of the Company in 1952. Hey was a very worthy recipient of the Liversidge Lectureship. His selection might have been partly due to the influence of Professor David Orme Masson who in 1923 had retired from his Chair of Chemistry at the University of Melbourne, and in the late 1920s had become a consultant to 'EZ'; Masson would have had intimate knowledge of the internationally acclaimed research at 'EZ' that had solved problems encountered in the large scale electrolytic production of zinc.⁴

The second lecturer in the Royal Society of New South Wales series was Professor William John Young, the Foundation Professor of Biochemistry at the University of Melbourne; the third was George Joseph Burrows, Senior Lecturer in Chemistry at the University of Sydney. In the ANZAAS series the second lecturer (1932) was Professor A.C.D. Rivett who in 1924 had succeeded Masson in the Chair of Chemistry at the University of Melbourne; ⁵ Masson himself was the third Liversidge Lecturer in this series (1935). In 1934 Professor T.G.H. Jones,⁶ University of Queensland, was the second Liversidge Lecturer in the University of Sydney series. So in the first few years of the existence of the three Australian series of Liversidge Research Lectureships, Professors of Chemistry from the Universities of Adelaide, Melbourne, Queensland and Western Australia had been recipients of the awards, but neither Charles Edward Fawsitt, Professor of Chemistry at the University of Sydney (1909-1946)⁷, nor John Campbell Earl, Professor of Organic Chemistry, Pure and Applied, University of Sydney (1928-1947)⁸ were Liversidge Lecturers in any of the three Australian series. As it transpired, it was about 30 years before a Professor of Chemistry at the University of Sydney was awarded the Liversidge Lectureship; that honour came to Professor R.J.W. Le Fèvre, who alluded to this

fact in the introduction of his 1960 Lecture in the Royal Society of New South Wales series.

John Stuart Anderson is unique in having given a Liversidge Lecture in each of three different series: his first was in the Royal Society of New South Wales series in 1942 when he was a Senior Lecturer at the University of Melbourne; the second was in the Royal Society of Chemistry series in 1963, the year in which he accepted the invitation to the Chair of Inorganic Chemistry at Oxford; and the third was in 1984 in the ANZAAS series after his formal retirement, and while he was a Visiting Fellow at the Research School of Chemistry, Australian National University - his age was then 76. A. Albert, G.M. (Sir Geoffrey) Badger, R.D. Brown and L.E. Lyons were each awarded Liversidge Lectureships in both the Royal Society of New South Wales series, and the ANZAAS series.

(a) The Royal Society of New South Wales Series 1931-2000

A sequential list of the 32 Lecturers and the lecture titles in this series of Liversidge Research Lectures, the subject of this volume, is given above in the Table of Contents.

(b) The ANZAAS Series of Liversidge Research Lectures 1930-2000

1. 1930 **Wilsmore, N.T.M.**, 'Chemical Research and the State', *Australian and New Zealand Association for the Advancement of Science Report*, 1930, **20**, 546-569 (Brisbane Meeting).
2. 1932 **Rivett, A.C.D.**, 'Electrolytic Conduction in Aqueous Solutions,' *ibid.*, 1932, **21**, 420-431 (Sydney Meeting).
3. 1935 **Masson, D.O.**, 'Crucial Advances in Chemical Theory During the Last Half Century,' *ibid.*, 1935, **22**, 439-451 (Melbourne Meeting).
4. 1937 **Rigg, T.** (New Zealand), 'Soil Deficiencies in New Zealand', *ibid.*, 1937, **23**, 401-422 (Auckland Meeting).
5. 1939 **Denham, H.G.** (New Zealand), 'Modern Developments in the Industrial World', *ibid.*, 1939, **24**, 350-365 (Canberra Meeting).
6. 1946 **Albert, A.**, 'What Can Chemistry Contribute to the Mastery of Disease', (the Liversidge Centenary Lecture), *ibid.*, 1946, **25**, 324-343 (Adelaide Meeting).
7. 1947 **Heymann, E.**, 'Potentials at Interfaces', *ibid.*, 1947, **26**, 303-316 (Perth Meeting).
8. 1949 **Penfold, A.R.**, 'The Volatile Oils of the Australian Flora', *ibid.*, 1949, **27**, 161-172 (Hobart Meeting).
9. 1951 **Mellor, D.P.**, 'Some Recent Developments in the Chemistry of Metal Complexes', *ibid.*, 1951, **28**, 131-142 (Brisbane Meeting).
10. 1952 **Price, J.R.**, 'Recent Developments in the Study of Australian Plant Products', *ibid.*, 1952, **29**, 67-80 (Sydney Meeting).

