Rediscovered

An introduction to the School of Chemistry Collection

Petronella Nel

Introduction

In 2007 the School of Chemistry Collection was returned to the University of Melbourne, after a considerable stay at Museum Victoria. The first step undertaken upon its return was an audit, conducted in November 2007. In July 2008 I was approached by the School of Chemistry to do a significance assessment. What I discovered during this period of research was very illuminating.

History of the collection

The existence of the collection today is due largely to the efforts of the late Dr Joan Treasure Radford, a member of the School of Chemistry from 1956 to 1980. In the 1970s Radford developed an interest in the history of chemistry and the School of Chemistry in particular. This resulted in two major contributions to documenting the School's history: a book published in 1978[1] and the collection. It was the knowledge Radford gained while researching the book that enabled her to recognise the cultural value of much of the unused equipment in the chemistry store. She described the objects and their uses and related them to the chemists who had worked in the department over the previous century. She then catalogued the collection in a card index and in 1980 organised for it to be placed on long-term loan with the Science Museum of Victoria, now part of Museum Victoria.

In 2007, after 27 years of being located at Museum Victoria, the School of Chemistry Collection was returned to the University and has been in the temporary care of the University of Melbourne Archives. It is intended that, with appropriate funding support, the collection will return to its original home, the School of Chemistry, where space is being made available as part of the major renovations that began in 2008. The collection also requires re-housing, conservation, detailed cataloguing and documentation. To begin this work, the Russell and Mab Grimwade Miegunyah Fund has made a generous grant in 2009 to re-house the most fragile items into archival quality materials and boxes, thus ensuring their physical safety.

Description of the collection

The University of Melbourne's Chemistry Collection comprises more than 300 items, dating from the 1850s to the 1960s. These interpret the first century of teaching and research in chemistry at the University. Items include bottles of chemicals, liquids and solutions; solids; balances; glassware; burners;

Opposite: Induction coil, made by Cox Cavendish Electrical Co. Ltd, London, date unknown. Cat. no. 55, School of Chemistry Collection, University of Melbourne. Photography by Petronella Nel.

Below: Professor Kirkland (seated front row, third from left) and his chemistry class in about 1878, in the courtyard of the old medical building. Photography by Anglo-Australasian Photographic Company. UMA/I/1235, University of Melbourne Archives.

apparatus for the measurement of heat, light, electricity, radiation, and the investigation of gases; paper-based materials; photographic film; slides; catalogues and lecture notes. Many of the items are of historical significance due to their association with key figures in the history of chemistry and science at the University of Melbourne, in Australia, and internationally. A small exhibition of the collection opened on 25 February 2009 as part of the School of Chemistry's celebrations on the completion of the ground floor refurbishments.

Key objects featured in the first exhibition

The inaugural display celebrated the first 100 years of chemistry teaching and research at the University of Melbourne. The induction coil, used in chemistry lecture demonstrations, is very similar to an induction coil which featured in an 1878 photograph of John Drummond Kirkland, the first professor of chemistry and his chemistry class. During Kirkland's time, chemistry was taught through the School of Medicine. Kirkland struggled to obtain University funding to buy new apparatus. To compensate, he bought much of the analytical chemistry equipment from his personal funds. Induction coils draw from a 6–12 volt battery and generate a spark of many thousands of volts in the gap between the points of the two metal rods. This model could probably produce a spark over a four-inch gap.

The Cleveite sample and helium in a discharge tube represent the enduring friendship and ongoing scientific collaboration and mentoring that developed between David Orme Masson and William Ramsay, one of England's leading chemists at the time. Masson (1858–1937) was professor of chemistry at Melbourne from 1886 to 1923. As well as being a distinguished teacher and researcher, he contributed significantly to Australian scientific and public life, being instrumental in the establishment and governance of many important bodies including the Council for Scientific Industrial Research (CSIR). His connection to William Ramsay all started in 1880 when Masson was appointed as Ramsay's assistant at the University College of Bristol.[2] In 1895 Masson was visiting England when Ramsay announced the isolation of helium, which he achieved by using Cleveite. Cleveite is a variety of uraninite,

Cleveite sample and helium in a discharge tube (presented by Sir William Ramsay).
Cat. nos 155a & b,
School of Chemistry Collection,
University of Melbourne.
Photography by Petronella Nel.

which contains at least ten per cent rare earth elements. Helium formed via radioactive decay of uranium is trapped within Cleveite, but is released with the addition of acid. In 1904 Ramsay received the Nobel Prize for the discovery of the noble gases. Masson's son Irvine Orme Masson later studied under Ramsay and was his last personal assistant.

