

Mineral Collections in Australian Museums

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Abstract While there is no national mineral collection in Australia, each State Museum houses a collection. Establishment of major Natural Science museums in the early colonial cities (now State capital cities) mirrors the development and settlement of Australia by Europeans. The impetus for the establishment of mineral collections in these museums was to educate the public, so that they might be inspired to find important mineral resources that would be of use in the developing colonies. The first description of new minerals from Australia, discovered in the period from 1870–1900, reflect the opening up of new mining districts. Today, there are approximately 257,000 geological specimens housed in the major State museums in Australia. The Australian Museum, in Sydney, New South Wales, and Museum Victoria in Melbourne, Victoria, manage the largest collections. Museum Victoria and the Western Australian Museum house the largest collections of type specimens. Periods of collection growth have coincided with a strong curatorial presence, in both a research and collection development capacity. The nucleus of the State collections consists of fine private mineral collections, which have been preserved by both chance and inspired planning. Many small institutions, such as mining academies, have had their collections subsumed by the larger State repositories. While the collections of the larger museums encompass specimens from around Australia and the world, their focus is on the geodiversity of their immediate region. The smaller museum collections are, by and large, representative of the mineralogy of their State. Several State collections also manage significant rock and ore collections although in some States these are managed by the State Geological Survey or Mines Department. Today, all of the State mineral repositories, with the exception of Queensland, have dedicated curatorial research and collection staff who manage and research the collections. Mineralogical research in museums in Australia is largely conducted through grants and partnerships with universities and government departments. The establishment of Australia's first synchrotron facility in Melbourne, due to open in 2007, will provide further opportunities for research collaborations. In recent years, the Australian Museum, the Western Australian Museum and the South Australian Museum have developed new mineral/geology galleries. With several others planned these exhibitions show that minerals are still popular with, and relevant to, the Australian community. There is pressure on all Australian museums to make their collections more accessible and in particular accessible using on-line facilities. A challenge for the future will be to develop on-line interpreted geological information based on these collections.

Key words: Australian museums, mineral collections, museum research, mineral exhibitions.

Introduction

European settlement of Australia commenced in 1788 with the arrival of the “First Fleet” from Britain. Australia was settled as a series of colonies. These colonies federated in 1901 to form the Commonwealth of Australia with the former colonies forming the States and Territories

of modern Australia. The development of the major cities within these former colonies has influenced the development of mineral collections in Australian museums. Australia does not have a central national mineral repository. Mineral collections have been established in State-run museums in the capital cities of each of the States.

Historical Influences

The Australian Museum was established in New South Wales in 1829 less than 50 years after the arrival of Europeans to Australia. Why was there a need to develop mineral collections? Sir William Robinson in 1889 provides an answer in his address at the opening of the Geological Museum in Perth. *“And now we have here an illustration of one great value of such a collection of mineral specimens, and which collection we hope presently to increase: it is that when strangers come to Perth or other parts of the Colony and want to know reliably what part they should go in search of gold or other minerals, they may learn from these specimens where to go, and what are their prospects of success. If only in this respect, this collection will be of great practical value to the colony”* (Bevan and Downes, 2000).

The developing colonies were desperate for resources. The establishment of museums with displays of economic resources was to educate the public in the hope that they would be inspired to search and find useful resources, which would help build the colony and attract immigrants. Through the 1800s a series of discoveries of large mineral deposits had a major influence on the development of the various colonies and their capital cities. These discoveries are reflected in the strengths of the mineral collections that were established at this time.

In the 1840s the discovery of major copper deposits at Burra Burra, Moonta and Wallaroo in South Australia probably saved the colony from bankruptcy. In the 1850s the discovery of extremely wealthy gold fields in New South Wales and Victoria attracted hundreds of thousands of immigrants to Australia. This influx of people created a rush for gold which resulted in major discoveries across Australia and helped open up the remote areas of Queensland and Western Australia. The discovery of the large lead-zinc-silver deposits at Broken Hill in the early 1880s had a lasting effect on the Australian mining industry and the development of mineral collections. The deposits at Broken Hill have been mined continuously for over 120 years and have been a rich treasure house of mineral species. The discovery of the large Mt Lyell copper deposits, in the rugged west coast region of Tasmania, in the early 1890s lead to the discovery of other significant deposits in the region, including the large tin deposits at Mt Bischof and the crocoite-bearing deposits at Zeehan. The discovery of the rich gold deposits at Kalgoorlie in Western Australia in the 1890s has had a major impact on the development of Western Australia and the opening up of many rich gold and nickel deposits in the interior of the State.