11. 1954 **Alexander, A.E.**, 'Surface Chemistry in the Service of Man', *ibid.*, 1954, **30**, 80-88 (Canberra Meeting).
12. 1955 **Shortland, F.B.** (New Zealand), 'New Trends in Fats Research', *ibid.*, 1955, **31**, 49-62 (Melbourne Meeting).
13. 1957 **Stokes, R.H.**, 'Molecular Hydrodynamics: The Diffusion of Molecules and Ions through Liquids', *Aust. J. Sci.*, 1957, **19**, P35-P41 (Dunedin Meeting).
14. 1958 **Badger, G.M.**, 'Activated Metal Catalysts in Organic Syntheses', *Aust. J. Sci.*, 1958-59, **21**, P45-P51 (Adelaide Meeting).
15. 1959 **Dwyer, F.P.**, 'The Future of Inorganic Chemistry in Biology', *Aust. J. Sci.*, 1959-60, **22**, 240-247 (Perth Meeting).
16. 1961 **Brown, R.D.**, 'Electronic Structure and Chemical Reactivity', *Aust. J. Sci.*, 1961-62, **24**, 22-26 (Brisbane Meeting).
17. 1962 **Cole, A.R.H.**, 'Some Aspects of Infrared Spectroscopy and Molecular Structure', *Aust. J. Sci.*, 1962-63, **25**, 225-234 (Sydney Meeting).
18. 1964 **Newnham, I.E.**, 'The Chemical Challenge of the Heavy Beach Sands', *Aust. J. Sci.*, 1963-64, **26**, 329-334 (Canberra Meeting).
19. 1965 **Angyal, S.J.**, 'Conformations of Molecules in Solution', *Aust. J. Sci.*, 1965-66, **28**, 173-178 (Hobart Meeting).
20. 1967 **Swan, J.M.**, 'Making and Breaking Chemical Bonds', *Aust. J. Sci.*, 1966-67, **29**, 435-441 (Melbourne Meeting).
21. 1968 **Wilson, A.T.** (New Zealand), 'The Chemistry Underlying the Phosphate Problem in Agriculture', *Aust. J. Sci.*, 1968-69, **31**, 55-61 (Christchurch Meeting).
22. 1969 **Whitton, W.I.**, 'Australia's Need for New Chemical Knowledge', *Aust. J. Sci.*, 1969-70, **32**, 263-271 (Adelaide Meeting).
23. 1970 **Sutherland, K.L.**, 'Chemistry in Developing Countries - Necessity or Triviality', *Search*, 1970, **1**, 207-212 (Port Moresby Meeting).
24. 1971 **Stranks, D.R.**, 'Shorter and Shorter Time Periods in Chemistry and Chemical Education', *Search*, 1971, **2**, 239-249 (Brisbane Meeting).
25. 1972 **Bayliss, N.S.**, 'Complexes in Solution', *Search*, 1972, **3**, 376-380 (Sydney Meeting).
26. 1973 **Parker, A.J.**, 'Hydrometallurgy of Copper and Silver in Solvent Mixtures', *Search*, 1973, **4**, 426-432 (Perth Meeting).
27. 1975 **Rickards, R.W.**, 'Chemistry and Microorganisms', not published (Canberra Meeting).