The Sartorius balance belonged to Gustav Ampt (1886–1953), considered one of Australia's ablest analysts in his day. Ampt was a demonstrator, lecturer and senior lecturer in the Department of Chemistry from 1919 to 1951. He purchased the balance for £10 with funds that he won in one of his final awards. The balance has been an essential part of the chemist's equipment since the early 19th century, enabling the mass of a sample to be measured by comparison with standard masses. While many balances came equipped with standard masses, a good chemist would have his own calibrated set of analytical masses. Such sets were in use until about 1960, when the Melbourne department switched over to modern balances with in-built standard masses against which the unknown could be compared. A set of analytical masses in the collection, used by Ernst Johannes Hartung, ranges from 0.01g to 50g. Hartung made corrections for each mass and scratched his initials on the lid of the wooden box. Hartung, who was lecturer in chemistry from 1919 to 1924, associate professor from 1924 to 1927 and professor from1927 to 1954,[3] stated that '… the balance is the most important instrument of the chemist and the basis of all quantitative chemical work …'[4]

From 1940 the University of Melbourne became heavily involved in wartime research and specifically with the production of optical glass (for use in gun-sights, telescopes, binoculars and the like), which under wartime conditions could not be obtained from the traditional overseas suppliers. Manufacturing details were not available to Australian industry because European producers guarded their secrets closely, during peace times, for commercial reasons. Professor Thomas Laby of the School of Physics led the project. Hartung's team, which included Gustav Ampt, found that early attempts undertaken

Left: Set of analytical masses made by Bosch, Jungingen, Germany, c.1924. Cat. no. 14a, School of Chemistry Collection, University of Melbourne. Photography by Petronella Nel.

Right: Balance made by F. Sartorius company, Göttingen, Germany, c.1908. Cat. no. 7, School of Chemistry Collection, University of Melbourne. Photography by Petronella Nel.

in Sydney were inadequate due to impurities in the silica sands of the melts and the clay of the firing pots. Hartung and Ampt's chemical analysis and refinement of the raw materials overcame these problems.[5] Numerous experimental batches were produced in the process of perfecting the glass. The collection includes four glass samples. Three are irregularly shaped while the fourth comprises laminated layers of glass. These complement glass samples and instruments used in this project that are now part of the collection of the School of Physics Museum.

Film in the collection

The collection includes six complete reels of cinematic film and some incomplete reels and off-cuts. In November 2008 this film was assessed for preservation and digitisation. An additional complication was that some of the film was based on cellulose nitrate, which can spontaneously combust. An examination of the film reels undertaken at the National Film and Sound Archive concluded that six reels of film should be retained and that the incomplete reels and off-cuts could be disposed of. The complete reels of film comprised two titles: *Brownian motion*, also called *Colloids*, made in 1934 by Hartung and Leonard William Weickhardt (who became research director at ICI-ANZ and later Chancellor of the University of Melbourne from 1972 to 1978); and *Semi-micro analysis* made in 1955 by Robert Craig, Thomas O'Donnell and Ronald

Stills from the film *Colloids*, made by Ernst J. Hartung and Leonard W. Weickhardt, Chemistry Department, University of Melbourne, 1934. School of Chemistry Collection, University of Melbourne.
Film digitisation by Digital Pictures Melbourne Pty Ltd.

Below: Professor Hartung and Gustav Ampt examining one of the melts of glass in their work on optical glass during World War II.
Reg. no. 158, School of Physics Museum, University of Melbourne.