This flurry of mining activity provided many specimens for the developing mineral collections in Australia. As well as the founding of museums in the capital cities, other mineral collections were established by Mines Departments/Geological Surveys operating in the various colonies. These were established as follows:

- 1852 Victoria
- 1859 Tasmania
- 1875 New South Wales
- 1868 Queensland
- 1882 South Australia
- 1896 Western Australia

Mining Schools were also established on the developing mining fields to educate students in all aspects of mining, metallurgy, and geology. For example, School of Mines was established at the Ballarat and Bendigo gold fields in 1870, the Zeehan School of Mines in Tasmania was founded in 1892 and the Kalgoorlie School of Mines, in Western Australia, opened in 1902. These Schools also established mineral collections. Many of these non-museum collections were housed in poor conditions and have deteriorated overtime. Many of these collections have been transferred to the care of the appropriate State-run museum.

The development of the mining industry in Australia attracted immigrant mineralogists many of whom worked with or for their local museum. The first new minerals species described from Australia reflect the interest in the mineralogy of the newly discovered mineral deposits (Sutherland *et al.*, 2000). The first new mineral from Australia, maldonite, was discovered on the Maldon gold field in Victoria and described in 1870. In 1878–79, hannayite and newberyite were described from bat guano deposits at Skipton near Ballarat in Victoria, which were being mined for fertilizer. The mineral diversity of Broken Hill deposits attracted mineralogists with four new minerals described during the 1890s (marshite, miersite, willyamite and raspite). Also during the 1890s the mineral-rich west coast of Tasmania produced two new species, dundasite and heazlewoodite. This academic interest in mineralogy assisted the development of museum collections in the various colonies.

The Museums

While the Queensland Museum in Brisbane and the Northern Territory Museum in Darwin have small mineral collections they are not considered significant and will not be discussed in this paper (see Fig. 1).

The Australian Museum, Sydney

The Australian Museum was established in 1829 in Sydney, New South Wales. It is a museum of natural history and anthropology. The collection of the Mineral Resources Department (formally Mines Department) is the only other significant mineral collection in New South Wales although it does not have a fulltime curator managing it). The Australian Museum's collection consists of 54,000 minerals, representing 1,300 mineral species (approximately 33% of known species), and 12% of the mineral collection is databased. The Museum also manages a collection



Fig. 1. Map of Australia showing the dates that the State museums were established.

of approximately 18,000 rocks, meteorites and tektites. The highlights of the mineral collection include: a significant suite of minerals from the early mining at Broken Hill; the Albert Chapman collection, a collection of approximately 820 specimens including many fine Australian specimens; and significant gemstone collection.

Presently there are 3 staff associated with the mineral and rock collections at the Australian Museum. They are: 1 senior research officer, Dr. Ian Graham; 1 collection manager, Ross Pogson; and 1 assistant collection Manager, Gael Webb. The Mineral Department has its own X-ray diffraction facilities and access to a scanning electron microscope. It has research collaborations with other museums in Australia, local and overseas universities and CSIRO. The main research themes include: the origin of gemstones in basaltic volcanic terrains; volcanism in eastern Australia; Ni-PGE magmatic sulphide deposits; and mineral systematics. The Australian Museum has a large mineralogy and geology display and a special exhibition featuring the Chapman collection. In addition, it is party to a new geology museum in the city of Bathurst to the west of Sydney where the recently acquired former collection of Warren Somerville is displayed.

South Australian Museum, Adelaide

The South Australian Museum was established in Adelaide in 1856. It is a museum of natural history and anthropology. The main components of the collection include the Geological Survey Collection of South Australia and the transfer of the University of Adelaide collection is presently planned. There are no other major mineral collections in South Australia. The South Australian Museum's collection consists of 30,000 minerals, representing approximately 33% of known mineral species, and 4,000 rocks and ores. The collection is approximately 80% databased. Highlights of the collection include: excellent suites of copper minerals from South Australian mines including fine-quality specimens from Burra Burra, Moonta and Wallaroo; excellent specimens from early mining at Broken Hill; and good opals from South Australian deposits.

Presently there are 3 staff in the mineralogy section: 2 senior researchers, Dr. Allan Pring and Dr. Joel Brugger; and 1 collection manager, Ben McHenry. The South Australian Museum has a very active research program and currently five post doctoral positions and three PhD students work in the department. The department has its own X-ray diffraction facilities. The researchers have a formal relationship with the University of Adelaide (e.g. they present lectures and design courses etc). They also have research collaborations with local and overseas museums and universities. Their key research topics include: sulphide mineralogy; kinetics of mineral reactions; uranium mineralogy; and the transport of metals in geological fluids and vapours. In 1999, the Mineral Gallery of the South Australian Museum was redeveloped. The displays feature an introduction to minerals, systematic displays of minerals and minerals of South Australia.