28. 1976 **Lyons, L.E.**, 'Some Photo-Effects in Organic Solids', *Search*, 1976, **7**, 339-345 (Hobart Meeting).
29. 1977 **Solomon, D.H.**, 'Minerals, Macromolecules and Man', *Search*, 1977, **8**, 363-369 (Melbourne Meeting).
30. 1979 **Buckingham, D.A.** (New Zealand), 'The Future of Coordination Chemistry in Biology', *Search*, 1980, **11**, 26-34 (Auckland Meeting).
31. 1980 **Mander, L.N.**, 'The Total Synthesis of Gibberellins', *Search*, 1982, **13**, 188-93 (Adelaide meeting).
32. 1981 **Gerlock M.** (Cambridge), 'The Unique Chemical Relevance of Contemporary Ligand Field Studies', not published (Brisbane meeting).
33. 1982 **Phillips, L.F.** (New Zealand), 'Photochemistry with Lasers', *Search*, 1983, **14**, 13-8 (Sydney meeting).
34. 1983 **Sargeson, A.M.**, 'Organic Cages for Metal Ions', not published (Perth meeting).
35. 1984 **Anderson, J.S.**, 'Demolition, Construction and Alteration: Some Thoughts on Reaction and Processes in Solids', not published (Canberra meeting).
36. 1985 **Healy, T.W.**, 'Molecules on Surfaces - a Central Part of Biological and Technical Science', not published (Melbourne meeting - Monash University).
37. 1987 **Brodie, A.M.**, 'Poised for Action - Lactoferrin, the Iron-Binding Protein from human milk', published as 'Poised for Action - Lactoferrin - the Red Milk Protein', *Chem. N.Z.*, 1990, **54**, 111-16 (Palmerston North Meeting, New Zealand).

[Note: There was no Liversidge Research Lecture at the Townsville meeting of ANZAAS later in 1987].
38. 1988 **Johnston, G.A.R.**, 'Neurochemistry of Anxiety and Stress', not published (Sydney Meeting).
39. 1990 **Pearman, G.I.**, 'The Greenhouse Effect - Interfacing Science and Policy', *Search*, 1990, **21**, 101-106 (Hobart meeting).
40. 1991 **Solomon, D.H.**, 'The Bicentennial \$10 Banknote - Success or failure?', not published (Adelaide Meeting).
41. 1992 **Bond, A.M.**, 'Contribution of Electrochemistry to Science by the End of the 20th Century', not published (Brisbane meeting).
42. 1993 **Alexander, R.**, 'Chemical Fossils: Their Environmental and Geochemical Applications', not published (Perth meeting).

43. 1994 **Volkman, J.**, 'Australia's Offshore Oil, Gas and Mineral Industries in 2020', not published (Geelong, Deakin meeting).
44. 1995 **Selinger, B.**, 'A Matisse for Science', not published (Newcastle meeting).
45. 1996 **Tzotzos, G.**, 'Genetically Engineered Food - Gain or Gamble?', not published (Canberra meeting).
46. 1997 **Phillips, D.** (Imperial College, London), 'Light Relief: Light and Lasers in Medicine', not published (Adelaide meeting). For an earlier version of this lecture see Phillips, D., 'A Little Light Relief: Light and Lasers in Medicine' in *Highlights in Science*, Ed. Messel, H., Pergamon Press (1987), pp. 225-35.

There were no meetings of ANZAAS between 1997 and 2000.

(c) The University of Sydney Series 1930-2000

The Liversidge Research Lectures in this series have been presented in association with the Sydney University Chemical Society. The first two Lecturers were Australian, but since 1938 it has usually been the policy to have eminent overseas chemists as Lecturers in this series. The names of the Lecturers and their institutional addresses at the time of their presentations are listed below, but the Lecture titles were not generally available.

1. 1930 **Macbeth, A.K.** (University of Adelaide)
2. 1934 **Jones, T.G.H.** (University of Queensland)
3. 1938 **Findlay, A.** (University of Aberdeen), 'Chemistry in Space', *JPACI*, 1938, **5**, 401.
4. 1945 **Speakman, J.B.** (University of Leeds)
5. 1949 **Haworth, Sir W.N.** (University of Birmingham), 'Sugar as a Source of Carbon Compounds in Industry' *JPRACI*, 1949, **16**, 145.
6. 1964 **Bailar, J.C.** (University of Illinois)
7. 1975 **Ellis, A.J.** (DSIR, New Zealand)
8. 1976 **Barton, Sir Derek H.R.** (Imperial College, London)
9. 1977 **Figgis, B.N.** (University of Western Australia)
10. 1978 **Rice, S.A.** (James Franck Institute, University of Chicago)
11. 1985 **Cornforth, Sir John W.** (University of Sussex), 'Fifty Years of Chemistry', *Chem. in Aust.*, 1985, **52**, 160.