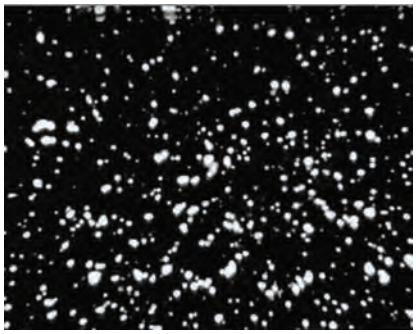
Brown during Brown's time at Melbourne (Brown later became foundation Professor of Chemistry at Monash University).[6] The reels in the best condition were used for digital conversion. Thanks to the digitisation process, the content of these films can now be viewed and insight gained into the use of novel technologies by innovative lecturers like Hartung to capture the imagination of the conference audience or the student. The *Colloids* film was displayed on large plasma screens on the evening of the ground floor renovation celebrations.

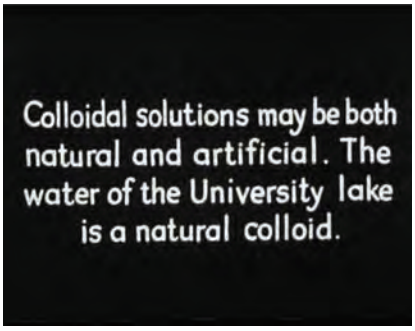
Comparison with other university chemistry collections

So what is the significance of this chemistry collection? A survey of comparable collections undertaken as part of the significance assessment showed that chemistry exhibits are often found in physical science museums such as the Museum of Science in Boston and the Science Museum in London. Around the world museums dedicated to chemistry can be found at the universities of Edinburgh, Dundee, St Andrews, Rome, Kazan State University in Russia, and at the Hungarian Chemistry Museum. But this is not a large number; museums devoted to chemistry are relatively rare.

In Australia, numerous universities have a science and/or physics museum or collection. But of these, only two have a connection to the history of chemistry, and they are associated with universities that are younger than Melbourne: the Museum of the History of Science (established 1986) at the University of New South Wales (established 1949); and the Scientific Instrument Collection (established 1993) at Monash University (established 1958). Inquiries by Professor Ian Rae, Past-President of the Royal Australian Chemical Institute, to various chemistry departments at the major universities in Australia revealed a tragic disintegration of chemistry collections and museums in Australian universities. There were tales of items being thrown out due to relocation into smaller buildings; items given away to local fossickers or loaned to school teachers and alumni; only remnants of formerly substantial collections being visible in display cases; and one science museum and

Left: Experimental sample from the development of optical glass, 1942. Cat. no. 11, School of Chemistry Collection, University of Melbourne. Photography by Petronella Nel.





one chemistry department having been closed down completely.

Reflection

After auditing the collection, then researching the objects and identifying the people associated with them, together with the revelation of what has occurred to chemistry collections elsewhere in Australia, I believe that Dr Joan Radford had immense foresight when she decided to gather together and preserve the collection, and transfer it for safekeeping to what is now Museum Victoria.

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Dr Petronella Nel is an objects conservator and lecturer at the Centre for Cultural Materials Conservation (CCMC) at the University of Melbourne. She holds a Bachelor of Science (Honours), a PhD in chemistry and a Master of Arts in cultural materials conservation, all from the University of Melbourne. Petronella is currently working on two collaborative research projects: one analysing adhesives used on archaeological pottery and the other studying the composition of ochre-earth pigments.

Notes

1 Joan T. Radford, *The Chemistry Department of the University of Melbourne: Its contribution to Australian science 1854–1959*, Melbourne: Hawthorn Press, 1978.
2 Leonard W. Weickhardt, 'Masson, Sir David Orme (1858–1937)', *Australian dictionary of biography*, vol. 10, Melbourne: Melbourne University Press, 1986, pp. 432–435.
3 Leonard W. Weickhardt, 'Hartung, Ernst Johannes (1893–1979)', *Australian dictionary of biography*, vol. 14, Melbourne: Melbourne University Press, 1996, pp. 405–406.
4 Radford, *Chemistry Department of the University of Melbourne*, p. 145.
5 Radford, *Chemistry Department of the University of Melbourne*, pp. 182–187.
6 'Obituary: Ronald Drayton Brown (1927–2008)', website of Monash University: News and Events, Monash Memo, 12 November 2008, www.monash.edu.au/news/monashmemo/stories/20081112/ronald.html, accessed March 2009.