Tasmanian Museum and Art Gallery, Hobart

The Tasmanian Museum and Art Gallery, Hobart was established in 1843 as the Museum of the Royal Society of Tasmania. It is a museum of natural history and anthropology and also the State Art Gallery for Tasmania. In addition the Museum manages the West Coast Pioneer Museum at Zeehan which has a very significant collection of minerals from the West Coast mines. The mineral collection consists of 12,000 minerals, 23% of known species. The collection is 100% databased. Also in Tasmania the Queen Victoria Museum in Launceston, which was also established in the 1840s, houses the small but significant collection of approximately 4,700 minerals. Highlights of these collections include world's best crocoite specimens and excellent suites of minerals from a diverse range of mines on the west coast of Tasmania.

The collections are presently managed by: 1 senior curator, Noel Kemp, at the Tasmanian Museum and Art gallery; and 1 collection manager, Alisanne Ramsden, at the Queen Victoria Museum in Hobart. Neither of these staff are conducting research in mineralogy. There are small exhibitions of minerals on display in Hobart and Launceston. However, the West Coast Pioneer Museum in Zeehan has a large display with many superb specimens of crocoite from the local mines.

Museum Victoria, Melbourne

Museum Victoria was established in 1854 (as the National Museum of Victoria). It is a museum of natural history, anthropology, social history and the history of science and technology. It is established on three campuses across Melbourne. Its flagship, the new Melbourne Museum complex opened in 2000. Museum Victoria is the only mineral repository in the Victoria. The mineral collection has a complex history and is the amalgamation of four major institutional collections. These are: Museum Victoria's collection; Geological Survey of Victoria collection; University of Melbourne collection; and the CSIRO North Ryde Collection. The mineral collection consists of 50,000 minerals, which represent approximately 58% of known mineral species, and is 100% databased. In addition, the department manages 50,000 rocks and ores, 370 meteorites and approximately 5,000 tektites. Highlights of the mineral collection include: a significant collection of Victoria and Australian gold; excellent suites of Broken Hill minerals including material from early mining operations and recent open cut mining activity; a diverse reference collection; and a large type specimen collection. The department loans material to a wide variety of researchers with approximately 48% of loans to researchers within Victoria, 22% to researchers in other Australian States and 30% to researchers in overseas institutions.

The collections are currently managed by: 1 senior researcher, Dr. Bill Birch; and 1 senior collection manager, Dermot Henry. The department has X-ray diffraction facilities and research links with the University of Melbourne and CSIRO Minerals and research collaborations with local and overseas museums and universities. Currently one PhD student is undertaking his research in the department. The key research areas are: the mineralogy of Victoria including work on phosphate, zeolite and gem minerals; the mineralogy of oxidised deposits (especially at Broken Hill); and new mineral descriptions (Bill Birch has described 25 new minerals). Currently, Museum Victoria has only a small display on minerals and rocks. A new integrated geological display planned for 2008.

Western Australian Museum, Perth

The Western Australian museum was established in 1881 primarily as a Geological Museum. In 1892, it diversified to become a museum of natural history. Currently it is a museum of natural history and anthropology. There are two other major mineral collections in Western Australia these are the Geological Survey of Western Australia and the University of Western Australia. The mineral collection at the Western Australian Museum contains 30,000 minerals, representing approximately 33% of known species. They are 90% databased. The Museum also manages a small rock and ore collection and a very large and significant meteorite collection of over 14,000 specimens. Highlights of the mineral collection include: the Edward Simpson collection of approximately 7,000 specimens from Western Australia many featured in Simpson's classic 3 volume work Minerals of Western Australia; suites of minerals from mines in Western Australia; and a large type mineral collection.

The collections are managed by: 1 curator of minerals and meteorites, Dr. Alex Bevan; 1 as-

sistant curator, Dr. Peter Downes; and 1 manager of the Simpson Collection, Dr. G. Deacon. The key research areas of these staff include: meteorites and meteorite impact studies; alkaline rocks of Western Australia including kimberlites; and oxidised zone mineralogy of Western Australia mineral deposits. In 2000, the Western Australian Museum opened their new permanent geology and mineral display *Diamonds to Dinosaurs*. The exhibition is an integrated display on palaeontology, geology and mineralogy illustrated with many fine examples from Western Australia as well as other Australian and overseas localities.