12. 1986 **White, J.W.** (Research School of Chemistry, Australian National University)
13. 1987 **Davidson, E.R.** (University of Indiana)
14. 1988 **Gray, H.B.** (Beckman Institute, California Institute of Technology)
15. 1989 **Lowe, G.** (University of Oxford)
16. 1992 **Thomas, Sir John M.** (Davy Faraday Research Laboratory, Royal Institution of Great Britain)
17. 1993 **Buckingham, A.D.** (University of Cambridge)
18. 1994 **Taube, H.** (Stanford University)
19. 1995 **Bergman, R.** (University of California, Berkeley)
20. 1996 **Polanyi, J.** (University of Toronto)
21. 1997 **Green, M.L.H.** (University of Oxford)
22. 2000 **Beckwith., A.L.J.** (Australian National University)

2. THE TWO UNITED KINGDOM SERIES OF LIVERSIDGE RESEARCH LECTURES

(a) The Royal Society of Chemistry Series

The Liversidge bequest to what was then the Chemical Society (London) has funded a series of Liversidge Research Lectures from 1928 to the present. The frequency of the awards varied from one to three years until 1955 when it was set as biennial. The first fifteen lectures (1928-1955) were published in the *Journal of the Chemical Society*. The next four lectures (1957-1963) were published in the *Proceedings of the Chemical Society*. The twentieth lecture in this series, the 1965(6) lecture by E.J. Bowen, was published in *Chemistry in Britain*, but since then it appears that publication of the Liversidge Research Lectures has not been a requirement; only five of the next seventeen lectures have appeared in print (*Chemical Society Reviews*).

A complete list of the Royal Society of Chemistry (Chemical Society, London) Lecturers, Lecture titles, and the journal references for those published is given below:

1. 1928 **Donnan, F.G.** 'Physical Chemistry in the Service of Biology', *J. Chem. Soc.*, 1929, 1387-1398.
2. 1929 **Freundlich, H.** 'Surface Forces and Chemical Equilibrium', *J. Chem. Soc.*, 1930, 164-179.
3. 1930 **Bone, W.A.** 'Fifty Years' Experimental Research upon the Influence of Steam on the Combustion of Carbonic Oxide', *J. Chem. Soc.*, 1931, 338-361.

4. 1932 **Aston, F.W.**, 'Physical Atomic Weights', *J. Chem. Soc.*, 1932, 2888-2894.
5. 1935 **Whytlaw-Gray, R.**, 'The Process of Coagulation in Smokes', *J. Chem. Soc.*, 1935, 268-280.
6. 1936 **Paneth, F.A.**, 'Study of Transmutation in the Chemical Laboratory', *J. Chem. Soc.*, 1937, 642-654.
7. 1939 **Hinshelwood, C.N.**, 'Some Considerations on the Nature of Catalysts', *J. Chem. Soc.*, 1939, 1203-1212.
8. 1941 **Sidgwick, N.V.**, 'Complex Formation', *J. Chem. Soc.*, 1941, 433-443.
9. 1943 **Sugden, S.**, 'Magnetochemistry', *J. Chem. Soc.*, 1943, 328-333.
10. 1945 **Rideal, E.K.**, 'Reactions in Monolayers', *J. Chem. Soc.*, 1945, 423-428.
11. 1946 **Urey, H.C.**, 'The Thermodynamic Properties of Isotopic Substances', *J. Chem. Soc.*, 1947, 562-581.
12. 1948 **Pauling, L.C.** 'The Modern Theory of Valency', *J. Chem. Soc.*, 1948, 1461-1467.
13. 1951 **Melville, H.W.**, 'Transient Entities in Chemical Reactions', *J. Chem. Soc.*, 1952, 1547-1556.
14. 1954 **Emeleus, H.J.**, 'Organometallic Compounds Containing Fluorocarbon Radicals', *J. Chem. Soc.*, 1954, 2979-2986.
15. 1955/56 **Steacie, E.W.R.**, 'Reactions of Radicals in Gaseous Systems', *J. Chem. Soc.*, 1956, 3986-3996.
16. 1957/58 **Norrish, R.G.W.**, 'Some Isothermal Reactions of Free Radicals Studied by Kinetic Spectroscopy', *Proc. Chem. Soc. London*, 1958, 246-255.
17. 1959/60 **Ubbelohde, A.R.J.P.**, 'Ionic Crystals and their Melts', *Proc. Chem. Soc. London*, 1960, 332-340.
18. 1961/62 **Bawn, C.E.H.**, 'Stereospecific Polymerisation', *Proc. Chem. Soc. London*, 1962, 165-176.
19. 1963/64 **Anderson, J.S.**, 'Some Basic Problems of Solid-State Chemistry', *Proc. Chem. Soc. London*, 1964, 166-173.
20. 1965/66 **Bowen, E.J.**, 'Light Emission from Organic Molecules', *Chemistry in Britain*, 1966, **2**, 249-256.
21. 1967/68 **Nyholm, Sir Ronald** (lecture not published)
22. 1969/70 **Porter, G.** (lecture not published)
23. 1971/72 **Chatt, J. and Leigh, G.J.**, 'Nitrogen Fixation' (incorporating the Liversidge Lecture delivered in London, 18 Nov., 1971), *Chem. Soc. Reviews*, 1972, **1**, 121-144.

24. 1973/74 **Bell, R.P.**, 'Recent Advances in the Study of Kinetic Hydrogen Isotope Effects', *Chem. Soc. Reviews*, 1974, **3**, 513-544.
25. 1975/76 **Addison, C.C.**, (lecture not published)
26. 1977/78 **Rowlinson, J.S.**, 'The Surface of a Liquid', *Chem. Soc. Reviews*, 1978, **7**, 329-343.
27. 1979/80 **Williams, R.J.P.**, 'On First Looking into Nature's Chemistry. Part I. The Role of Small Molecules and Ions: The Transport of the Elements', *J. Chem. Soc. Reviews*, 1980, **9**, 281-324. 'Part II. The Role of Large Molecules', *Chem. Soc. Reviews*, 1980, **9**, 325-364.
28. 1981/82 **Turner, D.W.** (lecture not published).
29. 1983/84 **Greenwood, N.N.** (lecture not published).
30. 1985/86 **Ottewill, R.H.** (lecture not published).
31. 1987/88 **Shaw, B.L.** (lecture not published).
32. 1989/90 **Parsons, R.** (lecture not published).
33. 1991/92 **Turner, J.J.** (lecture not published).
34. 1993/94 **Dixon, R.N.**, 'The Dynamics of Photodissociation', *Chem. Soc. Reviews*, 1994, **23**, 375-385.
35. 1995/96 **Osborn, J.A.** (lecture not published).
36. 1997/98 **King, D.A.** (lecture not published).
37. 1999/2000 **Edwards, P.P.** (lecture not published).

(b) The Christ's College, Cambridge University Series

In his bequest to Christ's College, Cambridge, Liversidge provided for the appointment of a Lecturer alternatively in chemistry and "on the English language with special reference to possible improvements in grammar and spelling." It appears that none of the chemistry Lectures were published. The Lecturer's Institution is given in brackets.