Type Specimens in Australian Museums

In 2000, an illustrated type catalogue was produced as part of the IMA Catalogue of Type Mineral Specimens (Sutherland *et al.*, 2000). Museum Victoria (40) and Western Australian (39) are the largest repositories with South Australia (13) and Australian Museum (4). This distribution of types reflects researchers in these States describing new species.

Acquisitions

Only the Australian Museum in Sydney and Museum Victoria in Melbourne have budget allocation for acquisitions to purchase minerals. Fortunately the Federal Government of Australia has instigated the Tax Incentive Scheme. This scheme enables companies and individuals to donate specimens to Australian cultural institutions, such as Art Galleries and Museums, and receive the value of the donation as a tax credit. This credit can be used over a 5 year period to reduce taxes payable.

Most of the Mineralogy staff in museum in Australia are actively acquiring specimens by fieldwork. In addition, close links with collector groups such as the State-based Mineralogical Societies ensures a constant flow of specimens for identification and donation to the collections. Many of these collectors ultimately offer their collection to their local State museum.

Future Developments

Several of the major museums in Australia have or are planning to implement the integrated museum database system KeEMu. Museum Victoria has been a pioneer in implementing this database which is now being adopted by several of the major international museums including the Smithsonian, the American Museum of Natural History and the Natural history Museum, London. This may well provide the opportunity for globally linking databases. This style of database linking is currently underway with zoological collections via the GBIF project.

In addition there is scope to develop better online geological information by drawing on information within collection databases to present comprehensive illustrated geological stories. Needless to say, these developments are limited by the resources allocated to them.

The Australian Synchrotron Project currently underdevelopment in Melbourne Victoria will provide research opportunities for Australian mineralogist and encourage links with museum researchers. In addition local museums should encourage the use of their mineral collections as a research resource.

Succession planning will be important for all of the mineralogy sections in Australian museums. Approximately 40% of staff will retire within the next 5 to 10 years. It is important that the current staff promote the science of mineralogy to ensure that its relevance is prominent when

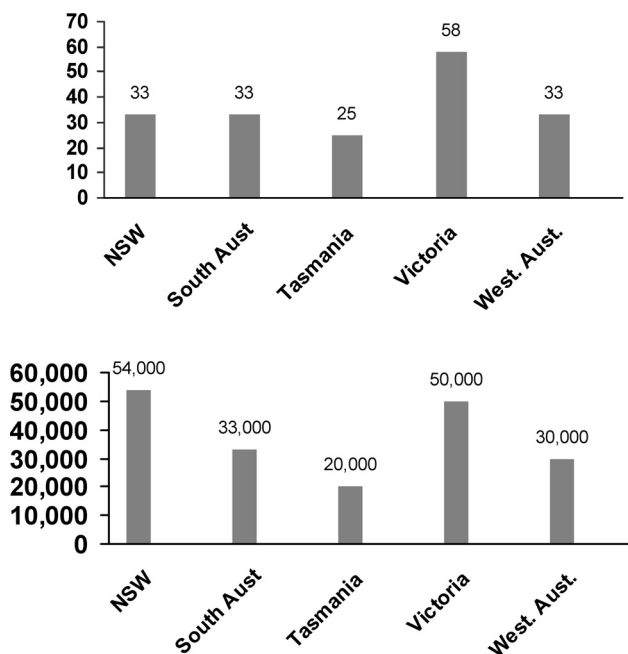


Fig. 2. Mineral specimens in State Museums in Australia (below) and the percentage of known mineral species in the collections (above).

staff retire to ensure they are replaced by appropriately trained staff.

Conclusions

Presently there are over 187,000 mineral specimens in the major State museums in Australia (Fig. 2). These State Museums are the only curated repositories of minerals in Australia. These collections are managed by 13 staff of which only 9 would classify themselves as mineralogists.

Captain Andrew Clark of the Philosophical Institute of Victoria said in 1855 in regard to the then recently established National Museum of Victoria (now Museum Victoria): *“The Museum is not to be a mere collection of curiosities, serving rather to bewilder than instruct. It is not to contain specimens that are interesting only because they are beautiful. I hope to see in that Museum a complete collection of all the ores that are useful....I desire to see the museum filled with objects that are peculiarly valuable in a new country to the exclusion of merely ornamental specimens”*

The diversity of research conducted on mineral collections in Australia by museum staff and other researchers implies that the collections are of value rather than mere curios. Australian museums are embracing new technologies (particularly online) to make their collections more accessible. That many of the museums have recently developed or are planning new exhibitions suggest mineralogy and geology are still relevant and of interest to the Australian general public.

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