1. 1930 **Fourneau, E.** (Pasteur Institute), 'Chemo-Therapy'
2. 1931 **Weekley, E.** (Univ. of Nottingham), 'English Present and Future'
3. 1932 **Hill, A.V.** (Univ. of Cambridge), 'Chemical Wave Transmission in Nerve'
4. 1933 **Wyld, H.C.K.** (Univ. of Oxford), 'Milton and Spelling Reform'
5. 1934 **Fowler, R.H.** (Univ. of Cambridge), 'The Heavy Isotope of Hydrogen'
6. 1935 **Ogden, C.K.** (Univ. of Cambridge), 'Basic English and Grammatical Reform'

7. 1937 **Simpson, P.** (Univ. of Oxford), 'The Reform of English Spelling: the Evidence of History and the Poets'
8. 1939 **Ewald, P.P.** (Univ. of Cambridge), 'Molecular Refraction and the Optical Properties of Solids'
9. 1949 **du Vigneaud, V.** (Cornell University), 'The Oxytocic Hormones of the Posterior Pituitary Gland'
10. 1952 **Butenandt, A.** (Tubingen University), 'Gene Function and Tryptohan Metabolism'
11. 1953 **Pitman, I.J.** (Univ. of Oxford), 'Spelling Reform through Improvement in the Process of Learning to Read'
12. 1968 **Calvin, M.** (Univ. of California), 'Regulation in the Photosynthetic Cycle'
13. 1977 **Lyons, J.** (Univ. of Sussex), 'What is Language?'
14. 1979 **Todd, Lord (A.R.)** (Univ. of Cambridge), 'An Organic Chemist Reflects on His Science'
15. 1985 **Miles, T.** (Univ. College of North Wales), 'Dyslexia'
16. 1989 **Malpas, R.** (Univ. of Cambridge), 'Molecules and Men'
17. 1992 **Crystal, David** (The Cambridge Encyclopedia), 'Language Disability: from Mountain to Iceberg'
18. 1997 **Kroto, Sir Harold** (Univ. of Sussex), 'The New Round World of Carbon Chemistry and Material Science'
19. 2000 **Hogg, Richard M.** (Univ. of Manchester), 'The English Language: Past Imperfect and Future Conditional'

References

- (1) N.S.W. Branch of the Australian Chemical Institute, report on meeting, *J. Proc. Aust. Chem. Inst.*, 1941, **8**, 5.
- (2) Best, R.J., *Discoveries by Chemists: A History of the Chemistry Department of the University of Adelaide 1885-1984*, The University of Adelaide Foundation, Adelaide, 1987.
- (3) De Garis, B.K., 'Wilsmore, Norman Thomas Mortimer (1868-1940)', *Australian Dictionary of Biography*, **12**, 517-8.
- (4) Weickhardt, L., *Masson of Melbourne: The Life and Times of David Orme Masson, KBE, MA, DSc, LL.D, FRSE, FRS, Professor of Chemistry, University of Melbourne, 1886-1923*, Royal Australian Chemical Institute, Melbourne, 1989.
- (5) Schedvin, C.B., 'Sir Albert Cherbury David Rivett (1885-1961)', *Australian Dictionary of Biography*, **11**, 398-401.

- (6) Zerner, B., 'Jones, Thomas Gilbert Henry (1895-1970)', *Australian Dictionary of Biography*, **14**, 585-6.
- (7) Cable, K.J. and Bygott, U., 'Fawsitt, Charles Edward (1878-1960)', *Australian Dictionary of Biography*, **8**, 474-5.
- (8) Brown, D.J., 'Earl, John Campbell (1890-1978)', *Australian Dictionary of Biography*, **14**, 70-1.

The Liversidge Lectures and the Lecturers in the Royal Society of New South Wales Series 1931-2000

Comments

The series of Liversidge Research Lectures presented under the auspices of the Royal Society of New South Wales is unique in that the Society has consistently maintained a policy of publication. During the seventy years of this Lecture's existence thirty-one of the thirty-two presentations have been published in the *Journal and Proceedings of the Royal Society of New South Wales*; in the case of the missing Lecture, no manuscript was submitted. In fact, until the middle of the twentieth century, this journal was an important vehicle for the publication of Australian chemistry in a wider sense than the Liversidge Lectures. In this respect *J. Proc. Roy. Soc. N.S.W.* is unique among the periodicals published by the Royal Societies of the Australian States, a phenomenon that has been discussed in some detail in a recent paper by Baker and Rae.¹ Until 1979 the ANZAAS Liversidge Lectures were also published regularly, but in recent years there have been many gaps in the publication record (see above). Similarly, in the Royal Society of Chemistry (U.K.) series all of the first twenty Lectures were published, but between 1966 and 2000 only five of the seventeen presentations have appeared in print.

The first Lecture in the Royal Society of New South Wales series was in 1931, the second in 1933, and the third in 1940; since then the interval has been two years, except that there was no lecture in 1972. The Society's records contain no explanation for the 1972 gap, nor for the 1933-1940 hiatus², but some light is shed on the latter by the following quotation taken from the 1935 ANZAAS Report:³

Liversidge Lectureships.

Bequests similar to that made to this Association were also made to the University of Sydney and the Royal Society of New South Wales by the late Professor Liversidge. In October, 1934, a meeting was held, at which there were present Professors C.E. Fawsitt and J.C. Earl (representing the University of Sydney), Professor O.U. Vonwiller and Mr. A.R. Penfold (representing the Royal Society of New South Wales) and Mr. E.C. Andrews and Dr. A.B. Walkom (representing this Association). At this meeting discussion took place as to whether the lectureships were fulfilling the objects which Professor Liversidge had in mind when he made the bequests. Professor Liversidge desired the lectures to awaken an enthusiasm for and provide a stimulus to research work in chemistry, and the opinion was expressed at the meeting that, as a whole, the lectures have not contributed as greatly as desired towards the attainment of the donor's object. It was decided to suggest to the University of Sydney and the Royal Society of New South Wales the possibility of withholding appointment to the lectureships for several years and thus allowing the income to accumulate so that a chemist of world-wide reputation might perhaps be invited from abroad to deliver a series of lectures in Sydney about 1939 or 1940. Should this be done it might be possible for the Association to appoint as its lecturer at that time the one invited from abroad by the other Institutions, but in the meantime it was suggested that the Association should continue the present system of having a Liversidge Research Lecture at each of its meetings.

The comment that 'as a whole, the lectures have not contributed as greatly as desired towards the attainment of the donor's object.' is intriguing; to whom were they referring, and who was the instigator of this remark? The first two Lecturers in the three Australian series were, respectively, N.T.M. Wilsmore (1930) and A.C.D. Rivett (1932) (ANZAAS series), A.K. Macbeth (1930) and T.G.H. Jones (1934) (University of Sydney series), and H. Hey (1931) and W.J. Young (1933) (Royal Society of New South Wales series). The 1930 ANZAAS Liversidge Lecture by Wilsmore 'Chemical Research and the State' was interesting, but quite general and politically oriented, and had no original research component; in that respect, it did not fulfill the Liversidge requirement. The second ANZAAS Liversidge Lecture, by Rivett, entitled 'Electrolytic Conduction in Aqueous Solutions' contained results of original research, and certainly *did* meet the expectations of Liversidge. The Lectures by Macbeth and Jones were not published so no comment can be made on them, except to say that their titles indicate that they were *research* lectures. Hey's Lecture 'The Production of Zinc by Electrolysis of Zinc Sulphate Solutions', and Young's lecture 'The Function of Phosphates in Fermentation of Sugars' both had a high content of original fundamental research (Young's mentor and collaborator in the sugar fermentation work, Sir Arthur Harden, was a Nobel Prize winner for chemistry in 1929); so if they were the target of the criticism, it was misplaced. Perhaps there was a negative reaction to the fact that Hey was an industrial chemist, and that Young was a biochemist? If the remark originated from the ANZAAS representatives, it is curious that the one Liversidge Lecture which clearly did not meet the conditions of the award was that given by Wilsmore, the first Lecturer in the ANZAAS series; yet the Royal Society of New South Wales and the University of Sydney were being asked by the committee convened by ANZAAS to make no award for several years, to allow the funds to grow, and then perhaps to seek an eminent Lecturer from overseas! For whatever the reason, The Royal Society of New South Wales made no award of the Liversidge Lectureship from 1933 until 1940, when the recipient was G.J. Burrows, a Senior Lecturer at the University of Sydney. Burrows was a very good choice - perhaps he is even more highly regarded now than by his contemporaries - but he was not from 'abroad'. Indeed, with only one exception (L.H. Briggs, New Zealand), the Royal Society of New South Wales has consistently made the award to chemists working in Australia. On the other hand, the Liversidge Lecturers in the University of Sydney series have mainly been eminent chemists from overseas institutions. Perhaps this policy difference was a matter of mutual agreement between the University of Sydney and the Royal Society of New South Wales?

The selection of the Lecturers by the Council of the Royal Society of New South Wales during the last seventy years reflects an essentially even distribution across inorganic, organic, physical, and biological chemistry. These Lectures, taken together with the ANZAAS series of Liversidge Lectures, represent a very good cross section of Australian chemical research that has been carried out during the last seven decades of the twentieth century. The only non-Australian in the Royal Society of New South Wales series, Lindsay Heathcote Briggs, was Professor of Chemistry at the University of Auckland. Apart from a geographic affinity, Briggs' research on natural products from New Zealand plants had an Australian flavour - some Australian plants were included in his phytochemical researches. Of the other 31 Lecturers, one (Hey) was from industry; one (Lemberg) was from a medical research institute; six (Bowden, Marston, Rees, Wadsley, Johns and Swaine) were from CSIRO; seven (Burrows, Le Fèvre, Freeman, Napper, Hunter, Sternhell and Lindoy) were from the University of Sydney; five (Albert, Birch, Martin, Craig and Hyde) were from the Australian National University; three (Cavill, Black and Dance) were from the University of New South Wales; two (Young and Anderson) were from the University of Melbourne; two (Badger and Jordan) were from the University of Adelaide; two (Lauder and Lyons) were from the University of Queensland; one (Brown) was from Monash University; and one (Williams) was from the

University of Technology, Sydney. In terms of fields of research, one gap in the selection of the Liversidge Lecturers in the Royal Society of New South Wales series is that none of the excellent work done on Australian natural products during the later years of the CSIRO-sponsored Australian Phytochemical Survey is represented. In 1952 Dr. J.R. Price (later Sir Robert, and Chairman of CSIRO) delivered a Liversidge Lecture in the ANZAAS series entitled 'Recent Developments in the Study of Australian Plant Products', but in the next 25 years or so a great deal of additional, high quality research was carried out on Australian plant constituents, particularly by chemists in CSIRO, but also by research groups in Australian universities. Much of this work was on alkaloids - hundreds of new alkaloids were isolated and their structures determined using modern NMR and mass spectroscopic methods.

The average age of the Lecturers at the time of their presentations was 50, but Ian Lauder and John Stuart Anderson share the distinction of being only 34 years of age in the year of presentation of their Lecture.

Up to the year 2000, seven of the Lecturers in the Royal Society of New South Wales series have been elected Fellows of the Royal Society, London (F.R.S.), and 19 have been made Fellows of the Australian Academy of Science (F.A.A.) following the foundation of that body in 1954.

Comment on the Reproduction Format

The format used in the *J. Proc. Roy. Soc. N.S.W.* has been changed several times over the years. For re-publication in this volume the text of the 31 Liversidge Research Lectures for the period 1931-2000 has been scanned with Optical Character Recognition (OCR), and changed into a uniform format. Since the reproductions are extended quotations, there have been no editorial changes; earlier spellings of words such as 'sulphur', etc, are retained, and the original structural formulae have been preserved, except in a few cases where clarification was desirable. In the early 20th Century the benzene ring was often represented by a simple hexagon without showing the unsaturation; all such drawings have been retained. The original (and variable) style of presentation of citations has been preserved.

The figures and diagrams were scanned separately at high resolution, and re-inserted in appropriate places in the text.

Biographical Sketches of the Lecturers

Each Lecture is introduced with a biographical sketch and a photograph of the Lecturer.

References

- (1) Baker, A.T. and Rae, I.D., 'More than Bugs and Stones; Chemistry, in the Royal Society of New South Wales', *Historical Records of Australian Science*, 2000, **13** (2), 31-44.
- (2) Krysko, M., Honorary Secretary, Royal Society of New South Wales, personal communication.
- (3) Editorial, *Report of the Twenty-Second Meeting of the Australian and New Zealand Association for the Advancement of Science*, 1935, **22**, xxiii.